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Products with this mark conform to the EMC standards (regulations on electromagnetic interference) of European Community.
The DL series digital oscilloscopes have high-speed sampling and a wide range of bandwidths that can be utilized for design and development of electronic devices. They can also execute computations on repetitive waveforms and automatically extract waveform parameters. The DL Series offers an extensive selection of digital oscilloscopes with large-capacity memories, powerful triggering functions, unique History Memory function and internal printers. It also can save and load data to and from internal or external media.

**Digital Oscilloscope Selection Guide**

**Features**
- Analog 4ch+Logic 32/16bits input
- Max. 5GB/s Serial Bus analysis functions
- Power supply analysis functions
- "Virtual DA" functions
- Probe power connectors
- Supports USB Storage
- USB mouse/keyboard
- Power supply analysis functions
- Fast screen update & all points display
- Compact & lightweight, 4 ch
- Max. 10 GS/s
- CAN bus analysis
- I2C bus analysis
- SPI bus analysis
- FlexRay bus analysis
- DC/Battery powered
- Start/Non-Ack/Address & Data
- User define math functions
- CAN & LIN bus analysis
- Power supply analysis functions
- User define math functions
- CAN bus analysis
- SPI bus analysis
- User-defined math
- Power Analysis
- Four additional probe power connectors
- 10 GS/s
- Sampling Rate
- 10 GS/s
- Logic Input
- Max. 5 GS/s
- Bandwidth
- 500 MHz
- Number of analog input channels
- 4
- Max. vertical sensitivity
- 500 ps/div
- Logic Input
- Max. sweep sensitivity
- 500 ps/div
- Max. record length
- Selectable
- Internal printer
- Ethernet
- USB/GP-IB
- Internal Dimensions
- Optional
- External Dimensions
- Optional
- Weight (kg)
- Approx. 7.7
- Approx. 6.5
- Approx. 3.9
- Approx. 5.5
- Approx. 4.4

**Bus Types**
- PC
- CAN
- LIN
- SPI
- FlexRay

**Display (TFT LCD)**
- 8.4-inch color, XGA
- 8.4-inch color, VGA
- 6.4-inch color, VGA

**DL Series Serial Bus Analyzer Selection Guide**

## TL Series Serial Bus Analyzer Selection Guide

<table>
<thead>
<tr>
<th>Bus Types</th>
<th>DL9700L/9500L Series</th>
<th>DL9040/9140/9240 Series</th>
<th>DL7400 Series</th>
<th>DL1700E Series</th>
<th>DL1600 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triggers</td>
<td>&quot;(&quot;</td>
<td>&quot;(&quot;</td>
<td></td>
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<tr>
<td>Analysis &amp; Search</td>
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<tr>
<td>CAN</td>
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<tr>
<td>Analysis &amp; Search</td>
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<td>LIN</td>
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<td>Analysis &amp; Search</td>
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<td>SPI</td>
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<td>Analysis &amp; Search</td>
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<td>FlexRay</td>
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<tr>
<td>Analysis &amp; Search</td>
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</tr>
</tbody>
</table>

**Notes:**
- See each product catalog for more detailed specifications.
- The DL1400 series comes standard with four probe power connectors.
- The DL1400 series comes standard with four probe power connectors.
The ScopeCorder series can be used to capture single-shot or infrequently recurring signals. They can also execute computations on repetitive waveforms, and automatically extract waveform parameters. The ScopeCorder series offers an extensive selection with large-capacity memories, powerful triggering functions, and internal printers. It also can save and load data to and from internal or external media.

DL750P and SL1400 can provide big paper output capability for many applications in the field.

### ScopeCorder Series Selection Guide

**Features**

<table>
<thead>
<tr>
<th>Model</th>
<th>DL750</th>
<th>DL750P</th>
<th>SL1400</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Compact, 16 ch isolated inputs (8 module slots)</td>
<td>Compact, 16 ch isolated inputs (8 module slots)</td>
<td>Compact, 16 ch isolated inputs (8 module slots)</td>
</tr>
<tr>
<td></td>
<td>GigazoomEngine and Max 1 GW</td>
<td>GigazoomEngine and Max 1 GW</td>
<td>Eleven kinds of plug-in input modules</td>
</tr>
<tr>
<td></td>
<td>Dual Capture</td>
<td>Dual Capture</td>
<td>Web server functions</td>
</tr>
<tr>
<td></td>
<td>Eleven kinds of plug-in input modules</td>
<td>Eleven kinds of plug-in input modules</td>
<td>Web server functions</td>
</tr>
<tr>
<td></td>
<td>Web server functions</td>
<td>Web server functions</td>
<td>A4 (210 mm) Big Printer</td>
</tr>
<tr>
<td></td>
<td>A6 (112 mm) printer</td>
<td>A6 (112 mm) printer</td>
<td>Print probe power connectors</td>
</tr>
<tr>
<td></td>
<td>Probe power connectors</td>
<td>Probe power connectors</td>
<td>Probe power connectors</td>
</tr>
</tbody>
</table>

---

### Features

- **Max. sampling rate:** 10 MS/s (1)
- **Bandwidth:** 3 MHz (2)
- **Number of analog input channels:** Plug-in module: 16 ch (isolation)
- **Logic input:** Std: 16 (8 bits) * 3
- **Max. vertical sensitivity (V/div):** 100 µV/div (1), 100 µV/div (2)
- **Vertical axis resolution:** 1 mV range
- **Max. sweep sensitivity:** 500 ns/div (1), 500 ns/div (2)
- **Max. record length:** 50 MS max/2.5 MW (16 ch) (1), 50 MS max/2.5 MW (16 ch) (2)
- **Optional:** 1 GW max/50 MW (16 ch), 1 GW max/50 MW (16 ch)
- **Internal media drive:** 40 GB (2)
- **Internal printer:** 10.4-inch color, SVGA
- **External dimensions:** W × H × D (mm): 355 × 250 × 180
- **Weight (kg):** Approx. 6.6 * 3

### Analog Voltage

<table>
<thead>
<tr>
<th>Input</th>
<th>Model No.</th>
<th>Sample Rate (Resolution)</th>
<th>Channel Isolation</th>
<th>Maximum Input Voltage</th>
<th>DC Accuracy</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>701250</td>
<td>10 MS/s, 12-bit</td>
<td>2, isolated</td>
<td>600 V typ/250 V typ</td>
<td>± 0.5%</td>
<td>10 MS/s, 12 bit, broad bandwidth (3 MHz), high accuracy (0.5%), high noise immunity</td>
</tr>
<tr>
<td></td>
<td>701251</td>
<td>1 MS/s, 16-bit</td>
<td>2, isolated</td>
<td>600 V typ/140 V typ</td>
<td>± 0.5%</td>
<td>1 MS/s, 16 bit, bandwidth: 300 kHz, high accuracy (0.25%), high sensitivity range (10 mV), low noise (&lt;100 nV/typ), and high noise immunity</td>
</tr>
<tr>
<td></td>
<td>701260</td>
<td>100 kS/s, 16-bit</td>
<td>2, isolated</td>
<td>1000 V typ/850 V typ</td>
<td>± 0.25%</td>
<td>High voltage (direct 850 V input), high accuracy (0.25%), with RMS, and high noise immunity</td>
</tr>
</tbody>
</table>

### Temperature

<table>
<thead>
<tr>
<th>Input</th>
<th>Model No.</th>
<th>Sample Rate (Resolution)</th>
<th>Channel Isolation</th>
<th>Maximum Input Voltage</th>
<th>DC Accuracy</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>701261/62</td>
<td>100 kS/s (voltage), 500 kS/s (Resistance)</td>
<td>2, isolated</td>
<td>42 V</td>
<td>± 0.25%</td>
<td>Universal modules (voltage/temperature), voltage 100 kS/s, 16-bit, temperature 500 kS/s, voltage 0–1 V, 200 V range, thermocouple, universal modules, module, high temperature (0.08%), high sensitivity range (1 mV), and low noise (&lt;100 nV/typ)</td>
</tr>
<tr>
<td></td>
<td>701255</td>
<td>10 MS/s, 12-bit</td>
<td>Non-isolated</td>
<td>600 V typ/250 V typ</td>
<td>± 0.5%</td>
<td>10 MS/s, 12-bit Non-Isolation (non-iso version of model 701250)</td>
</tr>
</tbody>
</table>

### Acceleration

<table>
<thead>
<tr>
<th>Input</th>
<th>Model No.</th>
<th>Sample Rate (Resolution)</th>
<th>Channel Isolation</th>
<th>Maximum Input Voltage</th>
<th>DC Accuracy</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>701270</td>
<td>10 kS/s, 16-bit</td>
<td>2, isolated</td>
<td>42 V</td>
<td>± 0.5%</td>
<td>Both acceleration and voltage input, built-in anti-aliasing filter, supports built-in type acceleration sensors (4 mA/22 V)</td>
</tr>
</tbody>
</table>

---

*1: See each product catalog for more detailed specifications
*2: Depends on input module
*3: Plug-in modules are not included

---

4. When using the 10.1 Isolation probe (700929).
5. When using the 1:1 safety adapter lead (701901).
6. When using the 10.1 passive probe (701940).
**Waveform Measuring Instruments**

**Mixed Signal Oscilloscopes**

**DL9000 Series MSO Models**

http://www.yokogawa.com/tm/DL9710L/

---

**Features**

- Simultaneous measurement and analysis of 4 analog channels + 16/32-bit logic
- High-speed acquisition and quick response
- Fast and powerful analysis of logic channels
- Capture and separate anomalies easily with History Memory
- Extensive trigger functions for handling the most complex waveforms
- Versatile zoom and search functions
- “Virtual D/A” Function
- Serial Bus Analysis (I2C, SPI, CAN, LIN) (optional)
- Power Supply Analysis (optional)

---

**Model Number and Suffix Codes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701320</td>
<td>DL9505L</td>
<td>4ch 500MHz + Logic 16bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701321</td>
<td>DL9510L</td>
<td>4ch 1GHz + Logic 16bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701330</td>
<td>DL9705L</td>
<td>4ch 500MHz + Logic 32bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701331</td>
<td>DL9710L</td>
<td>4ch 1GHz + Logic 32bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
</tbody>
</table>

- D: UL/CSA standard
- F: VDE standard
- Q: BS standard
- R: AS standard
- H: GB standard

**Help menu/language**

- HE: English Help

**Logic Probe**

- L0: No Logic Probe attached
- L2: Attach two 250 MHz Logic Probes (701981)
- L4: Attach four 250 MHz Logic Probes (701981)

**Options**

- I/B: Built-in printer
- I/P4+: 4 Probe power connections on rear panel
- I/C8+: Built-in HDD + Ethernet interface
- I/C10+: Ethernet interface
- I/G2+: User-defined math function
- I/G4+: Power Supply Analysis Function
- I/P5*: PC+SPI bus analyzer
- I/F+: CAN+LIN+SPI bus analyzer
- I/F8*: PC+C AN+LIN+SPI bus analyzer

---

**Basic Specifications**

- **Analog inputs**
  - Analog Bandwidth: DC-1GHz (DL9710L, DL9510L)
  - DC-500MHz(DL9705L, DL9505L)
  - Analog input: 4ch
  - Vertical sensitivity: for 1MΩ input 2mV/div to 5V/div
  - for 50Ω input 2mV/div to 500mV/div (±1.5% of 5div + offset voltage accuracy)
  - DC accuracy: ±(1.5% of 8div + offset voltage accuracy)
  - Vertical axis resolution: 8-bit

- **Logic inputs**
  - Number of input: 32bits (8bits × 4) (DL9710L, DL9705L)
  - 16bits (8bits × 2) (DL9510L, DL9505L)
  - Maximum toggle frequency: 250 MHz (701981)
  - Input voltage range: ±10 V (DC + AC peak, 701981)
  - Logic Threshold level: ±10 V (0.1 V setting resolution, 701981)
  - Input impedance: approx. 10kΩ/approx. 9 pF (701981)

- **Common Specifications**
  - Max. sampling rate: 5GS/s
  - Sweep sensitivity: 500ps/div to 50s/div
  - Max. record length: 6.25MW
  - History memory: Max. 2000 (2.5 kW), when using history
  - Max. Logic toggle frequency: 1600 (2.5 kW), when in N single mode
  - Trigger modes: Auto, Auto Level, Normal, Single, and N Single
  - Trigger types: Edge/State, Width, Event Interval, Serial Bus (I2C, SPI, CAN, LIN), Serial Pattern
  - Internal media drive: Flash ROM, 90MByte
  - Interface: USB Peripheral support, PC Card Interfaces, USB-PC Connection, Ethernet (optional)
  - Internal printer (optional): Thermal line-dot, width 112mm
  - Other options: Serial Bus analysis (I2C, SPI, CAN, LIN), User-defined Math, Power supply analysis, Internal HDD, Probe Power supply
  - Display (TFT LCD): 8.4-inch color TFT LCD
  - External dimensions: 350(W) × 200(H) × 285(D)mm
  - Weight: Approx. 7.7kg (excluding printer)

---

**Features**

- Simultaneous measurement and analysis of 4 analog channels + 16/32-bit logic
- High-speed acquisition and quick response
- Fast and powerful analysis of logic channels
- Capture and separate anomalies easily with History Memory
- Extensive trigger functions for handling the most complex waveforms
- Versatile zoom and search functions
- “Virtual D/A” Function
- Serial Bus Analysis (I2C, SPI, CAN, LIN) (optional)
- Power Supply Analysis (optional)

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<td>701330</td>
<td>DL9705L</td>
<td>4ch 500MHz + Logic 32bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701331</td>
<td>DL9710L</td>
<td>4ch 1GHz + Logic 32bits Max. 5 GS/s(2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
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</table>

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- HE: English Help

**Logic Probe**

- L0: No Logic Probe attached
- L2: Attach two 250 MHz Logic Probes (701981)
- L4: Attach four 250 MHz Logic Probes (701981)

**Options**

- I/B: Built-in printer
- I/P4+: 4 Probe power connections on rear panel
- I/C8+: Built-in HDD + Ethernet interface
- I/C10+: Ethernet interface
- I/G2+: User-defined math function
- I/G4+: Power Supply Analysis Function
- I/P5*: PC+SPI bus analyzer
- I/F+: CAN+LIN+SPI bus analyzer
- I/F8*: PC+C AN+LIN+SPI bus analyzer

---

**1:** Not available for DL9500 series
**2:** Please order I/P4 option if you use either current probes or differential probes such as 701920, 701922.
**3:** Choose either one
**4:** Choose either one
**5:** Choose either one, I2C, CAN, LIN and SPI triggers are standard.
Waveform Measuring Instruments

Overview

The DL9000 signalXplorer is Yokogawa’s 10(X)th generation digital oscilloscope. It allows users to select the most appropriate memory setting for a given measurement and then acquires and displays long and short memory records quickly, saving the waveforms to its segmented memory. Advanced memory handling ensures that you get all the benefits of a long memory scope regardless of the record size you allocate for each acquisition. This is made possible by the state-of-the-art ADSE (advanced data stream engine) ASIC.

Features

- 4 input channels
- Analog BW
  - 500 MHz (DL9040/DL9040L)
  - 1 GHz (DL9140/DL9140L)
  - 1.5 GHz (DL9240/DL9240L)
- Max. sampling rate
  - 5 GS/s (2 channels) 2.5 GS/s (4 channels) (DL9040/DL9040L/DL9140/DL9140L)
  - 10 GS/s (2 channels) 5 GS/s (4 channels) (DL9240/DL9240L)
- Max. record length
  - 2.5 M word/channel (DL9040/DL9140/DL9240)
  - 6.25 M word/channel (DL9040L/DL9140L/DL9240L)
- Fast acquisition rate
  - Max. 2.5 M waveforms/sec/ch
- History memory function
  - Review & analyze up to 2,000 of the most recent waveforms after the acquisition is stopped
- Compact and lightweight
  - 18 cm (7.1") depth, 6.5 kg (14.5 lbs.)

Basic Specifications

Max. sampling rate
- 5 GS/s (2 channels) 2.5 GS/s (4 channels) (DL9040/DL9040L/DL9140/DL9140L)
- 10 GS/s (2 channels) 5 GS/s (4 channels) (DL9240/DL9240L)

Bandwidth
- 500 MHz (DL9040/DL9040L)
- 1 GHz (DL9140/DL9140L)
- 1.5 GHz (DL9240/DL9240L)

Number of analog input channels
- 4 input channels

Vertical sensitivity
- For 1 MΩ input: 2 mV/div to 5 V/div (steps of 1-2-5)
- For 50 Ω input: 2 mV/div to 500 mV/div (steps of 1-2-5)

DC accuracy
- For 1 MΩ input: ±(1.5% of 8 div + offset voltage accuracy)
- For 50 Ω input: ±(1.5% of 8 div + offset voltage accuracy)

Vertical axis resolution
- 8-bit (25 LSB/div)

Sweep sensitivity
- 500 ps/div to 50 s/div (steps of 1-2-5)

Max. record length
- 2.5 M word/channel (DL9040/DL9140/DL9240)
- 6.25 M word/channel (DL9040L/DL9140L/DL9240L)

Internal media drive
- Flash ROM, Capacity 90 MB

Standard Interface
- USB Peripheral Support/PC Card Interfaces/USB-PC Connections/ Ethernet Communication (C10 and C8 Options)

Internal printer
- Thermal line-dot, Paper width 112 mm (option)

Other options
- FC Analysis Function, SPI Analysis Function, CAN Analysis Function, LIN Analysis Function, Internal Hard Disk Drive, User-defined math function, Power supply analysis function

Display (TFT LCD)
- 8.4-inch (21.3 cm) color TFT liquid crystal display

External dimensions
- 350 (W) x 200 (H) x 178 (D) mm
- When printer cover is closed, excluding handle and protrusions

Weight
- Approx. 6.5 kg
The DL7400 Series Allows Multi-channel Capture of Analog and Logic Signals

Overview

The DL7400 Series includes 4 and 8-channel analog input models. Each model has up to 16-bit logic inputs. All these inputs come in a convenient, benchtop-sized instrument. In addition to capturing up to 16 logic signals, the DL7400 Series lets you simultaneously measure up to 8 analog signals without needing to synchronize two separate oscilloscopes.

Features

- 4 or 8 analog channels and 16-bit logic input
- Maximum 16 MW recording memory
- USB compliant, USB mass storage supported
- Ethernet connectivity (optional)
- User-defined math (optional)
- 2 GS/s maximum speed
- 500 MHz analog bandwidth
- Supports 250 MHz logic probe
- PC card interface (Type II)
- Power supply analysis function (optional)
- Serial bus analysis function (optional)
- FlexRay signal analyzer (optional)

Basic Specifications

- Input channels: 4/8 analog (depends on model), and 16-bit logic
- Voltage axis sensitivity setting range
  - For 1 MΩ input: 2 mV/div to 10 V/div (steps of 1, 2, or 5)
  - For 50 Ω input: 2 mV/div to 1 V/div (steps of 1, 2, or 5)
- Frequency characteristics
  - For 1 MΩ input: using passive probe model 700988; specified at probe tip) 10 V/div to 10 mV/div; DC to 400 MHz (500 MHz+); * When using Miniature passive probe model 701941; specified at probe tip.
- A/D conversion resolution
  - 8 bits (24 LSB/div)
- Maximum sampling rate
  - 2 GS/s
- Maximum record length
  - 701450/701470: 4 MW/channel
  - 701460/701480: 16 MW/channel
- DC accuracy
  - ±(1.5% of full scale + offset voltage accuracy)
- Time axis setting range
  - 1 ns/div to 50 s/div (for record length of 10 kW or greater)
- Display
  - 8.4-inch color TFT liquid crystal display
- Built-in printer (optional)
- Paper width: 112 mm
- Interfaces
  - GPIB, USB-PC connector, USB peripheral connector, Ethernet (100BASE-TX, 10BASE-T; optional), SCSI (optional)
- Other options
  - PC bus analysis functions, CAN Bus Signal Analysis Function, SPI Bus Signal Analysis Function, Power Analysis Functions, FlexRay Signal Analyzer
- External dimensions
  - 373 (W) × 210.5 (H) × 355.3 (D) mm (when the printer cover is closed; does not include knobs and protrusions)
- Weight
  - Approx. 10 kg (22.4 lbs, including printer; does not include logic inputs)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701450</td>
<td>DL7440 with 4 CH input and maximum 4 MW memory</td>
<td></td>
</tr>
<tr>
<td>701460</td>
<td>DL7440 with 4 CH input and maximum 16 MW memory</td>
<td></td>
</tr>
<tr>
<td>701470</td>
<td>DL7480 with 8 CH input and maximum 4 MW memory</td>
<td></td>
</tr>
<tr>
<td>701480</td>
<td>DL7480 with 8 CH input and maximum 16 MW memory</td>
<td></td>
</tr>
</tbody>
</table>

Options

- Built-in printer
- Four additional passive probes (701470, 701480 only) *
- Four additional probe power connectors (701470, 701480 only) *
- Logic input for 701450/701470 (Standard option)
- Logic input for 701460/701480 (Standard option)
- SCSI interface
- Ethernet interface
- User-defined math function *
- Power Supply Analysis Function *
- SPI + CAN Bus Analyzer *
- CAN + FlexRay Signal Analyzer *
- FlexRay Signal Analyzer *

1: Select one only.
2: The DL7400 Series is equipped with four passive probes (700988) as standard.
3: The DL7400 Series is equipped with four probe power connectors as standard.
4: Select /N3 for models 701450 and 701470, and /N4 for models 701460 and 701480. Logic probes are sold separately. These options can be installed free of charge.
5: /G2 and /G4 cannot be ordered together. /G4 includes /G2
6: Options /F5, /F7, and /F8 cannot be specified together. Select one only.
7: The SPI Bus Analysis and Search functions are standard feature. The SPI Bus Triggers are only available as an option.
8: Four 700988 probes are not included when this option is specified.
9: When the option /E4 is specified, neither /EX4 nor /EA4 can be specified together.
Waveform Measuring Instruments

These Compact, Lightweight Models Offer High-speed Sampling and Long Memory

Overview
This series has an A4 sized footprint, is compact, and space-saving and with 350 MHz or 500 MHz bandwidth and Max. 8 MW memory.

Features
- Maximum sampling rate
  1 GS/s: Real-time sampling
  100 GS/s: Repetitive sampling
- 500MHz analog bandwidth (DL1735E : 350 MHz)
- Maximum record length
  DL1740EL: 8 Mwords
  DL1740E, DL1735E: 2 Mwords
  DL1720E: 1 Mwords
- HDTV trigger
- FC and SPI bus trigger and analysis (optional)
- USB storage and USB peripherals
  Supports USB memory devices (flash memory, hard disk drive, MO drive, etc.)
  Supports a USB mouse, keyboard, or printer
- Ethernet function (optional)
  Web server, FTP server, and network printing
- PC card interface (Type II)
  (or select floppy disk for removable media type)
- Built-In printer (optional)

Basic Specifications
- Input channels 4 (701725, 701730, 701740) 2 (701715)
- Voltage axis sensitivity setting range
  For 1 MΩ input: 2 mV/div to 10 V/div (steps of 1, 2, or 5)
  For 50 Ω input: 2 mV/div to 1 V/div (steps of 1, 2, or 5)
- Frequency characteristics
  For 1 MΩ input (using passive probe model 700988; specified at probe tip): 10 V/div to 10 mV/div; DC to 400 MHz (500 MHz*), (DC to 350 MHz, 701725)
  * When using Miniature passive probe model 701941; specified at probe tip.
- A/D conversion resolution
  8 bits (24 LSB/div)
- Maximum sampling rate
  1 GS/s
- Maximum record length
  701715: 1 MW/CH
  701725, 701730: 2 MW/CH
  701740: 8 MW/CH
- DC accuracy ±(1.5% of 8 div + offset voltage accuracy)
- Time axis setting range
  1 ns/div to 50 s/div (for record length of 10 kW or greater)
- Display
  6.4-inch color TFT liquid crystal display
- Built-in printer (optional)
  Paper width: 112 mm
- Computer interface
  GP-IB, USB-PC connector (USB Rev 1.1 compliant), Ethernet (100BASE-TX/10BASE-T compliant, optional)
- Other options
  FC + SPI bus analysis function, probe power
- External dimensions
  220 (W) × 265.8 (H) × 264.1 (D) mm
- Weight
  Approx. 5.5 kg (with all options)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701715</td>
<td>-</td>
<td>DL1720E digital oscilloscope with 2 ch input, 500 MHz analog bandwidth and maximum 1 MW memory</td>
</tr>
<tr>
<td>701725</td>
<td>-</td>
<td>DL1735E digital oscilloscope with 4 ch input, 350 MHz analog bandwidth and maximum 2 MW memory</td>
</tr>
<tr>
<td>701730</td>
<td>-</td>
<td>DL1740E digital oscilloscope with 4 ch input, 500 MHz analog bandwidth and maximum 2 MW memory</td>
</tr>
<tr>
<td>701740</td>
<td>-</td>
<td>DL1740EL digital oscilloscope with 4 ch input, 500 MHz analog bandwidth and maximum 8 MW memory</td>
</tr>
</tbody>
</table>

- Power cable
  - D: UL and CSA standard
  - F: VDE standard
  - Q: BS standard
  - R: AS standard
  - H: GB standard

- Internal storage drive
  - J1: Floppy disk drive
  - J3: PC card interface (Type II)

- Options
  - B5: Built-in printer
  - P2: Probe power for model 701715
  - P4: Probe power for models 701725, 701730, and 701740
  - I10: Ethernet interface
  - F5: FC + SPI bus analysis function
  - EK2: Attach two 701941 probes

The instrument comes standard with passive probes (700988). Four probes are included with the 701725, 701730 and 701740, and two probes are included with the 701715.

1. One or the other must be selected.
2. Select P2 for model 701715, or P4 for models 701725, 701730 and 701740.
3. Option for models 701725, 701730, and 701740 only.
4. For Option for model 701715 only The 700988 probes are not included when this option is specified.
5. Option for models 701725, 701730, 701740 only. The 700988 probes are not included when this option is specified.
Overview

With a three-mode power supply (AC, 12 VDC and battery) the DL1600 goes everywhere you need to make measurements. It also has serial bus (PC, SPI, CAN), signal capturing, and protocol analysis functions.

Features

- CAN Bus signal analysis function (optional).
- DC Power model + Battery box.
- PC Bus analysis function (optional).
- 4 channels 200 MS/s (DL1640/DL1640L)
- 2 channels 200 MS/s (DL1620)
- 200 MHz analog bandwidth.
- Maximum memory length: 32 MW (DL1640L) and 8 MW (DL1640/DL1620)
- 6.4-inch wide-angle-view TFT color liquid crystal display.
- Compact and lightweight (approx. 3.9 kg 10.8 lbs).
- A size or smaller footprint.
- Internal storage media (select PC card, Zip® drive, or Floppy drive).
- USB compliant, USB storage Supported (optional).
- Ethernet connectivity (optional).
- Real-time digital filtering.

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model/Options</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701605</td>
<td>-AC</td>
<td>DL1620 digital oscilloscope</td>
</tr>
<tr>
<td>701610</td>
<td>-AC</td>
<td>DL1640 digital oscilloscope</td>
</tr>
<tr>
<td>701620</td>
<td>-AC</td>
<td>DL1640L digital oscilloscope</td>
</tr>
<tr>
<td>701605</td>
<td>-DC</td>
<td>100–120 V &amp; 220–240 V</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>BS standard</td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td>AS standard</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>GB standard</td>
</tr>
<tr>
<td></td>
<td>-Y</td>
<td>No power cable</td>
</tr>
<tr>
<td>701605</td>
<td>-J1</td>
<td>Floppy drive</td>
</tr>
<tr>
<td>701605</td>
<td>-J2</td>
<td>Zip® drive</td>
</tr>
<tr>
<td>701605</td>
<td>-J3</td>
<td>PC card drive (Type II)</td>
</tr>
<tr>
<td>701605</td>
<td>-B5</td>
<td>Built-in printer</td>
</tr>
<tr>
<td>701605</td>
<td>-P2</td>
<td>Probe power for 701605</td>
</tr>
<tr>
<td>701605</td>
<td>-P4</td>
<td>Probe power for 701610 and 701620</td>
</tr>
<tr>
<td>701605</td>
<td>-C1</td>
<td>GP-IB + USB</td>
</tr>
<tr>
<td>701605</td>
<td>-C10</td>
<td>Ethernet + USB</td>
</tr>
<tr>
<td>701605</td>
<td>-F5</td>
<td>PC bus signal analysis function</td>
</tr>
<tr>
<td>701605</td>
<td>-F7</td>
<td>CAN bus signal analysis function</td>
</tr>
</tbody>
</table>

The main unit comes standard with four passive probes (700960) for 701610/701620 and two passive probes for 701605.
1 Select “-Y” for the DC power model.
2 Choose one.
3 Choose one.
4 The PC bus analysis function includes the SPI bus analysis function.
5 The CAN bus analysis function includes the SPI bus analysis function.
6 The Battery box comes standard with the cable for connecting to the main unit.

Basic Specifications

| Input channels: 4 (701610, 701620), 2 (701605) |
| Sensitivity: 2 mV/div to 10 V/div (in steps of 1, 2, or 5) |
| DC accuracy: 10 mV/div to 10 V/div: 1.5% of 8 div + offset voltage accuracy |
| Frequency characteristics: 10 mV/div to 10 V/div: DC to 200 MHz |
| Vertical resolution: 8 bits (24 LSB/div) |
| Maximum sampling rate: 200 MS/s |
| Maximum record length: 701605, 701610: 8 MW/ch, 701620: 32 MW/ch |
| Sweep time: 2 ns/div to 800 s/div (varies depends on memory length) |
| Display: 6.4-inch TFT color liquid crystal display |
| Built-in printer (optional) |
| Communication interfaces: Serial port (RS232), USB port (optional), USB-PC port (optional), GP-IB port (optional), Ethernet port (complies with 100BASE-TX and 10BASE-T: optional) |
| Internal media drive: Floppy drive, Zip® drive, PC card drive |
| Other options: Built-in printer, Probe power, GP-IB + USB, Ethernet + USB, PC bus signal analysis function, CAN bus signal analysis function |
| External dimensions: 220 (W) × 266 (H) × 224 (D) mm |
| Weight: Approx. 4.5 kg (10.8 lbs; with all options) Approx. 3.9 kg (8.6 lbs; without any options) |

Our Best-selling Models Support 3-mode Power Supplies and Weights just 3.9 kg
**Overview**

ScopeCorder is a new measurement tool combining the functions of an oscilloscope for capturing instantaneous phenomena and a data recorder for monitoring long-term trends.

**Features**

- Standard high resolution A4 thermal printer (DL750P)
- Effective print width is 200 mm (1600-dot resolution) (DL750P)
- Compact body and isolated 16 analog channels, 8 slots and 16-bits logic input.
- Eleven kind of plug-in modules offers high accuracy and low noise measurement and also offer various measurement (Voltage/Current/Temperature/Strain/Vibration/Frequency)
- 1 GW large memory and 30 days observation.
- 1 GW instantaneous display (GigaZoom Function)
- Simultaneous high-speed and low-speed recording using Dual Capture
- Cycle statistical calculation
- Many Ethernet functions (Web server/FTP server/Email)
- Various communication interfaces (USB/Ethernet/GPIB/RS232/SCSI)
- PC card drive available
- 40GB internal hard drive

### Basic Specifications

- **Input**
  - Type: Isolated plug-in module
  - Slots: 8 (16 channels)
  - Logic inputs: 16 (8 bits x 2)
  - Display: 10.4-inch color TFT liquid crystal display
- **Built-in printer**
  - Printing method: Thermal line-dot printing
  - Paper width: 112 mm (DL750), 210 mm (Effective print width 200mm) (DL750P)
- **Communication interfaces**
  - GP-IB, USB peripheral equipment jacks (USB keyboards and USB printers), USB (complies with Rev. 1.1, for connection to PC), Ethernet (complies with 100BASE-T and 10BASE-T; with /C10 option), serial (RS232), and SCSI
- **Internal media drives**
  - Floppy drive, Zip® drive (DL750), or PC card (choose one), and 40 GB hard drive (with /C8 option)
- **External dimensions**
  - Approximately 355 (W) x 250 (H) x 180 (D) mm (DL750), 355 (W) x 250 (H) x 225 (D) mm (DL750P)
- **Weight**
  - Approx. 6.6 kg (DL750), 8.0 kg (DL750P), (main unit with full options, including M3, C8, C10, and P4)
  - Approx. 9 kg (DL750P), 10.3 kg (DL750P), (main unit and eight 701250 modules)

### Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701210</td>
<td>-D</td>
<td>DL750 main unit (16 isolated channels, 8 slots + 16-bit logic)1 112 mm width A6 thermal printer built-in</td>
</tr>
<tr>
<td>701230</td>
<td>-D</td>
<td>DL750P main unit (16 isolated channels, 8 slots + 16-bit logic)1 210 mm width A4 thermal printer built-in</td>
</tr>
<tr>
<td>Power cable</td>
<td>-Q</td>
<td>UL/CeSAT standard</td>
</tr>
<tr>
<td>-F</td>
<td>VDE standard</td>
<td></td>
</tr>
<tr>
<td>-R</td>
<td>AAS standard</td>
<td></td>
</tr>
<tr>
<td>-Q</td>
<td>BS standard</td>
<td></td>
</tr>
<tr>
<td>-H</td>
<td>DB standard (Complied with CCC)</td>
<td></td>
</tr>
<tr>
<td>Internal media drive</td>
<td>-J1</td>
<td>Floppy drive</td>
</tr>
<tr>
<td>-J2</td>
<td>Zip® drive (available for the DL750 only)</td>
<td></td>
</tr>
<tr>
<td>-J3</td>
<td>PC card drive</td>
<td></td>
</tr>
<tr>
<td>Default Help language</td>
<td>-HE</td>
<td>English</td>
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<tr>
<td>-HJ</td>
<td>Japanese</td>
<td></td>
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<tr>
<td>-HC</td>
<td>Chinese</td>
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<td>-HG</td>
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<td>-HF</td>
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<td>-HL</td>
<td>Italian</td>
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<td>-HK</td>
<td>Korean</td>
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<tr>
<td>Memory expansion</td>
<td>-M1</td>
<td>Memory expansion to 10 MW/CH4</td>
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<tr>
<td>-M2</td>
<td>Memory expansion to 25 MW/CH4</td>
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</tr>
<tr>
<td>-M3</td>
<td>Memory expansion to 50 MW/CH4</td>
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<tr>
<td>Other specifications</td>
<td>/C8</td>
<td>Internal 40 GB hard drive (FAT32)</td>
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<tr>
<td>/C10</td>
<td>Ethernet interface</td>
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<tr>
<td>/G2</td>
<td>User-defined math function</td>
<td></td>
</tr>
<tr>
<td>/G3</td>
<td>DSP channel function</td>
<td></td>
</tr>
<tr>
<td>/P4</td>
<td>Probe power (4-output)</td>
<td></td>
</tr>
<tr>
<td>/DC</td>
<td>DC-12V Power (10-18VDC)</td>
<td></td>
</tr>
</tbody>
</table>

1. Plug-in modules are not included.
2. Choose only one.
3. Zip drive and DC12V power supply cannot be specified together with the DL750P.
4. Cannot be specified together.
**Easily & Quickly Saves Data to Memory and Paper**

**Overview**

A plug-in module type chart recorder with a large built-in A4 sized high-resolution thermal printer

**Features**

- Easy-to-operate
- Standard high resolution A4 size thermal printer
- Effective print width is 200 mm (1600-dot resolution)
- Compact body and isolated 16 analog channels, 8 slots and 16-bits logic input
- Eleven kinds of plug-in modules offers high accuracy and low noise measurement and also offer various measurement, Voltage/Current/Temp/Temperature/Strain/Vibration/Frequency
- 50MW large memory and 30 days observation
- Cycle statistical calculation
- Many Ethernet functions (Web server/FTP server/E-mail)
- Various communication interface USB/Ethernet/GP-IB/RS-232/SCSI
- PC card drive is available
- 40 GB internal hard drive
- USB storage function is available

**Basic Specifications**

- **Input**
  - Type: Isolated plug-in module
  - Slots: 8 (16 channels)
  - Logic inputs: 16 (8 bits × 2)
  - Sweep time: 100 us to 30 days
- **Display**
  - 10.4-inch color TFT liquid crystal display
- **Built-in printer**
  - Printing method: Thermal line-dot printing
  - Paper width: 210 mm (Effective print width 200 mm)
- **Communication interface**
  - GP-IB, USB peripheral equipment jacks
  - USB keyboards and USB printers
  - USB (compiles with Rev. 1.1, for connection to PC), Ethernet (compiles with 100 BASE-TX and 10 BASE-T; with /C10 option), serial (RS232), and SCSI
- **Internal media drives**
  - PC card or Drive less (choose one), and 40GB hard drive (with /C8 option)
- **External dimensions**
  - 355(W) × 250(H) × 225(D) mm
- **Weight**
  - Approx. 8.0 kg (main unit with full options, including C8, C10 and P4)
  - Approx. 10.3 kg (main unit and eight 701250 modules)

**Model Number and Suffix Codes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701240</td>
<td>0</td>
<td>SL1400 main unit (16 isolated Channels, 8 slots + 16-bit logic) 210 mm width A4 thermal printer built-in</td>
</tr>
<tr>
<td>Power cable</td>
<td></td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td>Internal media drive</td>
<td></td>
<td>PC card drive</td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td>English, Panel in English</td>
</tr>
<tr>
<td>Other specifications</td>
<td></td>
<td>Internal 40 GB hard drive (FAT32)</td>
</tr>
</tbody>
</table>

**Plug-in Module Model Numbers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701250</td>
<td>High-speed 10 MS/s 12-bit Isolation module (2 CH)</td>
</tr>
<tr>
<td>701251</td>
<td>High-speed 10 MS/s 16-bit Isolation module (2 CH)</td>
</tr>
<tr>
<td>701255</td>
<td>High-speed 10 MS/s 12-bit Non-Isolation module (2 CH)</td>
</tr>
<tr>
<td>701260</td>
<td>High-voltage 100 kS/s 16-bit Isolation module (2 CH, with RMS)</td>
</tr>
<tr>
<td>701261</td>
<td>Universal module (2 CH)</td>
</tr>
<tr>
<td>701262</td>
<td>Universal module (with anti-aliasing filter, 2 CH)</td>
</tr>
<tr>
<td>701265</td>
<td>Temperature/High-precision voltage module (2 CH)</td>
</tr>
<tr>
<td>701270</td>
<td>Strain module (NDIS, 2 CH)</td>
</tr>
<tr>
<td>701271</td>
<td>Strain module (USB, Shunt-CAL, 2 CH)</td>
</tr>
<tr>
<td>701275</td>
<td>Acceleration module (with anti-aliasing filter, 2 CH)</td>
</tr>
<tr>
<td>701280</td>
<td>Frequency module (2 CH)</td>
</tr>
</tbody>
</table>

* Above plug-in modules can be used among all ScopeCorder series.
The USB 2.0 compliance test solution busXplorer™-USB takes advantage of the wide variety of DL9000 trigger and analysis functions to offer a system for carrying out highly automated USB compliance tests. In addition to facilitating execution of the various tests from a PC via Ethernet, the newly developed test software displays detailed test procedures including the wiring method. This allows even inexperienced operators to easily perform the tests.

*1) busXplorer™-USB comprises a test fixture and test software.

The USB 2.0 Compliance Test Solution Equipments

• 701312/701313  DL9240/DL9240L
• 701985  USB Compliance Test Fixture & Software
• 701923  PBD2000 2GHz BW differential probe
• 701913  PBA2000 2.5GHz BW active probe
• 701933  50MHz BW current probe

*The equipment that is required varies depending on the test. Please contact us for details.

Detailed analyses of signal waveforms can be performed by using the system in conjunction with the Xviewer Waveform Analysis Tool (sold separately).

Detailed analyses of signal waveforms can be performed by using the system in conjunction with the Xviewer Waveform Analysis Tool (sold separately).

Xviewer/MATLAB tool kit

View Waveform Data on Your PC

Plug-in for MATLAB software

701992
Xviewer

Xviewer is a PC software application designed to work with Yokogawa’s DL Series and the DL750 Series ScopeCorders. Xviewer allows you to display DL-acquired waveform data (using the “Viewer” function), perform file transfers, and control DL Series from a PC.

You can download a trial version of Xviewer from Yokogawa’s web site at:
http://www.yokogawa.com/tm/701992/

701991
MATLAB tool kit

The MATLAB tool kit for the DL Series is a plug-in for MATLAB software. The toolkit can be used to control supported instruments using MATLAB or to acquire data from the instruments to use in MATLAB via a communication interface (GP-IB, USB, Ethernet).

You can download a trial version of MATLAB tool kit from Yokogawa’s web site at: http://www.yokogawa.com/tm/701991/

In addition to the above, various kinds of accessory software, free software, LabVIEW drivers, and LabWindows/CVI drivers, can be downloaded from the following web site:
http://www.yokogawa.com/tm/tm-softwaredownload.htm
# Waveform Measuring Instruments

## DL Series Accessories List

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PB500 (500 MHz passive probe)</td>
<td>701943</td>
<td>500 MHz BW, 10:1, 1.5 meters</td>
</tr>
<tr>
<td>PBA2500 (2.5 GHz active probe)</td>
<td>701913</td>
<td>2.5 GHz BW, 10:1, 1.2 meters</td>
</tr>
<tr>
<td>PBA1500 (1.5 GHz active probe)</td>
<td>701914</td>
<td>1.5 GHz BW, 10:1, 1.2 meters</td>
</tr>
<tr>
<td>PBA1000 (1.0 GHz active probe)</td>
<td>701912</td>
<td>1.0 GHz BW, 10:1, 1.2 meters</td>
</tr>
<tr>
<td>PB2000 (2 GHz differential probe)</td>
<td>701923</td>
<td>2 GHz BW, 10:1, Max. differential input voltage: ±5 V, 1.2 meters</td>
</tr>
<tr>
<td>PBLS000 (5 GHz low capacitance probe)</td>
<td>701974</td>
<td>5 GHz BW, 10:1, 20.1, 0.95 meters</td>
</tr>
<tr>
<td>400 MHz passive probe</td>
<td>700988</td>
<td>400 MHz BW (10:1) Allows the division ratio to be switched between 10:1 and 1:1. 1.5meters</td>
</tr>
<tr>
<td>200 MHz passive probe</td>
<td>700960</td>
<td>200 MHz BW (10:1) Allows the division ratio to be switched between 10:1 and 1:1. 1.5meters</td>
</tr>
<tr>
<td>500 MHz Miniature passive probe</td>
<td>701941</td>
<td>DC to 500 MHz, 10:1, 1.2 meters</td>
</tr>
<tr>
<td>350 MHz Miniature passive probe</td>
<td>701942</td>
<td>DC to 350 MHz, 10:1, 3.0 meters</td>
</tr>
<tr>
<td>100:1 High voltage probe</td>
<td>701944</td>
<td>400 MHz BW, 10:1, 1.2 meters</td>
</tr>
<tr>
<td>100:1 High voltage probe</td>
<td>701945</td>
<td>250 MHz BW, 100:1, 3.0 meters</td>
</tr>
<tr>
<td>900 MHz FET Probe</td>
<td>700939</td>
<td>DC to 900 MHz, Input impedance 1.8 pF</td>
</tr>
<tr>
<td>Logic probe</td>
<td>701980</td>
<td>Input impedance: 1 MΩ Max. toggle frequency: 100 MHz</td>
</tr>
<tr>
<td>Logic probe</td>
<td>701981</td>
<td>Input impedance: 10 KΩ Max. toggle frequency: 250 MHz</td>
</tr>
<tr>
<td>100 MHz differential probe</td>
<td>701921</td>
<td>DC~100 MHz, 10:1, 100:1, Max. differential input voltage: ±70 V (10:1), ±700 V (100:1)</td>
</tr>
<tr>
<td>200 MHz differential probe</td>
<td>701922</td>
<td>DC~200 MHz, 10:1, Max. differential input voltage: ±20 V</td>
</tr>
<tr>
<td>15 MHz differential probe</td>
<td>700925</td>
<td>DC~15 MHz, 10:1, 100:1, Max. differential input voltage: ±500 V (100:1), ±50 V (10:1)</td>
</tr>
<tr>
<td>100 MHz differential probe</td>
<td>700924</td>
<td>DC~100 MHz, 100:1, 1000:1, Max. differential input voltage: ±1400 V (1000:1), ±350 V (100:1)</td>
</tr>
<tr>
<td>500 MHz differential probe</td>
<td>701920</td>
<td>DC~500 MHz, 10:1, Max. differential input voltage: ±12 V</td>
</tr>
<tr>
<td>Deskew signal source</td>
<td>701935</td>
<td>Output voltage: Approx. 0-5 V Output current: Approx. –100 to 0 mA</td>
</tr>
<tr>
<td>Current probe</td>
<td>701933</td>
<td>DC to 50 MHz 30 Arms</td>
</tr>
<tr>
<td>Current probe</td>
<td>701930</td>
<td>DC to 10 MHz 150 Arms</td>
</tr>
<tr>
<td>Current probe</td>
<td>701931</td>
<td>DC to 2 MHz, 500 Arms</td>
</tr>
<tr>
<td>Current probe</td>
<td>701932</td>
<td>DC to 100 MHz, 30 Arms</td>
</tr>
<tr>
<td>Probe power supply</td>
<td>701934</td>
<td>Large current output, external probe power supply (4 outputs)</td>
</tr>
<tr>
<td>50 Ω terminator</td>
<td>700976</td>
<td>Used to connect an oscilloscope having a 1 MΩ input to an instrument having a 50 Ω output.</td>
</tr>
<tr>
<td>Probe stand</td>
<td>701919</td>
<td>Diameter of attachable probe : ø8 to 13mm Weight : Approx. 1.5 kg</td>
</tr>
</tbody>
</table>
Waveform Measuring Instruments

ScopeCoder Series Accessories List

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 MHz band differential probe</td>
<td>700925</td>
<td>A probe designed for digital oscilloscopes to transform its single-ended input to a differential input, ±500 V (DC + AC peak)</td>
</tr>
<tr>
<td>100 MHz band differential probe</td>
<td>700924</td>
<td>A probe lets you make wide-band differential input measurements. Just connect the probe to the input of a single-end input digital oscilloscope, ±1400 V (DC + AC peak) or 1000 Vrms</td>
</tr>
<tr>
<td>Current probe 30 Arms</td>
<td>701933</td>
<td>Bandwidth DC up to 50 MHz. Can be directly connected to an oscilloscope with 1 MΩ input impedance.</td>
</tr>
<tr>
<td>Current probe 150 Arms</td>
<td>701930</td>
<td>Bandwidth DC up to 10 MHz. Can be directly connected to an oscilloscope with 1 MΩ input impedance.</td>
</tr>
<tr>
<td>Current probe 500 Arms</td>
<td>701931</td>
<td>DC to 2 MHz, 500 Arms</td>
</tr>
<tr>
<td>Current probe 30 Arms</td>
<td>701932</td>
<td>DC to 100 MHz bandwidth, 30 Arms</td>
</tr>
<tr>
<td>Probe power supply</td>
<td>701934</td>
<td>Large current output, external probe power supply (4 outputs)</td>
</tr>
<tr>
<td>Isolation probe</td>
<td>700929</td>
<td>A 10:1 probe designed for use with isolated modules</td>
</tr>
<tr>
<td>1:1 BNC safety adapter lead (with combination with followings)</td>
<td>701901</td>
<td>1000 Vrms-CAT II for 701250, 701251, 701260 (10:1)</td>
</tr>
<tr>
<td>Safety mini clip (hook type)</td>
<td>701959</td>
<td>1000 Vrms-CAT II (2 per set)</td>
</tr>
<tr>
<td>Large alligator clip (dolphin type)</td>
<td>701954</td>
<td>1000 Vrms-CAT II (2 per set)</td>
</tr>
<tr>
<td>Passive probe for DL750/SL1400 (10:1)</td>
<td>701940</td>
<td>Non-isolated 600 Vpk (701255) 42 V or less (others)</td>
</tr>
<tr>
<td>BNC cable</td>
<td>366926</td>
<td>A 1 m long BNC-alligator clip cable.</td>
</tr>
</tbody>
</table>

Accessories Combinations

- High-speed 100Ms/s 12-bit Isolation Module 701250
- High-speed 100Ms/s 16-bit Isolation Module 701251
- High-voltage 10kV 16-bit Isolation Module 701260
- Frequency Module 701269
- Isolated Leads 758917
- Safety Clamps (DSUB, Shunt-Cal) 701955
- Alligator Adapters 758922
- Alligator Adapters 758929
- Differential Probes 1000Vrms 701924
- Current Probes 150Amps DC -50kHz 701930
- Current Probes 30Amps DC -50kHz 701923
- Power Probe 4-output (option) 701926
- High-speed 100Ms/s 12-bit Non-isolation Module 701255
- Acceleration/Voltage Module (with AAF) 701275
- Bridge Head (NDIS) 701276
- Bridge Head (DSUB, Shunt-Cal) 120 Ohm: 701957 250 Ohm: 701956
- Bridge Head (NDIS) 701270
- Strain Module (NDIS) 701271
- Strain Module (DSUB, Shunt-Cal) 701271
- Universal Module 701261
- Universal Module (with AAF) 701262
- Temperature/High-precision Voltage Module 701263
- 1:1 Banana-alligator Cable 366981
- Shunt Resistor for 4-20mA Measurement 250 Ohm ± 0.1% 701920
- 100 Ohm ± 0.1% 438921 10 Ohm ± 0.1% 438922
- Shunt Resistor 4:20mA Measurement 250 Ohm ± 0.1% 438920
- 100 Ohm ± 0.1% 438921 10 Ohm ± 0.1% 438922
- Logic Probe (TTL level/Contact Input) 1m: 702911 3m: 702912
- Logic Probe 700987
- Isolated Logic Measurement Leads 758917
- Isolated Logic Probes 700986
- Alligator Adapters 758922
- Alligator Adapters 758929
- Carrying Case 701967
- Logic Input Terminals

Waveform Measuring Instruments
Yokogawa’s WT Series Power Meters and PZ4000 Power Analyzer:
Advanced Technology and High Reliability for a Wide Range of Power Measurement Solutions

WT Series

<table>
<thead>
<tr>
<th>Models</th>
<th>WT3000</th>
<th>WT2000</th>
<th>WT1000</th>
<th>WT210/WT230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>With basic power accuracy of ±0.02% of reading, DC and 0.1 Hz-1 MHz measurement bandwidth, and up to four input elements, the WT3000 provides higher-accuracy measurement of inverter I/O efficiency.</td>
<td>Total harmonic measurement and analysis function Voltage fluctuation/flicker measurement function Higher power accuracy</td>
<td>Up to six input elements in one instrument (3 phase power input from two systems in one unit) 6.4-inch TFT Color LCD Wide voltage and current input range</td>
<td>Entry class model Compact design (half-rack size) and superior cast performance 5 mA range for very low current measurements (model WT210 only)</td>
</tr>
<tr>
<td>Input elements</td>
<td>1 to 4</td>
<td>1 to 3</td>
<td>1 to 6</td>
<td>1 (WT210, 2 or 3 (WT230))</td>
</tr>
<tr>
<td>Basic power accuracy (50/60 Hz)</td>
<td>±0.02% of rdg ± 0.04% of mg</td>
<td>±0.04% of rdg ± 0.04% of mg</td>
<td>±0.1% of rdg ± 0.1% of mg</td>
<td>±0.1% of rdg ± 0.1% of mg</td>
</tr>
<tr>
<td>Power measurement frequency range</td>
<td>DC: 0.1 Hz to 1 kHz</td>
<td>DC: 2 Hz to 300 kHz</td>
<td>DC: 0.1 Hz to 1 kHz</td>
<td>DC: 0.5 Hz to 1 kHz</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>150/300/600/1000 V</td>
<td>150/300/600/1000 V</td>
<td>150/300/600/1000 V</td>
<td>150/300/600/1000 V</td>
</tr>
<tr>
<td>Input current range</td>
<td>Direct input: 0.5/1/2.5/10/20/30 A or 5/10 m/20/50/100/200 m/500 m/1 A External input: 50/100/200/500 m/1/2.5/5 V</td>
<td>Direct input: 1/2.5/10/20/30 A External input: 50 m/100 m/200 m/500 m/1 A</td>
<td>Direct input: 1/2.5/5/10/20 A External input: 50 m/100 m/200 m/500 m/1 A</td>
<td>Direct input: 5 m/10 m/50 m/100 m/200 m/500 m/1 A/2.5/10/20 A (WT210) Direct input: 50 m/100 m/200 m (WT230) External input (option): 2.5/5/10 V or 50 m/100 m/200 m/500 m</td>
</tr>
<tr>
<td>Measurement parameters</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Phase angle, Peak voltage, Peak current, Voltage Frequency, Current Frequency, Active power integration, Apparent power integration, Reactive power integration, Current integration, Corrected power, Crest factor, Efficiency, Harmonic analysis, Flicker measurement</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Phase angle, Peak voltage, Peak current, Voltage Frequency, Current Frequency, Active power integration, Current integration, Corrected power, Crest factor, Efficiency, Harmonic analysis, Flicker measurement</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Phase angle, Peak voltage, Peak current, Voltage Frequency, Current Frequency, Active power integration, Current integration, Crest factor, Form factor, Impedance, Resistance, Reactance, Corrected Power, Harmonic analysis, Flicker measurement</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Phase angle, Peak voltage, Peak current, Voltage Frequency, Current Frequency, Active power integration, Current integration, Harmonic analysis</td>
</tr>
<tr>
<td>Display</td>
<td>6.4-inch TFT color LCD</td>
<td>7-segment LED, 4 displays</td>
<td>6.4-inch TFT color LCD</td>
<td>7-segment LED, 3 displays</td>
</tr>
<tr>
<td>External dimensions (mm) (W × H × D)</td>
<td>426 × 177 × 459</td>
<td>426 × 132 × 460</td>
<td>426 × 177 × 459</td>
<td>213 × 132 × 379 (WT230)</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>15</td>
<td>13</td>
<td>15</td>
<td>3 (WT210), 5 (WT230)</td>
</tr>
</tbody>
</table>

PZ4000 Power Analyzer

<table>
<thead>
<tr>
<th>Models</th>
<th>PZ4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Features</td>
<td>A power analyzer that displays measured waveforms Wide bandwidth, high-precision measurements A power analyzer capable of dynamically capturing load fluctuations Graphical power analysis</td>
</tr>
<tr>
<td>Input elements</td>
<td>1 to 4 or 1 to 3 + Sensor input</td>
</tr>
<tr>
<td>Basic power accuracy (50/60 Hz)</td>
<td>±0.04% of rdg ± 0.04% of rng</td>
</tr>
<tr>
<td>Power measurement frequency range</td>
<td>DC: 0.1 Hz to 1 kHz</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>30/60/120/200/300/600/1200/2000 V peak</td>
</tr>
<tr>
<td>Input current range</td>
<td>Direct input: 5 A (253751, 253752) 0.1/0.1/0.5/1/2/4/10 Apeak</td>
</tr>
<tr>
<td>Measurement parameters</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, Phase angle, Peak voltage, Peak current, Voltage Frequency, Current Frequency, Crest factor, Form factor, Impedance, Resistance, Reactance, Efficiency, Corrected Power, Harmonic analysis</td>
</tr>
<tr>
<td>Display</td>
<td>6.4-inch TFT color LCD</td>
</tr>
<tr>
<td>External dimensions (mm) (W × H × D)</td>
<td>428 × 177 × 459</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>15</td>
</tr>
</tbody>
</table>

*About CW series Clamp-on Power Meters, please refer to the page 63.
High-end Power Analyzer with Best-in-Class Precision ±0.02% of Reading and High Stability

Overview
For three-phase power metering, the WT3000 Precision Power Analyzer provides a basic power accuracy of ±0.02% of reading. It also offers bandwidth for DC or 0.1 Hz~1 MHz and accepts up to 4 input elements, facilitating high precision efficiency measurements through simultaneous measurement during I/O of inverters and other items under test. This, coupled with the ability to perform normal power and harmonic measurements simultaneously, means that the WT3000 can offer higher accuracy in evaluation of instruments and higher efficiency.

Features
- High accuracy and wide frequency range
- Up to 4 input elements
- Low power factor error
- Effective input range: 1% to 130%
- Simultaneously measurement with 2 units
- Data update rate: 50 ms to 20 sec
- Variety of display formats:
  Numeric, Waveform, Bar graph, Vector, Trend, MATH, FFT, CC
- IEC harmonic measurement in combination with software (761922)
- IEC Flicker measurement (/FL option)
- Storage function (approximately 30 MB internal memory )
- Motor efficiency and total efficiency measurement (Motor version)

Basic Specifications
- Measurement voltage range:
  15/30/60/100 /150/300/600/1000 V (for crest factor 3)
  7.5/15/30/50/75/150/300/500 V (for crest factor 6)
- Measurement current range:
  Direct input (30 A input element)
  500 mA/1/2 /5/10/20/30 A
  Direct input (2 A input element)
  5 m/10 m/20 m/50 m/100 m/200 m/500 m/1/2 A
- External sensor input
  DC, 0.1 Hz to 1 MHz
- Accuracy (45 to 66 Hz): greater than or equal to 500 mA range
  Voltage/current ±(0.01% of reading + 0.03% of range)
  Power ±(0.02% of reading + 0.04% of range)
- Influence of power factor (\(\lambda\)):
  When \(\lambda = 0\)
  Apparent power reading \(\times 0.03\%\) in the 45 to 66 Hz range
- External dimensions:
  Approx. 426 (W) \times 177 (H) \times 459 (D) mm
- Weight:
  Approx. 15 kg (including main unit, 4 input elements, and options)
Power Measuring Instruments

A High-Precision, Wide Frequency Range, Digital Power Meter with up to Six Input Elements

The WT1600 is a power meter designed to measure extremely small currents in energy-saving equipments, as well as large currents for evaluating large-sized loads. The WT1600 works with voltages ranging from 1.5 V up to 1000 V and supports a wide range of applications. A WT1600 can measure I/O signals on inverters, because it can accept signal inputs for up to six phases.

Overview

- Up to six input elements in one instrument (3 phase power input from two systems in one unit)
- Wide frequency range
- Wide current input range: 10 mA to 5 A or 1 A to 50 A
- Wide voltage input range: 1.5 V to 1000 V
- 50 ms data storing interval
- Standard integration and harmonic measurement functions
- Variety of display formats: Numeric, Waveform, Bar graph, Vector, Trend
- Standard external current sensor input for use with current clamps
- Motor evaluation function (optional)
- 30ch D/A output (optional)
- Built-in printer (optional)
- Ethernet function (optional)

Features

- Measurement voltage range
  1.5/3/6/10/15/30/60/100/150/300/600/1000 V
  (DC, 0.5 Hz to 1 MHz)
- Measurement current input range (Direct input)
  5 A input element
  10/20/50/100/200/500 mA, 1/2/5 A
  (DC, 0.5 Hz to 1 MHz)
  50 A input element
  1/2/5/10/20/50 A (DC, 0.5 Hz to 100 kHz)
- External sensor input (same for 5 A and 50 A input elements)
  50/100/250/500 mV, 1/2.5/5/10 V (DC, 0.5 Hz to 500 kHz)
- Basic accuracy: (45 Hz ≤ f ≤ 66 Hz)
  Voltage/Current/Power:
  ±(0.1% of rdg + 0.05% of rng)
- Effective of power factor (at cos φ = 0)
  ±0.15% of rng added
- External dimensions:
  Approx. 426 (W) × 177 (H) × 400 (D) mm
- Weight: Approx. 15 kg (with 6-input element)

Basic Specifications

Features

- Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760101</td>
<td></td>
<td>WT1600 digital power meter main unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Element Number</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>50 50</td>
</tr>
<tr>
<td>4</td>
<td>50 50 50</td>
</tr>
<tr>
<td>5</td>
<td>50 50 50 50</td>
</tr>
<tr>
<td>6</td>
<td>50 50 50 50 50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element types and quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>The numbers in the &quot;Description&quot; column have the following meanings.</td>
</tr>
<tr>
<td>50: 50 A input element</td>
</tr>
<tr>
<td>5: 5 A input element</td>
</tr>
<tr>
<td>Blank: No element</td>
</tr>
</tbody>
</table>

Elements are inserted in the order shown starting on the left side on the back.

<table>
<thead>
<tr>
<th>Model Number and Suffix Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication functions</td>
</tr>
<tr>
<td>-C1 GP-IB</td>
</tr>
<tr>
<td>-C2 Serial (RS-232)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power cord</th>
</tr>
</thead>
<tbody>
<tr>
<td>-D UL/CSA Standard</td>
</tr>
<tr>
<td>-F VDE Standard</td>
</tr>
<tr>
<td>-R SAA Standard</td>
</tr>
<tr>
<td>-Q BS Standard</td>
</tr>
<tr>
<td>-H GB Standard</td>
</tr>
</tbody>
</table>

Option specifications

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B5</td>
<td>Internal printer</td>
</tr>
<tr>
<td>C7</td>
<td>SCSI interface</td>
</tr>
<tr>
<td>C10</td>
<td>Ethernet, HDD, SCSI</td>
</tr>
<tr>
<td>JDA</td>
<td>30-channel DA output</td>
</tr>
<tr>
<td>MTR</td>
<td>Motor evaluation function</td>
</tr>
</tbody>
</table>

* The WT1600 unit cannot be purchased without any elements. Select an element type (5 A or 50 A) and quantity.

Note: In order to add elements and options after the WT1600 has been delivered, the WT1600 must be modified at the factory. Be aware of this in making your product selections. For further details, see Yokogawa’s home page or contact our sales office.
**Overview**

The WT210 and WT230 are compact, half-rack sized power meters. They are suited for a wide range of applications from low-frequency instruments to inverters, and offer improved basic accuracy and bandwidth. WT210 also has the same 5 mA range as WT200 allowing measurement of the extremely small currents found in energy-saving designs and intermittent control devices.

**Features**

- Maximum input with assured accuracy: 26 A
- Compact design (half-rack size)
- 5 mA range for very low current measurements (model WT210 only)
- Line filter function
- High-speed data update (as fast as 10 readings per second)
- Harmonic measurement function available (optional)
- User calibration capability
- Large-current measurement capability using external sensor input (optional)

**Basic Specifications**

- **Measurement voltage range**
  - Voltage: 15/30/60/150/300/600 V
- **Measurement current range**
  - Direct input:
    - 5 mA/10 mA/20 mA/50 mA/100 mA/200 mA
    - 0.5 A/1 A/2 A/5 A/10 A/20 A (WT210),
    - 0.5 A/1 A/2 A/5 A/10 A/20 A (WT230)
  - External Sensor input (optional):
    - 2.5 V/5 V/10 V or 50 mV/100 mV/200 mV
- **Frequency range:**
  - DC and 0.5 Hz to 100 kHz
- **Basic accuracy (45 Hz ≤ \( f \) ≤ 66 Hz)**
  - Voltage/current/power ±(0.1% of rdg + 0.1% of rng)
- **Effect of power factor (at \( \cos \phi = 0 \))**
  - ±0.2% of rng added
- **External dimensions:**
  - approx. 213 (W) × 88 (H) × 379 (D) mm (WT210)
  - approx. 213 (W) × 132 (H) × 379 (D) mm (WT230)
- **Weight:**
  - approx. 3.0 kg (WT210)
  - approx. 5.0 kg (WT230)

**Wiring Types and Model Numbers**

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Model 760401</th>
<th>Model 760501</th>
<th>Model 760502</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase 2-wire</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Single-phase 3-wire</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Three-phase 3-wire (2 voltages, 2 currents)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Three-phase 3-wire (3 voltages, 3 currents)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Three-phase 4-wire</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

**Model Number and Suffix Codes**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760401</td>
<td>D</td>
<td>WT210 single-input element model</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>AS standard</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>BS standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GP-IB communication interface</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>Select one</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>Serial (RS-232-C) communication interface</td>
</tr>
<tr>
<td></td>
<td>E1</td>
<td>External input 2.5/5/10 V</td>
</tr>
<tr>
<td></td>
<td>E2</td>
<td>External input 50/100/200 mV</td>
</tr>
<tr>
<td></td>
<td>HRM</td>
<td>Harmonic measurement function</td>
</tr>
<tr>
<td></td>
<td>DA4</td>
<td>4-channel DA output</td>
</tr>
<tr>
<td></td>
<td>CMP</td>
<td>Comparator and D/A, 4 channels each</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model number</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760502</td>
<td></td>
<td>WT230 2-input element model</td>
</tr>
<tr>
<td>760503</td>
<td></td>
<td>WT230 3-input element model</td>
</tr>
<tr>
<td>Interface</td>
<td>C1</td>
<td>GP-IB communication interface</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>Serial (RS-232-C) communication interface</td>
</tr>
<tr>
<td>Power cont</td>
<td>D</td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>AS standard</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>BS standard</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>GB standard</td>
</tr>
<tr>
<td></td>
<td>E1</td>
<td>External input 2.5/5/10 V</td>
</tr>
<tr>
<td></td>
<td>E2</td>
<td>External input 50/100/200 mV</td>
</tr>
<tr>
<td></td>
<td>HRM</td>
<td>Harmonic measurement function</td>
</tr>
<tr>
<td></td>
<td>DA12</td>
<td>12-channel DA output</td>
</tr>
<tr>
<td></td>
<td>CMP</td>
<td>Comparator and D/A, 4 channels each</td>
</tr>
</tbody>
</table>

Note: The WT210 communication interface cannot be changed or modified after delivery.
Power Measuring Instruments

**Power Analyzer**

**PZ4000**

**An Innovative Power Analyzer that Uses High-speed Sampling, Wide Frequency Range, and Waveform Analysis to Capture Transient Power Values**

**Overview**

In the power electronics field, power measurement requires wide bandwidth performances to evaluate low to high frequencies and distorted waveform signals. The PZ4000 offers wide measurement bandwidths of up to 2 MHz and 5MS/s high-speed sampling to make accurate power measurement. With its LCD color display, the PZ4000 can display a wide variety of measurement parameters and analyze input waveforms as well. Various analysis functions are available to measure fluctuated or transient power during power activation or changes of motors, lighting, etc, which are difficult to measure with conventional power meters.

**Features**

- Wide measurement bandwidth (DC, up to 2 MHz).
- Accurate capturing of input waveforms using high-speed (maximum 5 MS/s) sampling.
- Voltage and current waveform display and analysis functions to enable power calculations on fluctuating inputs.
- Harmonic analysis (up to 500th order) and Fast Fourier Transform (FFT) functions to enable high-frequency power spectrum analysis.
- Multiple channel, synchronized measurements using multiple units and Master-Slave trigger function simplifies complex investigations.
- Variety of display formats: Numeric, Waveform, Bar graph, Vector, X-Y
- Sensor input module option enables evaluation of motor efficiency and total efficiency including the motor drive.

**Model Number and Suffix Codes**

**Main unit**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>253710</td>
<td>-D</td>
<td>PZ4000 Power Analyzer</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>UL/CSA Standard</td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td>VDE Standard</td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>SAA Standard</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>BS Standard</td>
</tr>
<tr>
<td></td>
<td>/M1</td>
<td>GB Standard</td>
</tr>
<tr>
<td></td>
<td>/M2</td>
<td>Memory extension to 1 M word/CH</td>
</tr>
<tr>
<td></td>
<td>/M3</td>
<td>Memory extension to 4 M word/CH</td>
</tr>
<tr>
<td></td>
<td>/B5</td>
<td>Built-in printer</td>
</tr>
<tr>
<td></td>
<td>/C7</td>
<td>SCBI interface</td>
</tr>
</tbody>
</table>

**Plug-in modules**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>253751</td>
<td></td>
<td>Power measurement module Voltage: 1000 V Current: 5 A Current sensor: 500 mV</td>
</tr>
<tr>
<td>253752</td>
<td></td>
<td>Power measurement module Voltage: 1000 V Current: 5 A and 20 A Current sensor: 500 mV</td>
</tr>
<tr>
<td>253771</td>
<td>-E1</td>
<td>Sensor input module Torque / Revolution speed input</td>
</tr>
</tbody>
</table>

*Sensor input module can be used element 4 slot only.*

**Basic Specifications**

- Measurement voltage range
  - 30/60/120/200/300/600/1200/2000 Vpk (Max. 1000 Vrms)
- Measurement current range
  - Direct input: 0.1/0.2/0.4/1/2/4/10 Apk (Max. 5 Arms) for 253751 and 253752
  - 1/2/4/10/20/40/100 Apk (Max. 50 Arms) for 253752
  - External input: 100/200/400/1000 mVpk (Max. 500 mVrms)
- Frequency range: DC to 2 MHz
- Basic accuracy (45 Hz ≤ f ≤ 66 Hz)
  - Voltage/current: ±(0.1% of rdg 0.05% of rng)
  - Power: ±(0.1% of rdg +0.025% of rng)
  - Effect of power factor: ±0.15% of S reading added (S: apparent power)
- External dimensions: Approx. 426 (W) × 177 (H) × 450 (D) mm
- Weight: Approx. 15 kg (with 4-input module)

**253751 Power measurement module:**
- Voltage direct input ranges:
  - 30, 60, 120, 200, 300, 600, 1200, 2000 Vpk (1000 Vrms)
- Current direct input ranges:
  - 0.1, 0.2, 0.4, 1, 2, 4, 10 Apk (5 Arms)
- Current sensor input ranges:
  - 0.1, 0.2, 0.4, 1 Vpk (500 mVrms)

**253752 Power measurement module:**
- Voltage direct input ranges:
  - 30, 60, 120, 200, 300, 600, 1200, 2000 Vpk (1000 Vrms)
- Current direct input ranges:
  - 0.1, 0.2, 0.4, 1, 2, 4, 10 Apk (5 Arms, upper terminal)
  - 1, 2, 4, 10, 20, 40, 100 Apk (20 Arms, lower terminal)
- Current sensor input ranges:
  - 0.1, 0.2, 0.4, 1 Vpk (500 mVrms)

**253771 Sensor input module:**
- Torque computing analog input: 1 /2 /5 /10 /20 /50 Vpk
- Revolution speed computing analog input: 1 /2 /5 /10 /20 /50 Vpk
- Revolution speed computing pulse input:
  - Maximum input range ±5 Vp-p
  - Effective input range Min. 1 Vp-p

[Image of PZ4000 with CE mark]
Digital Power Meters

**WT2010/WT2030**

For Precision Harmonic Analysis and Voltage Fluctuation/Flicker Measurement

**WT2010/WT2030 Specifications**

- Rated values (range)
  Voltage: 10/15/30/60/100/150/300/600 V
  Current: Direct input: 1/2/5/10/20/30 A
- External shunt input: 50/100/200 mV
- Frequency range:
  DC and 2 Hz to 500 kHz (for power, up to 300 kHz)
- Basic accuracy (45 Hz ≤ f ≤ 66 Hz)
  Voltage/current:
  ±(0.05% of rdg + 0.05% of rng)
  Power: ±(0.04% of rdg + 0.04% of rng)
- Effect of power factor (at cos φ = 0)
  ±0.1% of rdg added
- External dimensions:
  approx. 426 (H) × 132 (D) × 400 (W) (D mm)
- Weight:
  approx. 13 kg (3-element model)
  approx. 10 kg (1-element model)

**Input/Output Ratio**: 1500 : 1

**Output current**: 400 mA (when the rated 600 A input current is flowing)

**Rated Current**: 600 A

**Frequency Band**: DC-100 kHz (-3dB)

**Wide dynamic range**: –600 A-0 A-600 A (DC), 600 A peak (AC)

**Use model 751521 for single-phase measurements and model 751523 for three-phase measurements.**

**Current Sensor Units**

**751521/751523**

Current Sensor Units

**Use model 751521 for single-phase measurements and model 751523 for three-phase measurements.**

- Wide dynamic range: –600 A-0 A-600 A (DC), 600 A peak (AC)
- Wide bandwidth: DC-100 kHz
- High accuracy: ±0.05% of rdg + 40 µA

**751521/751523 Specifications**

- Input format: Floating input method using a CT (s)
- Rated Current:
  DC: –600 A-0 A-600 A
  AC: 600 A peak
- Output current: 400 mA (when the rated 600 A input current is flowing)
- Input/Output Ratio: 1500 : 1
- Accuracy:
  DC: ±0.05% of rdg + 40 µA
  AC: ±0.05% of rdg + 40 µA
- Frequency Band: DC-100 kHz (-3dB)
- External dimensions:
  751521: Approx. 426 (W) × 221 (H) × 430 (D) mm
  751523: Approx. 426 (W) × 355 (H) × 430 (D) mm
- Weight:
  751521: Approx. 14 kg
  751523: Approx. 24 kg

**Application Software for Power Meters**

**760122/761922**

View Numeric Data on Your PC

**WTViewer Software**

WTViewer is an application software tool that reads numeric, waveform, and harmonic data measured with the WT300, WT1600, WT210 and WT230.

**761922**

Harmonic/Flicker Measurement Software (WT3000/G6 and FL are required)

The Harmonic/Flicker Measurement Software (Model 761922) loads data measured by the WT3000 and performs harmonic analysis that complies with IEC61000-3-2 edition 2.2. You can use the model 761922 harmonic measurement software to perform harmonic measurement tests conforming to IEC 61000-4-7 edition 2 (window width is 10 cycles of 50 Hz and 12 cycles of 60 Hz) with WT3000.

**Software for Standards-Compliant Measurements**

**751574**

Current Transducer

Yokogawa’s current transducer model 751574 is a large-current measurement DC-CT used inside current sensor units 751521 and 751523. It is especially valuable for applications with limited installation space such as measurements in embedded systems and measurements in actual vehicles (e.g., EV/HEV). (Note: A separate drive DC power supply is required. In addition, precision guarantee conditions may differ from those of the current sensors, depending on conditions such as the conductor position of the input primary wiring.)

- Wide dynamic range: –600 A-0 A-600 A (DC), 600 A peak (AC)
- Wide bandwidth: DC-100 kHz
- High accuracy: ±0.05% of rdg + 40 µA

**751574 Specifications**

- Rated Current:
  DC: –600 A-0 A-600 A
  AC: 600 A peak
- Output current: 400 mA (when the primary rated current of 600 A is flowing)
- Current transformation Ratio: 1500:1
- Accuracy:
  DC: ±0.05% of rdg + 40 µA
  AC: ±0.1% of rdg + 40 µA
- Frequency band: DC-100 kHz (-3dB)
- External dimensions:
  Approx. 122 (W) × 38 (H) × 57 (D) mm
- Weight: Approx. 1 kg.
### Accessories List

<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1 BNC safety adapter lead</td>
<td>701901</td>
<td>1000 Vrms-CAT II, 1.8 m long Safety BNC (male) to safety banana (female) use in combination with 701959, 701954, 758921, 758922 or 758929</td>
</tr>
<tr>
<td>Measurement leads</td>
<td>758917</td>
<td>Two leads in a set. Use 758917 in combination with 758922 or 758929. Total length: 75 cm Rating: 1000 V, 32 A</td>
</tr>
<tr>
<td>Small alligator adapters</td>
<td>758922</td>
<td>For connection to measurement leads (758917). Two in a set. Rating: 300 V</td>
</tr>
<tr>
<td>Large alligator adapters</td>
<td>758929</td>
<td>For connection to measurement leads (758917). Two in a set. Rating: 1000 V</td>
</tr>
<tr>
<td>Safety terminal adapter set</td>
<td>758923</td>
<td>(spring-hold type) Two adapters in a set.</td>
</tr>
<tr>
<td>Safety terminal adapter set</td>
<td>758931</td>
<td>Screw-fastened adapters. Two adapters in a set. 1.5 mm Allen wrench included for tightening.</td>
</tr>
<tr>
<td>Fork terminal adapter</td>
<td>758921</td>
<td>Two adapters (red and black) to a set. Used when attaching banana plug to binding post.</td>
</tr>
<tr>
<td>Conversion adapter</td>
<td>758924</td>
<td>For conversion between BNC and female banana plug</td>
</tr>
<tr>
<td>Conversion adapter</td>
<td>366971</td>
<td>9-pin/25-pin conversion adapter</td>
</tr>
<tr>
<td>External sensor cable</td>
<td>B9284LK</td>
<td>For the external input of the WT210 and WT230. Length: 50 cm</td>
</tr>
<tr>
<td>BNC cable</td>
<td>366924</td>
<td>BNC cable BNC–BNC, 1 m</td>
</tr>
<tr>
<td>BNC cable</td>
<td>366925</td>
<td>BNC cable BNC–BNC, 2 m</td>
</tr>
<tr>
<td>Compact instrument cart</td>
<td>701960</td>
<td>500 (W) × 560 (D) × 705 (H) mm /A: keyboard, mouse table /B: 3-prong power strip</td>
</tr>
<tr>
<td>Deluxe instrument cart</td>
<td>701961</td>
<td>570 (W) × 590 (D) × 893 (H) mm /A: keyboard, mouse table /B: 3-prong power strip</td>
</tr>
<tr>
<td>All-Purpose instrument cart</td>
<td>701962</td>
<td>467 (W) × 693 (D) × 713 (H) mm</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751535-E4</td>
<td>For EIA</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751535-J4</td>
<td>For JIS</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-E2</td>
<td>For WT210 EIA standalone installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-J2</td>
<td>For WT210 JIS standalone installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-E2</td>
<td>For WT210 EIA connected installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-J2</td>
<td>For WT210 JIS connected installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-E3</td>
<td>For WT230 EIA standalone installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-J3</td>
<td>For WT230 JIS standalone installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-E3</td>
<td>For WT230 EIA connected installation</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-J3</td>
<td>For WT230 JIS connected installation</td>
</tr>
</tbody>
</table>
**Time Interval Analyzers**

**TA720/TA320/TA220/TA120F**

**TA720**
- Time Interval Analyzer
- Maximum Continuous Sampling Rate: 80 MS/s
- Sampling rate: 100 MS/s continuous (at Single measurement function)
- 50 MS/s continuous (at Dual measurement function)
- Sampling Modes:
  - Time stamp mode (T.S. Mode)
  - Hardware histogram mode (H.H. Mode)
  - Inter-symbol interference analysis mode (ISI mode)
- Dual Measurement Function
  - Enables two measurements to be done simultaneously.
- Inter-Symbol Interference Analysis Function

**TA320**
- Time Interval Analyzer
- Max. sampling rate: 14 MS/s
- Sample size: up to 99,999,999 (10^8)
- Display resolution: 100 ps
- Easy operation with touch screen
- Compact and lightweight (approx. 5 kg)
- High-speed display update rate
- Measured data or the like can be stored because of incorporated 3.5-inch floppy disk drive

**TA220**
- Digital Jitter Meter
- Blu-ray Disc equalizer and PLL
- High-precision, high-repeatability measurements using the TIA measurement principle
- High-speed measurements (maximum speed: 50 ms)
- Applicable to CD/DVD
- External synchronization enabled by inhibit and external arming functions
- Bi-phase measurement (optional)
- External I/O control (optional)
- Level measurement (optional)

**TA120F**
- Digital Jitter Meter
- Sampling rate: 10 MSps (at data-to-clock phase difference jitter measurements)
- Internal jitter: 3T jitter: 300 ps rms
- Measured parameters: 3T jitter, data-to-clock phase difference jitter, and moving average
- External dimensions: approx. 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 5 kg

**Jitter Measuring Instrument Designed for Production Line Applications for Blu-ray Disc**

**High Precision, TIA Jitter Measurement**

**TA120F Specifications**
- Sampling rate: 10 MSps (at data-to-clock phase difference jitter measurements)
- Internal jitter: 3T jitter: 300 ps rms
- Measured parameters: 3T jitter, data-to-clock phase difference jitter, and moving average
- External dimensions: approx. 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 5 kg

**TA320 Specifications**
- Measuring functions:
  - Period, pulse width, duty ratio,
  - A to B interval
  - A to B to A interval
  - Phase difference
  - Time stamp mode
- Measuring range:
  - 30 ns to 100 ms
  - 5 ns to 100 ms (in TI measurement)
- Sample size: maximum of 32000
- Hardware histogram mode
- Measuring range:
  - 30 ns to 3.2 µs
  - 5 ns to 3.2 µs (in TI measurement)
- Sample size: maximum of 99,999,999
- Gating functions:
  - Internal (time/event) or external gate
time gate: 1 µs to 10 s
  - Event gate: 1 to 32000
  - (up to 99,999,999 in hardware histogram mode)
  - Arming: internal or external
  - External arming
time delay: 1 µs to 1 s
  - Event delay: 1 to 30000
- External dimensions:
approx. 213 (W) × 132 (H) × 392 (D) mm
- Weight: Approx. 5 kg
**Function Generators/Universal Counters**

**Function Generators**

**FG210/FG220/FG310/FG320/FG120/FG110**

- **Frequency Range 1 µHz to 15 MHz**
  - FG200/FG300 Specifications
    - Number of signal outputs: 1 (for FG210 or FG310), 2 (for FG220 or FG320)
    - Output waveforms: sine waves, square waves (duty ratio 50% fixed), triangular waves, pulse waves (duty ratio variable), arbitrary waves (FG310/FG320)
    - Operation mode: continuous, trigger or gate oscillation, DC output
    - Frequency range: sine and square waves: 1 µHz to 15 MHz, triangular and pulse waves: 1 µHz to 200 kHz
    - Maximum output voltage: ±10 V
    - Frequency resolution: 1 µHz or 9 digits max.
    - Output impedance: 50 Ω ± 1%
    - Sweep types: linear, log, linear step, log step, and arbitrary patterns (FG310/FG320)
    - Sweepable parameters: frequency, amplitude, offset phase, duty ratio, frequency and amplitude
    - Modulation types: AM, DSB-AM, FM, phase modulation, offset modulation, or PWM
    - External dimensions: approx. 213 (W) × 132 (H) × 350 (D) mm
    - Weight: Approx. 5 kg

- **FG120/FG110 Specifications**
  - Number of signal outputs: 1 (use 706011 (FG110)), 2 (use 706012 (FG120))
  - Output waveforms: sine, triangular, square, ramp, and pulse
  - Operation mode: continuous, trigger or gate oscillation, DC output
  - Output frequency range: sine and square waves: 1 µHz to 2 MHz, triangular, ramp, and pulse waves: 1 µHz to 100 kHz
  - Frequency resolution: 1 µHz or 10 digits
  - Maximum output voltage: ±10 V*
  - Frequency ratio: A and B: 1 mHz to 60 MHz
  - Duty ratio B
  - Input voltage range: ±5 V (ATT = x1)
  - Frequency range: 50 Hz to 20 MHz
  - External dimensions: approx. 213 (W) × 132 (H) × 350 (D) mm
  - Weight: Approx. 3.6 kg
    * (Maximum amplitude plus offset with high-impedance load)

**Universal Counters**

**TC110/TC120**

- **Frequency Range 1 µHz to 2 GHz (TC120)**
  - TC110/TC120 Specifications
    - Frequencies A, B, and C
      - Measurable range: A: 1 Hz to 120 MHz (1/2-prescaler), B: 1 mHz to 60 MHz, C: 100 MHz to 2 GHz (1/128-prescaler)
      - Period B
        - Measuring range: 20 ns to 999,999,999 s
      - Time interval A→B
        - Measuring range: 60 ns to 999,999,999 s
      - Pulse width B
        - Measuring range: 20 ns to 999,999,999 s
      - Duty ratio B
        - Measuring range: 0.00000001 to 0.99999999
    - Input range: 20 ns to 999,999,999 ns
    - Frequency ratio A/B
      - Measuring range: A and B: 1 mHz to 60 MHz
    - Totalization A
      - Input frequency range: 1 mHz to 50 MHz
      - Counting capacity: 0 to 999999999
    - Revolution B (TC110 only)
      - Measuring range: 60 mppm to 120 Mppm
    - Peak voltage A and B
      - Measuring voltage range: ±5 V (ATT = x1)
    - Frequency range: 50 Hz to 20 MHz
    - External dimensions: approx. 213 (W) × 100 (H) × 330 (D) mm
    - Weight: Approx. 3.6 kg

**TC110/TC120**

- **Measuring frequency range:** 1 mHz to 2 GHz (TC120)
- **Resolution of 8 digits in 1 s**
- **Easy 1-action operation with 1 key**
- **Convenient auto-trigger function**
- **Measurement of revolution (TC110 only)**

---

**FG210, FG220, FG310, FG320**

- **Synthesized Function Generators**
  - Generating frequencies: 1 µHz to 15 MHz (sine waves and square waves), 1 µHz to 2 MHz (triangular, pulsed, and arbitrary)
  - Independent 2 channels (FG220/FG320)
  - Multiple sweep functions and modulation functions
  - Intuitive operation with large LCD panel and touch screen

**TC110/TC120**

- **Wide Measuring Range from 1 mHz to 2 GHz (TC120)**

---

**Function Generators**

**TC110/TC120**

- **Universal Counter**

---

**TC110/TC120**

- **Universal Counter**
  - Measuring frequency range: 1 mHz to 2 GHz (TC120)
  - Resolution of 8 digits in 1 s
  - Easy 1-action operation with 1 key
  - Convenient auto-trigger function
  - Measurement of revolution (TC110 only)
### 5.5 Digits Digital Multimeter

**7556 Specifications**
- DC voltage (DCV)
  - Range: 200 mV to 1000 V
- DC current (DCA)
  - Range: 2 mA to 2000 mA
- AC voltage (ACV)
  - Range: 200 mV to 700 V
  - (true rms value measuring method)
- AC current (ACA)
  - Range: 2 mA to 2000 mA
- Resistance measurement (OHM, 2 W/4 W)
  - Range: 20 Ω to 20 MΩ
  - Maximum indication: 199999
- Absolute value display
  - -99.99% to 19.99% (selectable)
- Deviation display
  - -99.9% to 199.9% (selectable)
- Resolution
  - 0.0001
- Accuracy (at 1 kΩ range)
  - ±0.003% of reading ± 15 digits
- Fast sampling at 125 times/s
- Large capacity buffer memory: up to 8000 data items
- IC memory card usable
- GP-IB interface (standard)

**7556 Digital Multimeter**
- Fast sampling at 125 times/s
- Communication function
- Scanner Function for multi-points
- Large current measurement up to 200 A
- Adoption of command languages used in our and other companies’ DMMs
- Communication function
- Fast sampling at 125 times/s
- Digital Resistance Meter
- High-speed measurement (2.8 ms)
- Highly accurate (±0.006% of reading + 3 digits in 755611)
- High resolution (5.5 digits in 755611)
- Wide range (1 Ω range to 100 MΩ range)
- Full remote control through serial (RS-232) or GP-IB interface
- Software-based calibration function
- Printer output of measurement results and statistics
- Advanced contact check function

### 6.5 Digits Digital Multimeter

**7561/7562 Specifications**
- DC voltage (DCV)
  - Range: 200 mV to 1000 V
- DC current (DCA)
  - Range: 2 mA to 2000 mA
- AC voltage (ACV)
  - Range: 200 mV to 700 V
- AC current (ACA)
  - Range: 2 mA to 2000 mA
- Resistance measurement (OHM, 2 W/4 W)
  - Range: 20 Ω to 20 MΩ
  - Maximum indication: 199999
- Absolute value display
  - -9.999% to 9.999% (selectable)
- Deviation display
  - -99.9% to 99.9% (selectable)
- Resolution
  - 0.0001
- Accuracy (DC voltage-based accuracy)
  - ±0.003% of reading ± 15 digits
- Fast sampling at 333 times/s
- Large capacity buffer memory: up to 8000 data items
- IC memory card usable
- GP-IB interface (standard)

**7561 Digital Multimeters**
- High-speed measurement
- Highly accurate
- Full remote control through serial (RS-232)
- Communication function
- Wide variety of relay cards; digital I/O card
- Digital I/O card:
  - 750641; 4 by 4-ch, maximum 40 V/1A
- General-purpose matrix card:
  - 750631; 10-ch, 2-wire system, maximum 40 V/1A
- General-purpose actuator card:
  - 750612; 10-ch, maximum 40 V/100 mA
- Thermocouple multiplexer card:
  - 750621; 8-ch, 2-wire system, maximum 40 V/1A
- General-purpose multiplexer card:
  - 750601; 8-ch, 2-wire system, maximum 40 V/1A
- Programmable Scanner
- Switching for up to 50 channels
- Types of relay cards and a digital I/O card
- Switching program of up to 100 steps can be stored
- Step/scan interval: arbitrary setting is possible, 20 to 9999 ms (resolution: 1 ms)
  - 1 to 3600 s (resolution: 1 s)
  - 1 to 1440 min (resolution: 1 min)
  - 1 to 24 h (resolution: 1 h)
- Scan start timer:
  - Scan starting time settable in 1-s steps; internal clock with calendar function
- Power supply:
  - 20 V A max. (for 5 cards mounted)
  - 20 to 90 V AC continuous (free setting)
  - 90 to 250 V AC continuous (free setting)
- Power consumption:
  - 20 VA max. (for 5 cards mounted)
- External trigger input/Closed output
- Working temperature/humidity ranges
  - 5°C to 40°C, 20 to 80% RH (non-condensing)
- Power supply:
  - 90 to 250 VAC continuous (free setting)
- Water resistance:
  - 20 V A max. (for 5 cards mounted)
  - 90 to 250 VAC continuous (free setting)
- Card specifications:
  - General-purpose multiplexer card:
    - 750611; 10-ch, maximum 40 V/1 A input available
  - Thermocouple multiplexer card:
    - 750612; 10-ch, maximum 40 V/100 mA input available
  - General-purpose actuator card:
    - 750613; 10-ch, 2-wire system, maximum 40 V/1 A input available
  - General-purpose multiplexer card:
    - 750601; 8-ch, 2-wire system, maximum 40 V/1 A input available
  - Digital I/O card:
    - 750651; 16 bits, bidirectional, or 8 bits × 2 bidirectional

**Scanner**
- Switching for up to 50 channels
- Types of relay cards and a digital I/O card
- Switching program of up to 100 steps can be stored
- Step/scan interval: arbitrary setting is possible, 20 to 9999 ms (resolution: 1 ms)
  - 1 to 3600 s (resolution: 1 s)
  - 1 to 1440 min (resolution: 1 min)
  - 1 to 24 h (resolution: 1 h)
- Scan start timer:
  - Scan starting time settable in 1-s steps; internal clock with calendar function
- Power supply:
  - 20 V A max. (for 5 cards mounted)
- Water resistance:
  - 20 V A max. (for 5 cards mounted)
  - 90 to 250 VAC continuous (free setting)
- Card specifications:
  - General-purpose multiplexer card:
    - 750611; 10-ch, maximum 40 V/1 A input available
  - Thermocouple multiplexer card:
    - 750612; 10-ch, maximum 40 V/100 mA input available
  - General-purpose actuator card:
    - 750613; 10-ch, 2-wire system, maximum 40 V/1 A input available
  - General-purpose multiplexer card:
    - 750601; 8-ch, 2-wire system, maximum 40 V/1 A input available
  - Digital I/O card:
    - 750651; 16 bits, bidirectional, or 8 bits × 2 bidirectional
The GS820 is a highly accurate and highly functional 2-channel programmable DC voltage/current source that incorporates voltage/current generation and measurement functions.

- Isolated 2-channel source and measurement function
- Source and measurement ranges: 7 V and 3.2 A or 18 V and 1.2 A
- Minute current ranges with 200-nA or 1-pA resolution
- Generate arbitrary waveforms consisting of up to 100,000 points at 100-µs intervals
- Channel expansion through master-slave synchronization link
- Fast test speeds
- 16-bit digital I/O (model 765602)

Four-quadrant operation consisting of source operation (current source) and sink operation (current sink) is available with ranges up to 7 V and 3.2 A or 18 V and 1.2 A. The output and measurement resolutions are 5.5 digits.

### Source and Measurement Range

- **Source**
  - Function: Voltage or current
  - Mode: DC or pulse (pulse width: 50 µs to 3,600 s)
  - Sweep mode: Linear, logarithmic, or program (up to 100,000 steps)
  - Trigger source: External or internal timers 1 and 2 (period: 100 µs to 3,600 s)
  - Sweep start source: External or internal timers 1 and 2 (period: 100 µs to 3,600 s)
  - Source delay: 15 µs to 3,600 s

- **Measurement**
  - Function: Voltage, current, auto, voltmeter mode, ammeter mode, or resistance meter mode
  - Integration time: 0.001 to 25 PLC (Power Line Cycle)
  - Trigger source: External or internal timers 1 and 2 (period: 100 µs to 3,600 s)
  - Measurement data storage: Up to 100,000 data points
  - Average: Moving average (average count: 2 to 256)
  - Voltage sense: Two-wire system or four-wire system
  - Auto zero: Measure the internal zero reference every measurement and correct the measured value
  - NULL computation: Computes the difference with respect to the current measured value or user-defined value
  - User-defined computation: Computes user-defined equations in real-time
  - Operators: + (addition), - (subtraction), * (multiplication), / (division), ^ (exponentiation), % (mod), | (logic OR), & (logic AND), ! (negation), < (comparison), <= (comparison), == (comparison)
  - Functions: ABS() (absolute value), SQRT() (square root), LN(), LOG() (logarithm), SIN(), COS(), TAN() (trigonometric functions), SINH(), COSH(), TANH() (hyperbolic functions), RAND() (random number generation), EDGE() (logic change extraction), TRUNC(), FLOOR() (rounding to an integer), ISINF() (infinity judgment), ISNAN (not-a-number judgment)

### Communication Interface

- **GPIB**
  - Electrical and mechanical specifications: Conforms to IEEE Std 488.1-1987
  - Functional specifications: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, CO
  - Protocol: Conforms to IEEE Std 488.2-1987
  - Address: 0 to 30

- **RS232**
  - Connector type: D-Sub 9-pin
  - Electrical specifications: Conforms to EIA RS232
  - Connection format: Point-to-point
  - Transmission mode: Full-duplex
  - Synchronization mode: Start-stop synchronization
  - Baud rate: 9600, 14400, 19200, 38400, 57600, 115200 bps
  - USB
    - Number of ports: 1
    - Connector type: Type B connector (receptacle)
  - Electrical and mechanical specifications: Conforms to USB Rev. 2.0
  - Protocol: Mass storage class, USB-TMC

- **Ethernet**
  - Number of Ethernet ports: 1
  - Connector type: RJ-45 connector
  - Electrical and mechanical specifications: Conforms to IEEE 802.3
  - Transmission system: 10BASE-T/100BASE-T
  - Data rate: 10 Mbps or 100 Mbps
  - Protocol: VXI-11 server, HTTP server, FTP server, DHCP client, and command socket

### Model and Suffix code

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Notes</th>
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<tbody>
<tr>
<td>765601</td>
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<td>GS820 Multi Channel Source Measure Unit Standard Model</td>
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<td>765602</td>
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<td>GS820 Multi Channel Source Measure Unit Digital I/O Installed Model</td>
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<td>UL/CSA standard</td>
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<td>Q</td>
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<td>BS standard</td>
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<tr>
<td>H</td>
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<td>GB standard</td>
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</tbody>
</table>
The GS610 is a highly accurate and highly functional programmable voltage/current source that incorporates voltage/current generation and measurement functions. The maximum output voltage and current are 110 V and 3.2 A, respectively. Evaluation of over a wide range of basic electrical characteristics is possible, because the GS610 can operate as a current source or a current sink.

- Source and sink operation up to 110 V/3.2 A (four-quadrant operation)
- Basic accuracy: ±0.02% *1
- Sweep output at up to 100 µs intervals
- Comes with abundant sweep patterns (linear, logarithmic, and arbitrary)
- Stores up to 65535 points of source measure data in the internal memory
- Easy file operation with the USB storage function
- Remote control and FTP using Web server function (Optional)

*1: DC voltage generation

### Voltage/Current Generation and Measurement Range

Four-dimensional operation with source operation (current source) and sink operation (current sink) is possible at up to 110 V, 3.2 A, and 60 W. The output and measurement resolutions are 5.5 digits.

Voltage generation/measurement range: 200mV to 110 V
Current generation/measurement range: 20 µA to 3.2 A

- Maximum output current:
  - ±3.2 A (at an output voltage of ±12 V or less)
  - ±2 A (at an output voltage of ±30 V or less)
  - ±1 A (at an output voltage of ±60 V or less)
  - ±0.5 A (at an output voltage of ±110 V or less)

### Features

- Voltage/Current Generation and Measurement Range
- USB Drag & Drop
- USB STORAGE
- Source and sink operation (current source and current sink) is possible at up to 110 V, 3.2 A, and 60 W.
- Resolution: 5.5 digits
- Voltage generation/measurement range: 200mV to 110 V
- Current generation/measurement range: 20 µA to 3.2 A
- Maximum output current:
  - ±3.2 A (at an output voltage of ±12 V or less)
  - ±2 A (at an output voltage of ±30 V or less)
  - ±1 A (at an output voltage of ±60 V or less)
  - ±0.5 A (at an output voltage of ±110 V or less)

### 7651 Specifications

- **7651 Programmable DC Source**
  - High accuracy:
    - ±0.01% of setting (voltage)
    - ±0.02% of setting (current)
  - High resolution: 100 nV, 10 nA
  - Fast response: 10 ms/±0.1%
  - High resolution: 100 nV (DC V, 10 mV range)
  - High speed response: 10 ms/±0.1%
  - Low noise: 15 µVrms (1 V range, DC to 10 Hz)
  - Applicable to electronic loads owing to sink action

- **7651 Programmable DC Source**
  - Response time: 10 ms or less
  - Communication function: GPIB
  - Program function: up to 50 steps
  - Seven patterns can be stored with an IC memory card
  - Setting of interval/sweep time
  - Compact and high accuracy
  - Power consumption: about 30 VA
  - External dimensions: 213 (W) × 88 (H) × 350 (D) mm
  - Weight: 3.6 kg
  - Other features:
    - External trigger function
    - Software calibration function
    - Programmable voltage/current limiter function
    - No glitch design at polarity reversal

*About CA series Handy Calibrators, please refer to the page 64 to 65.*
7563 Specifications

- Maximum display: ±999999
- Resolution: Voltage 100 μV
- Resistance: 100 μΩ
- Thermocouple: 0.1°C
- RTD: 0.01°C
- Reference junction compensation accuracy: ±0.2°C
- Various computation functions
- Software calibration function
- Memory function
- Internal memory up to 1000 data items
- IC memory up to 8000 data items
- Communication function: GP-IB

MC100 Specifications

- High accuracy: ±0.05% of full scale
- Output ranges and resolution
  - 0 to 200 kPa (resolution 0.01 kPa)
  - 0 to 25 kPa (resolution 0.001 kPa)
- Functions useful for instrument calibration
  - Divider output, auto-step output, and sweep output
- Excellent temperature coefficient
  - Zero point: ±0.003% of full scale/°C
  - Span: ±0.002% of full scale/°C

Precision Digital Thermometer

MC100 Pneumatic Pressure Standard

- Supply pressure
  - 0 to 200 kPa range model: 280 kPa ±20 kPa
  - 0 to 25 kPa range model: 50 kPa ±10 kPa
- Accuracy
  - ±0.05% of full scale (at 23°C ±3°C)
- Output noise:
  - ±0.02% of full scale
- Effect of mounting orientation
  - Forward/backward incline of 90°
  - 0 to 200 kPa range model: ±0.01% of full scale
  - 0 to 25 kPa range model: ±0.1% of full scale
- Sideways incline of 30°
  - 0 to 200 kPa range model: ±0.2% of full scale
  - 0 to 25 kPa range model: ±2.5% of full scale
- Pressure display units (selectable):
  - kPa, kgf/cm², mmH₂O, mmHg
  - kPa, psi, inH₂O, inHg
- External dimensions: 213 (W) × 132 (H) × 400 (D) mm
- Weight: approx. 9.5 kg
MT210 Series Specifications

- Measuring range (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa and 3000 kPa
- Measuring range (gauge pressure: negative) -80 to 0 kPa, -10 to 0 kPa
- Measuring range (absolute pressure) 0 to 130 kPa abs
- Measuring range (differential pressure) 0 to 1 kPa, 10 kPa, 130 kPa and 700 kPa
- Accuracy (for 0 to 10 kPa range model) ±0.01% of reading + 0.015% of full scale (at positive pressure)
- Resolution 0 to 1 kPa range model: 0.00001 kPa 0 to 10 kPa range model: 0.001 kPa 0 to 700 kPa range model: 0.01 kPa 0 to 3000 kPa range model: 0.01 kPa
- Maximum allowable input (for gauge pressure positive) 0 to 10 kPa range model: 500 kPa gauge 0 to 130 kPa range model: 500 kPa gauge 0 to 700 kPa range model: 3000 kPa gauge 0 to 3000 kPa range model: 4500 kPa gauge
- Pressure display units (selectable): psi, inH2O, inHg, kPa, kgf/cm², mmH2O, mmHg
- External dimensions: 213 (W) x 132 (H) x 350 (D) mm
- Weight Approx. 6.5 kg (0 to 130 kPa range model)

MT210F Series Specifications

- Measuring range (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa and 3000 kPa
- Measuring range (gauge pressure: negative) -80 to 0 kPa, -10 to 0 kPa
- Measuring range (absolute pressure) 0 to 130 kPa abs
- Measuring range (differential pressure) 0 to 1 kPa, 10 kPa, 130 kPa and 700 kPa
- Accuracy (for 0 to 10 kPa range model) ±0.01% of reading + 0.015% of full scale (at positive pressure)
- Response time (0 to 130 kPa range model, at high speed mode) 50 msec max.
- Readout update interval (at medium and high speed mode) 100 msec
- Resolution 0 to 10 kPa range model: 0.0001 kPa 0 to 130 kPa range model: 0.001 kPa 0 to 700 kPa range model: 0.01 kPa 0 to 3000 kPa range model: 0.01 kPa
- Maximum allowable input (for gauge pressure positive) 0 to 10 kPa range model: 500 kPa gauge 0 to 130 kPa range model: 500 kPa gauge 0 to 700 kPa range model: 3000 kPa gauge 0 to 3000 kPa range model: 4500 kPa gauge
- Pressure display units (selectable): psi, inH2O, inHg, kPa, kgf/cm², mmH2O, mmHg
- External dimensions: 213 (W) x 132 (H) x 350 (D) mm
- Weight Approx. 6.5 kg (0 to 130 kPa range model)

MT220 Series Specifications

- Measuring range (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa and 3000 kPa
- Measuring range (gauge pressure: negative) -80 to 0 kPa, -10 to 0 kPa
- Measuring range (absolute pressure) 0 to 130 kPa abs
- Measuring range (differential pressure) 0 to 1 kPa, 10 kPa, 130 kPa and 700 kPa
- Accuracy (for 0 to 10 kPa range model) ±0.01% of reading + 0.015% of full scale (at positive pressure)
- Resolution 0 to 10 kPa range model: 0.001 kPa 0 to 130 kPa range model: 0.01 kPa 0 to 700 kPa range model: 0.1 kPa 0 to 3000 kPa range model: 1.0 kPa
- Maximum allowable input (for gauge pressure positive) 0 to 10 kPa range model: 500 kPa gauge 0 to 130 kPa range model: 500 kPa gauge 0 to 700 kPa range model: 3000 kPa gauge 0 to 3000 kPa range model: 4500 kPa gauge
- Pressure display units (selectable): psi, inH2O, inHg, kPa, kgf/cm², mmH2O, mmHg
- External dimensions: 213 (W) x 132 (H) x 350 (D) mm
- Weight Approx. 6.5 kg (0 to 130 kPa range model)

MT10 Series Specifications

- Type of pressure: gauge
- Three measuring ranges 0 to 130 kPa, 0 to 700 kPa, and 0 to 3000 kPa
- Measurement display range: -2.5 to 110% of FS
- Accuracy: ±0.04% of full scale + 0.03% of FS for 130 kPa model ±2.5% of FS for 700 kPa and 0 to 3000 kPa range models
- Resolution 0 to 130 kPa range model: 0.01 kPa 0 to 700 kPa range model: 0.1 kPa 0 to 3000 kPa range model: 1.0 kPa
- Maximum allowable input 0 to 130 kPa range model: 500 kPa gauge 0 to 700 kPa range model: 1000 kPa gauge 0 to 3000 kPa range model: 4500 kPa gauge
- Effect of temperature Zero: ±0.02% of FS at 10°C or less Span: ±0.02% of FS at 10°C or less
- Pressure display units (specified at shipment) kPa, kgf/cm², mmHg, kPa, inHg, inH2O, psi
- External dimensions: Approx. 72 (W) x 117 (H) x 27 (D) mm
- Weight Approx. 0.7 kg (0 to 130 kPa range model)
Modular Type Measuring Instruments for Easy Operation

### Features
- Modular Design for easy operation
- Modules for a Variety of Signals and Extensive Features
- Easily Control All Modules Using the Control Software
- Control Software that brings out the full functionality of the WE7000
- Network-Friendly Measuring Instruments USB2.0
  - Simply connect a USB cable and communication is ready
- PC-Based Measuring Instruments
  - Provides high-speed data communication using USB 2.0 (up to 480 Mbps)
  - Ethernet (100Base-TX/10Base-T)
    - Enables remote monitoring and measurement using the network such as a corporate LAN
  - Optical Communication
    - Provides optical communication interface with outstanding noise resistance
- High-speed data communication up to 250 Mbps
- Utility Software for More Convenience
- Transformation into Dedicated Measuring Instrument by Customization
- Embedded Modules That Enable High Speed and Independent Processing (Option)

### List of Measurement Module Features

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<thead>
<tr>
<th>Product</th>
<th>Model Code</th>
<th>Feature</th>
<th>Other Features</th>
<th>Partition</th>
<th>Memory</th>
<th>Power</th>
<th>Dimensions (mm)</th>
<th>Used Slots</th>
<th>Weight (kg)</th>
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<tbody>
<tr>
<td>PC-Based Measuring Instruments</td>
<td>WE7000</td>
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<td>Simply connect a USB cable and communication is ready</td>
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<td>Provides high-speed data communication using USB 2.0 (up to 480 Mbps)</td>
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<td>Ethernet (100Base-TX/10Base-T)</td>
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<td>Enables remote monitoring and measurement using the network such as a corporate LAN</td>
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<td>Provides optical communication interface with outstanding noise resistance</td>
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<td>High-speed data communication up to 250 Mbps</td>
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<td>Embedded Modules That Enable High Speed and Independent Processing (Option)</td>
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### Specifications

#### Number of slots:
- **WE500:** 5 measurement modules or 4 measurement modules + 1 communication module (when using optical communication)
- **WE900:** 9 measurement modules or 8 measurement modules + 1 communication module (when using optical communication)

#### Interface for communicating with PC:
- USB (Complies with USB Rev. 2.0), Ethernet (10Base-T or 100Base-TX)

#### External dimensions:
- **WE500:** Approx. 213 (W) × 266 (H) × 360 (D) mm (projections excluded)
- **WE900:** Approx. 350 (W) × 266 (H) × 360 (D) mm (projections excluded)
### 7077 02/7077 03/7077 14/7077 51/7077 61

**Application Software for WE7000**

**Ethernet or optical communications**

#### 7077 02: Computation Function Setup Software
- Software utility that adds data computation function to the WE7000 Control Software.
- Enables four arithmetic operations, FFT analysis, filter functions, waveform parameter measurement, etc.

#### 7077 03: Remote Monitor Add-On Software
- Multiple PCs can use a single measuring station.
- Other PCs can monitor the waveform while one PC is performing measurements. Measurement parameters can also be viewed.
- Able to block other PCs from starting or stopping measurements or changing measurement parameters while one PC is using the measuring station (Access Authority Control).
- Able to block other PCs from controlling or viewing the measuring instrument (Lock function).

#### 7077 14: Computation Waveform Viewer
- Can display waveforms of the WE7000 or DL Series data as well as compute and analyze the data on the PC.
- Equipped with extensive computation functions

#### 7077 51: Arbitrary Waveform Editor
- Create and edit data for the WE7121 and WE7281/82.
- Can edit waveforms of up to 4 M data points.
- Can load measured data (WVF format) and Excel (CSV format) files.
- Edit data within the specified interval (functions and dots).

#### 7077 61: Engine Combustion Pressure Analysis Package
- Offline analysis software for the measured data for the WE7275.
- Supports 4- to 8-cylinder engines.
- Equipped with standard analysis items (functions) required for the combustion pressure analysis.

### WE7000 Utility Software

<table>
<thead>
<tr>
<th>Type</th>
<th>Product</th>
<th>Model Number</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added on to the Control Software</td>
<td>Computation Function Setup Software</td>
<td>707702</td>
<td>Adds computation function to the Control Software</td>
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<tr>
<td></td>
<td>Remote Monitor Add-On Software</td>
<td>707703</td>
<td>Adds remote monitor function to the Control Software</td>
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<tr>
<td>Package software</td>
<td>Computation Waveform Viewer</td>
<td>707714</td>
<td>Waveform Viewer for the WE7000, DL, etc.</td>
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<tr>
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<td>Arbitrary Waveform Editor</td>
<td>707751</td>
<td>Arbitrary waveform data editor for the WE7121 and WE7281/82</td>
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<td>Engine Combustion Pressure Analysis Package</td>
<td>707761</td>
<td>Offline combustion pressure analysis for the WE7275</td>
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### Software for developing user application programs

<table>
<thead>
<tr>
<th>Product</th>
<th>Model Number</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>WVF File Access API</td>
<td>707712</td>
<td>API for accessing WVF</td>
</tr>
<tr>
<td>WVF File Access Tool Kit for MATLAB</td>
<td>707713</td>
<td>MATLAB toolkit for accessing WVF</td>
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<tr>
<td>WE Control API</td>
<td>707741</td>
<td>Functions for controlling the WE7000</td>
</tr>
<tr>
<td>Add On Tool for WE API Vol. 1</td>
<td>707742</td>
<td>ActiveX controls for Visual Basic</td>
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<tr>
<td>Add On Tool for WE API Vol. 2</td>
<td>707743</td>
<td>ActiveX controls for Visual Basic (for display)</td>
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<tr>
<td>Control Tool Kit for LabVIEW</td>
<td>707746</td>
<td>Toolbox for LabVIEW</td>
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<tr>
<td>Control Tool Kit for MATLAB</td>
<td>707747</td>
<td>Toolbox for MATLAB</td>
</tr>
</tbody>
</table>
Communications/Network Test Instruments

OTDR

Superior cost performance, easy to operate.

Features
- Short dead zone (0.8 m)
- Wide range of models available supporting FTTH to metro networks
- High performance & easy to use OTDR
- Bright & high contrast 8.4 inch LCD screen
- 11-model Lineup

Specifications
- Horizontal Axis Parameters:
  - Sampling resolution: 5 cm, 10 cm, 20 cm, 50 cm, 1 m, 2 m, 4 m, 8 m, 16 m, 32 m
  - Readout resolution: 1 cm (Min.)
  - Number of sampled data: Up to 50,000 points
- Vertical Axis Parameters:
  - Vertical axis scale: 0.2 dB/div, 0.5 dB/div, 1 dB/div, 2 dB/div, 5 dB/div, 7.5 dB/div
  - Readout resolution: 0.001 dB (Min.)
  - Memory capacity: 1000 waveforms or more
- Display: 8.4 inch color TFT (640 × 480 pixels)
- External dimensions: 287 (W) × 197 (H) × 85 (D) mm
- Weight: Approx. 2.8 kg (not including options)

Specifications by model

Single-mode Fiber 1 Wavelength Type

<table>
<thead>
<tr>
<th>Model</th>
<th>Wavelength</th>
<th>Applicable fiber</th>
<th>Distance range</th>
<th>Pulse width</th>
<th>Dynamic range</th>
<th>Event dead zone</th>
<th>Attenuation dead zone</th>
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<tbody>
<tr>
<td>735020</td>
<td>1550/125nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 450km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>32dB</td>
<td>0.8m</td>
<td>0.8m</td>
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<tr>
<td>735021</td>
<td>1550/125nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 450km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>32dB</td>
<td>0.8m</td>
<td>0.8m</td>
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Single-mode Fiber 3 Wavelength Type

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<th>Model</th>
<th>Wavelength</th>
<th>Applicable fiber</th>
<th>Distance range</th>
<th>Pulse width</th>
<th>Dynamic range</th>
<th>Event dead zone</th>
<th>Attenuation dead zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>735025</td>
<td>1310/1490/1550/25nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>34/32/3dB</td>
<td>0.8m</td>
<td>0.8m</td>
</tr>
<tr>
<td>735026</td>
<td>1310/1550/25nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>34/32/32dB</td>
<td>0.8m</td>
<td>0.8m</td>
</tr>
<tr>
<td>735027</td>
<td>1310/1550/25nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>34/32/32dB</td>
<td>0.8m</td>
<td>0.8m</td>
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<tr>
<td>735028</td>
<td>1310/1550/25nm</td>
<td>SM (ITU-T G.652)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km</td>
<td>3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>34/32/32dB</td>
<td>0.8m</td>
<td>0.8m</td>
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Multimode Fiber 2 Wavelength Type

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<thead>
<tr>
<th>Model</th>
<th>Wavelength</th>
<th>Applicable fiber</th>
<th>Distance range</th>
<th>Pulse width</th>
<th>Dynamic range</th>
<th>Event dead zone</th>
<th>Attenuation dead zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>735029</td>
<td>850/1300/1300nm</td>
<td>GI (50/125, 62.5/125um)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 450km</td>
<td>10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>3nm/12m</td>
<td>7/8/12m</td>
<td>7/8/12m</td>
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<tr>
<td>735030</td>
<td>850/1300/1300nm</td>
<td>GI (50/125, 62.5/125um)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 450km</td>
<td>10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>3nm/12m</td>
<td>7/8/12m</td>
<td>7/8/12m</td>
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Multimode/Single-mode Fiber 4 Wavelength Type

<table>
<thead>
<tr>
<th>Model</th>
<th>Wavelength</th>
<th>Applicable fiber</th>
<th>Distance range</th>
<th>Pulse width</th>
<th>Dynamic range</th>
<th>Event dead zone</th>
<th>Attenuation dead zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>735030</td>
<td>850/1300/1300nm</td>
<td>GI (50/125, 62.5/125um)</td>
<td>500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 450km</td>
<td>10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1us, 2us, 5us, 10us, 20us</td>
<td>3nm/12m</td>
<td>7/8/12m</td>
<td>7/8/12m</td>
</tr>
</tbody>
</table>

Notes: Specifications without any special remarks, assured at 23°C.
The AQ7260 OTDR covers a wide range of applications for the installation and servicing of optical networks, with a variety of OTDR modules and optional units:

- Sampling resolution: Min. 5 cm
- Sampling points: Max. 60,000
- Fast measurements
- 8.4 inch TFT-LCD color display for easy viewing
- Large internal memory: 20 MB
- USB ports for connectivity and data storage
- Telecordia GR 196 file format for data storage
- Compact and light weight: Approx. 3 kg

Specifications

Main frame:
Display: 8.4 inch color TFT (640 x 480 dots)
Horizontal axis:
- 25 m, 50 m, 100 m, 250 m, 500 m, 1 km, 2 km, 2.5 km, 5 km, 10 km, 20 km, 40 km, 80 km, 160 km, 240 km, 320 km, 640 km (Depend on the optical module)
Readout resolution: Min. 1 cm
Sample data count: Max. 60,000 points
Vertical axis: 0.2 dB/div, 0.5 dB/div, 1 dB/div, 2 dB/div, 3 dB/div, 5 dB/div, 7.5 dB/div
Return-resolution measurement function:
- Return loss at mechanical connectors can be measured.

Optical modules:
Center wavelength (nm):
- AQ7261 SMF Module: 1310/1550 +/- 25
- AQ7265 SMF Module: 1310/1550 +/- 20
- AQ7269 MMF/MMF Module: 850/1300 +/- 30 (MMF), 1310/1550 +/- 25 (SMF)
- Measured fiber: SM (ITU-T G.652)
- Distance range (km):
  - 2, 5, 10, 20, 40, 80, 160, 240, 320/640 (Depend on the optical module)
Dynamic range (dB):
- 5 km, 10 km, 20 km, 40 km, 80 km, 160 km, 240 km, 320 km, 640 km (Depend on the optical module)
- Return-loss measurement function:
- Total return loss of a fiber cable or between any two points can be measured.
AQ2160-01
Optical Powermeter
The AQ2160-01 is a compact, lightweight, cost-effective optical powermeter designed for optical fiber line installation and maintenance. The AQ2160-01 is a new de facto standard of handheld optical powermeters focusing on the ease of use, including simple operation, convenient backlighting, and safe transport using the neck strap.

AQ2160-02
Optical Powermeter
The AQ2160-02 is a full-featured handheld optical powermeter that can measure the relative and absolute optical power for CW and chopped light, and is equipped with the data storage capability. With the USB interface the AQ2160 can transfer the measured data from an internal memory to a PC.

AQ4270-01
LD Light Source (1310/1550 nm)
The AQ4270-01 is a rugged durable handheld LD light source that is operable in the temperature from 0°C to 50°C and conforms the waterproofing standard IEC60529 IP110031. The AQ4270-01 can output two wavelengths (1310/1550 nm), and is easy to maintain due to a user cleanable input connector.

AE5501
Traffic Tester Mini
AE5501 is designed for installation and maintenance of networks such as wideband Ethernet and CATV access networks, working in Layer 2 to Layer 3. It has various hardware interfaces (10BASE-T upto 1000BASE-T, SX, LX) to flexibly adapt to multiple Ethernet networks, in a simple operation.

A single unit can test Ethernet network at 10 Mbit/s, 100 Mbit/s, and 1 Gbit/s.
AE5511 TrafficTesterPro is an IP traffic generation tester that provides test solutions to evaluate and inspect network equipment such as LAN switches, routers, and GE-PON. TrafficTesterPro offers flexible modular designs. Customers can choose and exchange units to support their specific needs or to adapt to new interfaces and standards. Yokogawa is offering a wide variety of units, from highly functional type units, which have all the necessary functions to develop and inspect IP network equipment to affordable units, which provide cost-cutting at production and during shipping inspections.

### Features
- Supports 10 Mbit/s to 10 Gbit/s Ethernet
- A PC can control up to 16 frames (max. 512 ports)
- Full-wire rate traffic generation and statistics monitor function
- Frame BERT (Bit Error Rate Test) capability
- Frame latency and IFG measurement function
- Frame capture function
- Multi-user function allows up to eight users to share a unit
- Ethernet-OAM supported (AE5523 and AE5524)

### Applicable Functions by Unit
- Full-wire rate traffic generation
- Latency measurement
- Frame BERT
- Data Capture
- Frame capture
- Multi-user Sharing
- Link down generation
- IPv4 simulation
- IPv6 simulation
- Sequence check
- Alarm logging
- Non-statistics monitoring
- Pack. measurement
- Bit Error Rate Test
- Flow Measurement
- Log Management
- IOS

### Model Number and Suffix Code

<table>
<thead>
<tr>
<th>Unit</th>
<th>Interface</th>
<th>Number of Ports</th>
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</thead>
<tbody>
<tr>
<td>AE5520 10/100BASE-T unit</td>
<td>10BASE-T, 100BASE-TX</td>
<td>16 ports</td>
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<tr>
<td>AE5521 1000BASE-X unit</td>
<td>1000BASE-SX, 1000BASE-LX</td>
<td>4 ports (GBIC)</td>
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<tr>
<td>AE5522 10GBASE-X unit</td>
<td>1000BASE-LR, 1000BASE-ER, 1000BASE-SR</td>
<td>2 ports (XENPAK)</td>
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<tr>
<td>AE5523 1000BASE-T unit</td>
<td>10BASE-T, 100BASE-TX, 1000BASE-T</td>
<td>12 ports</td>
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<tr>
<td>AE5524 1000BASE-X unit</td>
<td>1000BASE-SX/LX</td>
<td>1 port (SFP)</td>
</tr>
</tbody>
</table>

### Table of Functions

<table>
<thead>
<tr>
<th>FUNCTIONS</th>
<th>AE5520</th>
<th>AE5521</th>
<th>AE5522</th>
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</tr>
</tbody>
</table>

*Can share per unit  *2: Only for single link down generation  *3: Supports the frame generation and the capture
Multi Application Test System

AQ2200

Communications/Network Test Instruments

Build Your Own Test Configurations in Small Footprint

Frame and Module Lineup

- Frame controllers
  - AQ2201 Frame controller (3 slots for modules)
  - AQ2202 Frame controller (9 slots for modules)
- Light source modules
  - AQ2200-111 DFB-LD module (C & L Band, SMF or PMF, 1-slot)
  - AQ2200-136 TLS module (1440-1640nm, SMF, 2-slot)
- AQ2200-141 FP-LD module (SMF, 1-slot)
  - AQ2200-142 DUAL FP-LD module (SMF, 1-slot)
- Sensor modules and Sensor Heads
  - AQ2200-211 Sensor module (-110dBm, 700-1700nm, 1-slot)
  - AQ2200-215 Sensor module (+30dBm, 970-1660nm, 1-slot)
- AQ2200-221 Sensor module (Dual sensor, 800-1700nm, 1-slot)
  - AQ2200-231 Optical sensor head (Large diameter, 800-1700nm)
  - AQ2200-241 Optical sensor head (Large diameter, 400-1100nm)
- Optical attenuator modules
  - AQ2200-311 ATTN module [w/ Monitor output (optional)] (SMF or MMF, 1-slot)
  - AQ2200-331 ATTN module [w/built-in optical power meter] (SMF or MMF, 1-slot)
- Optical switch modules
  - AQ2200-411 OSW module (1×4 or 1×8, SMF or MMF, 1-slot)
  - AQ2200-412 OSW module (1×16, SMF, 1-slot)
- AQ2200-421 OSW module (1×2 or 2×2, SMF or MMF, 1-slot)
  - 10Gbit/s BERT modules
  - AQ2200-601 10 Gbit/s BERT module (3-slot)
  - AQ2200-621 10 Gbit/s optical modulator (1.55 µm, SMF, 1-slot)
  - AQ2200-622 10 Gbit/s optical modulator (1.31 µm, SMF, 1-slot)
- AQ2200-631 10 Gbit/s optical receiver (1.31/1.55 µm, SMF, 1-slot)
  - AQ2200-641 XFP interface module

Features

The AQ2200 Multi Application Test System is the ideal system for measuring and evaluating a wide range of optical devices and optical transmitters.

- Flexible and space effective
- Easy-to-View TFT color display
- Remote operation through Ethernet network
- Built-in applications
  - Optical power stability measurement
  - Short-term optical power fluctuation measurement
  - Wavelength dependent loss measurement
  - Bit error rate test (BERT)
  - Optical return loss and insertion loss measurement
- Wide variety of plug-in modules
- Hot-swappable modules

Applications

- 10Gbit/s transceiver measurement system
- GE-PON ONU/OLT measurement system
- GE-PON optical three wavelength filter measurement
- Optical amplifier measurement system
- MUX/DEMUX measurement system

Passive component test applications

10Gbit/s BERT applications

Optical splitter measurement system for PON

10 Gbit/s transceiver measurement system
Communications/Network Test Instruments

Communications/Network Test Instruments

Redefining Optical Spectrum Measurement Excellence

Features

- **World Class Optical Performance & Flexibility**
  - High wavelength resolution: 0.02 nm (0.015nm typ.)
  - Wide close-in dynamic range: 70dB typ.
  - Single and multimode fiber test capability (up to GI 62.5/125µm)
  - In the diffraction-grating-based optical spectrum analyzer industry as of January 2006

- **Improved Measurement Throughput**
  - Fast measurement and fast data transfer

- **Enhanced User Friendliness**
  - USB for Mouse, keyboard, and external storage devices
  - Bright 10.4” LCD
  - Trace zoom capability
  - Various built-in analysis functions
  - Compatible with SCPI and supports AQ6317 series remote commands
  - Includes Wavelength Calibration Source
  - AQ6370 Viewer: Emulation/Remote control software (Optional)

**Specifications (extracts)**

- Applicable fiber: SM (9.5/125 µm), GI (50/125 µm, 62.5/125 µm)
- Measurement wavelength range: 600 to 1700 nm
- Wavelength accuracy: ±0.02 nm (1520 to 1580 nm), ±0.04 nm (1450 to 1520 nm, 1580 to 1620 nm), ±0.1 nm (Full range)
- Measurement data point: 101 to 50001
- Level sensitivity: -90 dBm (1300 to 1620 nm, resolution: 0.05nm or wider, sensitivity: HIGH3)
- Maximum input power: +20 dBm (Per channel, full span)
- Close-in dynamic range:
  - 45 dB (±0.2 nm from peak at 1523 nm, resolution: 0.05 nm),
  - 62 dB (±0.4 nm from peak at 1523 nm, resolution: 0.05 nm),
  - 40 dB (±0.2 nm from peak at 1523 nm, resolution: 0.1 nm),
  - 57 dB (±0.4 nm from peak at 1523 nm, resolution: 0.1 nm)
- Data storage: Internal memory and external (USB storage (memory/HDD))
- Printer: Built-in high-speed thermal printer (Factory option)
- Display: 10.4-inch color LCD (Resolution: 800 x 600)
- Power requirement: 100 to 240 V AC, 50/60Hz, approx. 150VA
- Dimensions and mass: Approx. 426 (W) x 221 (H) x 459 (D) mm, Approx. 27kg (without printer option)

- World class optical performance
- Close-in Dynamic Range
  - 70dB at peak±0.4nm, resolution setting 0.02nm (typical)
- DWDM signal measurement
  - DWDM channels allocated at 50GHz spacing can be measured and analyzed.

- Improved Measurement Throughput
- 3x Sweep speed
- 10x GP-IB data transfer speed
- 100x Ethernet data transfer speed
  - (in comparison with AQ6317C Optical spectrum Analyzer)

- Enhanced User Friendliness
- USB interface
  - Supports mouse, keyboard, and external storage devices.
- Trace zoom function
  - Enlarges a designated area

Model Number and Suffix Code

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>733301</td>
<td>-D</td>
<td>Optical Spectrum Analyzer AQ6370</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>UC/CSA standard (UL3P)</td>
</tr>
<tr>
<td></td>
<td>-G</td>
<td>VDE standard (CEE-C7)</td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>SAA standard (SAA-3P)</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>BS standard (BS3P Rectangular)</td>
</tr>
<tr>
<td></td>
<td>-M</td>
<td>BS standard (BS3P Round)</td>
</tr>
<tr>
<td></td>
<td>-P</td>
<td>HS standard (UL3P with 3P/2P converter)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9447 (FC) Connector adapter for optical input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9447 (SC) Connector adapter for optical input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9447 (ST) Connector adapter for optical input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9441 (FC) Universal adapter for calibration output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9441 (SC) Universal adapter for calibration output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AQ9441 (ST) Universal adapter for calibration output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Built-in thermal printer</td>
</tr>
</tbody>
</table>

AQ6370 Viewer Emulation/Remote Control Software (Optional)

Emulation function
- Exactly the same user interface and functions as AQ6370.
- Easy display and analyze waveform data.

Remote control function
- Allows you to control AQ6370 from anywhere on Ethernet networks.
- Real-time update gives you the sensation of operating on an actual unit.
- Applications: Troubleshooting in production lines, monitoring of long term tests in the lab.
Communications/Network Test Instruments

**Communications/Network Test Instruments**

25 GHz spacing DWDM signals
OSNR 40 dB (@Noise BW = 0.01 nm)

**Measurement Examples**

The wide close-in dynamic range makes it possible to accurately measure OSNR of DWDM signals with 25 GHz (or narrower) spacing. Even at 0.05 nm resolution setting, ASE noise between channels can be measured flatly.

**Modulated signal measurement**

With its high resolution and wide close-in dynamic range, a side-band at 10 Gbps or 40 Gbps modulated signal can be observed clearly.

**Features**

- **Best optical performance**
  - High wavelength accuracy: ±10 pm
  - High wavelength resolution: 10 pm
  - High wavelength resolution accuracy: ±2%
  - Wide close-in dynamic range

- **Fast sweep and quick response**
  - Measurement time is as low as 1/5 compared to the conventional models (AQ6317 Series)*
  - Faster auto-ranging in all sensitivities
  - Quicker key response as measurement conditions change
  * Depends on measurement settings and input light condition.

- **User-friendly GUI and powerful functions**
  - Easy operation with mouse/keyboard
  - Compatible with multiple interfaces (GP-IB, LAN, printer, etc.)
  - Large data storage area and fast data transfer (FTP)
  - Enhanced built-in applications

**Specifications**

- **Applicable fiber**
  - SM (9.6/125 µm), GI (50/125 µm)

- **Measurement wavelength range**
  - 600 to 1700 nm

- **Span**
  - 0.1 nm to full range and zero span

- **Wavelength repeatability**
  - ±2 pm (1 min, or less, 1450 to 1620 nm)

- **Number of samplings**
  - 101 to 60001

- **Resolution bandwidth**
  - 0.01, 0.02, 0.05, 0.1, 0.2, 0.5 and 1 nm

- **Resolution accuracy**
  - ±2% (RES.: 0.1 nm or wider, 1450 to 1620 nm)
  - ±2.5% (RES.: 0.05 nm, 1450 to 1620 nm)
  - ±6% (RES.: 0.02 nm, 1450 to 1620 nm)

- **Level linearity**
  - ±0.05 dB (50 to +13 dBm, RES.: ±0.02 nm or wider, SENS.: HIGH 1 to 3)

- **Close-in dynamic range**
  - 60 dB (100 pm from peak at 1523 nm, RES.: ±0.01 nm)
  - 70 dB (200 pm from peak at 1523 nm, RES.: ±0.01 nm)
  - 90 dB (1000 pm from peak at 1523 nm, RES.: ±0.01 nm)

- **Interface**
  - Remote control
  - AQ6317 Series compliant commands (IEEE488.1), IEEE488.2 full support
  - Others
    - GPIB × 2, RS232C, Printer port, External SVGA, PS/2 × 2, LAN

- **Power requirement**
  - 100 to 240 (±10%) V, 50/60 Hz, approx. 480 VA
  - Dimensions and mass
    - Approx. 425 (W) × 232 (H) × 500 (D) mm, 33 kg

**Notes:**
1) With 9.5/125µm SMF, after 1 hour warm-up, after optical alignment
2) At 15 to 30°C
3) At chop mode off
4) Horizontal scale: wavelength display mode
5) At 23 ± 3°C
6) With applied input fiber Type B1.1: 9.6/125µm SMF defined on IEC60793-2 (Mode field diameter: 9.5µm, NA: 0.104 to 0.107, PC polished), attenuation off, vertical scale: absolute power display mode
7) Sensitivity setting is HIGH3 and chop mode on
8) CE: CE marking
9) Power cord
   - D: UL/CSA standard (UL3P)
   - F: VDE standard (CEE-C7)
   - G: SAA standard (SAA-3P)
   - Q: BS standard (BS546 3P)
   - H: BS standard (BS 2P)
10) Accessory

**Ordering Information**

**Product name:** AQ6319 Optical Spectrum Analyzer

**Model:** 810804600-

**CE:** CE marking

**Power cord**
- D: UL/CSA standard (UL3P)
- F: VDE standard (CEE-C7)
- G: SAA standard (SAA-3P)
- Q: BS standard (BS546 3P)
- H: BS standard (BS 2P)

**Fuse type**
- 1: 5 A (AC 100 V to AC 120 V)
- 5: 3.15 A (AC 200 V to AC 240 V)

**Print paper (Roll type)**

Parts No.: 955-990000320
(model name: TF50KS – E2)
Communications/Network Test Instruments

**AQ7410B**

High-Resolution Reflectometer

The AQ7410B high-resolution reflectometer is a Michelson interferometer based instrument for measuring internal reflection of optical module and devices. With resolutions of 20 µm (AQ7413) and 65 µm (AQ7414), the AQ7410B offers the superior spatial analysis capability necessary for measuring multiple reflection points in optical modules and devices.

![Reflection measurement of an optical receiver](http://www.yokogawa.com/tm/optfiber/aq7410b/tm-aq7410b_01.htm)

**PRINCIPLE**

**Measurement example**

**AQ8603**

Optical Fiber Strain Analyzer

The AQ8603 is an optical fiber sensing system which can measure strain distribution in the optical fiber axial direction from one end by utilizing both Brillouin scattering light detecting technology and OTDR technology. The AQ8603 provides low cost monitoring in various structures and foundations such as architectural structures, civil engineering constructions, marine vessels, and aircraft.

**AQ6331**

Optical Spectrum Analyzer

The AQ6331 is a portable optical spectrum analyzer (OSA) offering the advanced performance required for DWDM network testing, in both C-band and L-band. The AQ6331 presents excellent wavelength resolution, with accuracy and dynamic range equal to a conventional bench top OSA for research and development applications.

**AQ4305**

White Light Source

The AQ4305 is a high power broadband light source that uses a halogen lamp. The AQ4305 can measure wavelength dependent loss characteristics of optical devices and optical fibers in conjunction with an optical spectrum analyzer.

**WD300 & WD30**

WDM Monitor & Channel Monitor

The WDM monitor WD300 is a polychromator based optical system having no moving parts and features excellent long term reliability. The WD300 can accurately and quickly perform wavelength, optical power and OSNR measurements that are required for the telecommunication equipment application, and is suitable for monitoring of DWDM system with 50GHz and 100GHz-channel spacing. The WD30, a miniaturized model, offers the best performance as a monitor of the RODAM applications.

**AQ8920**

Fiber Optic Distributed Temperature Unit

The AQ8920 is an optical fiber temperature distribution measuring instrument using Raman spectroscopy and OTDR technology, and can measure the temperature distribution along a fiber from one end. The AQ8920 provides low cost solutions in various plant applications such as the temperature monitoring of pipeline and furnace and the fire detection.

**FB200**

FBG Sensor Monitor

The FB200 is a FBG monitor that uses an Optical Fiber Bragg Grating (FBG) as a sensor and measures the changes of temperature, strain and pressure as a wavelength shift. The FB200 can quickly measure multiple FBG sensors deployed along a fiber. Its small, light and reliable design is ideal for constant monitoring.
**Optical Power Meter**

**TB200**

Supports All Blue, Red and Near Infrared Wavelength Bands

[Image of TB200]

http://www.yokogawa.com/tm/TB200/

**TB200 Specifications**

**Power Meter Unit**
- Display resolution: 0.01 dB (When W unit is selected, floating point 4 digits past decimal point)
- Unit Display
  - Absolute value: dBm, mW, µW, nW
  - Incremental value: dB
- Measurement Interval: Approx. 100 msec
- Interface: USB (type B)
- Power supply: AC adapter (rated input voltage: 100 to 240 V) / 7 VA
- AA alkaline dry cell (operation time: approx. 24 hours)

**Power Sensor Unit**
- Wavelength range: 400 to 850 nm
- Light-receiving element: Si-PD
- Received light power range: 1 µW (+30 dBm) to 100 mW (+20 dBm)
- Max. light receiving level: +20 dBm (100 mW)
- Max. power density: 5 mW/mm²

**3298F**

Multimedia Display Tester

Luminance, Contrast, Flicker and Chromaticity Measurements All with Just one Device

[Image of 3298F]

http://www.yokogawa.com/tm/3298F/

**3298F Specifications**

- Luminance measurement range: 0.01 to 40,000 cd/m²
- Luminance measurement range settings: 400.0/4,000/40,000 cd/m²
- Luminance measurement precision: ±0.03% of indicated value ± ±0.035% of full-scale value
- Spectral responsivity: Approximates CIE 1931 color matching functions
- Color system: Chromaticity coordinates: (x, y, L) or (u', v', L)
- Tristimulus values: (X, Y, Z) or (R, G, B) or (RGB ratio)
- Correlated color temperatures: (Tc, duc, L)
- Chromaticity precision: (deviation in x and y values) ±0.002 or less, for type A standard light source (23 ± 3°C, 70% RH or less, and luminance of at least 1% of the set range's full-scale value)
- ±0.03 or less, for combination of type A standard light source/three-wavelength fluorescent lamp + color filters (at 23 ± 3°C, 70% RH or less, and luminance of at least 1% of the set range's full-scale value)
- External dimensions: Approx. 87 (W) × 150 × 3 (H) (mm); tester dimensions: Approx. 107 (W) × 176 (H) × 55 (D) (mm)
- Weight: Approx. 1 kg
- Power supply: Four AA batteries or optional AC adapter

**329831**

Light Measurement Data Management Software

This light measurement data management software downloads measurements from a multimedia display tester (3298/3298F) to a PC and displays data tables, chromaticity diagrams, deviation charts, and trend graphs. The program can also read data stored in the display tester's memory.

- The program can be used to display data for each measurement parameter in table format and save the data to text files.
- A graphing function provides easy-to-understand graphical displays of luminance and chromaticity measurements according to the particular management application.
- Diagrams such as chromaticity diagrams can be copied and pasted to other Windows programs using the Windows clipboard.
- Diagrams such as chromaticity diagrams can be printed out as hard copies.
- Setting parameters can be saved to files.
- Memory data can be loaded into tables.

**329831 Specifications**

**Functions**
- Data table (measurement data)
  - Displays data for each measurement parameter in table format.
  - Any of the available parameters can be selected for display.
- Trend graph
  - Displays trends for luminance, flicker, and chromaticity.
  - The number of measurements is shown on the horizontal axis.
- Chromaticity diagram
  - Displays chromaticity measurements (x, y, u', v', L) table color system in graph format.
  - The screen size of the chromaticity diagram can be switched between two different sizes.
  - Three different plot modes are available: refresh, trace, and scatter.
- Deviation chart
  - Up to six reference colors can be set for chromaticity measurements.
  - Reference colors can be input numerically or through measurements.
  - Three different plot modes are available: refresh, trace, and scatter.
- Surface distribution graph
  - Displays deviations for luminance and chromaticity according to position (color irregularity).
- The graphical part of any graph or chart can be printed to the clipboard as a bitmap.
- The graphical part of any graph or chart can be printed.
- File saving
  - Information shown in a data table can be saved in text format.
- Settings
  - Various coefficients can be set (color correction coefficient, etc.).
- Memory data
  - Specified parameters in memory can be displayed in data tables.

**System Specifications**
- PC: PC with a Pentium 133 MHz or faster and at least 32 MB RAM, running Windows98/NT/2000. The PC should have a serial port conforming to the RS-232 standard. Screen: 640 × 480 resolution, 256 colors or more colors (65,000 or more colors recommended).
- Multimedia display tester:
  - 3298F (model: 329802) ROM Version 1.00 or later
  - 3298 (model: 329801) ROM Version 1.05 or later
Mobile/Wireless Test Instruments

VC3300

Saves Time, Money and Space for Testing and Programming

Features

- High-end tester class performance
  - Good power accuracy
- Typical test items are measured: approx. 0.2s
- 3 test mode for each usage
  - TxRx mode for component calibration (No signaling)
  - Manual mode for radio characteristics test (With signaling)
  - Scenario mode for automatic Go/No-Go test (With signaling)
- Support multiple wireless system
  - GSM/GPRS/EDGE/WCDMA/HSDPA
- Function test item: Call processing, Voice loop back, TV loop back, Emergency call, Frequency handover, System handover (WCDMA to GSM)
- Compact design and light weight

Specifications

- Frequency band
  - GSM900/DCS1800, GSM850/PCS1900
  - WCDMA (I, II, III, IV, V, VI, VIII, IX)
- Downlink transmission power: -120dBm to -10dBm
- Uplink reception power:
  - Measurement range:
    - -70dBm to +35dBm (WCDMA)
    - -40dBm to +35dBm (GSM)

VC200 Series

High C/P 2G/3G Mobile Phone Testing

WCDMA

Model 733014 and 733015 W-CDMA Test Functions:

- Call Processing
- Frequency Handover
- Maximum Output Power Measurement
- Minimum Output Power Measurement
- Open Loop Power Control
- Inner Loop Power Control
- EVM/Frequency Error
- Reference Sensitivity (BER)
- Maximum Input Power (BER)
- Voice Loop Back

Model & Suffix Code

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>733013</td>
<td>VC210 GSM tester</td>
<td></td>
</tr>
<tr>
<td>733014</td>
<td>VC220 WCDMA tester</td>
<td></td>
</tr>
<tr>
<td>733015</td>
<td>VC3300U GSM/WCDMA tester</td>
<td></td>
</tr>
</tbody>
</table>

WCDMA/GSM Mobile Phone Tester

VC-SHIELD

VC-SHIELD Shield Box

- Including the phone fixture
- Frequency Range: 800MHz to 2500MHz
- Shield Characteristics: < -60dB
- RF Cable Interface:
  - External RF Connector type N
  - Internal RF Connector type SMA

VC-SHIELD

Wireless Communication Tester

VC3300

http://www.yokogawa.com/tm/VC3300/

VC200 Series

http://www.yokogawa.com/tm/VC200/

VC-SHIELD

http://www.yokogawa.com/tm/VC-SHIELD/
The Most Advanced IQ Baseband Signal Generator with High Sampling Clock Rate and Multi-channels

**Features**
- High speed sampling clock: Max. 300 MHz
- Long memory: Max. 128 M points/Ch
- Multi-channels: Max. 8 channels
- High resolution: 14 bits D/A Converter
- Sequence function
- Digital output (Option)
- Analog summing output and sequence trigger (Option)

**Model and Suffix Code**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>703155</td>
<td>-0642</td>
<td>2 ch (1 Output, Differential output), 64 M Points Memory</td>
</tr>
<tr>
<td></td>
<td>-1282</td>
<td>2 ch (1 Output, Differential output), 128 M Points Memory</td>
</tr>
<tr>
<td></td>
<td>-0644</td>
<td>4 ch (2 Output, Differential output), 64 M Points Memory</td>
</tr>
<tr>
<td></td>
<td>-1284</td>
<td>4 ch (2 Output, Differential output), 128 M Points Memory</td>
</tr>
<tr>
<td></td>
<td>-0648</td>
<td>8 ch (4 Output, Single-ended output), 64 M Points Memory</td>
</tr>
<tr>
<td></td>
<td>-1288</td>
<td>8 ch (4 Output, Single-ended output), 128 M Points Memory</td>
</tr>
</tbody>
</table>

**Power Cable**
- UL, CSA Standard
- VDE Standard
- BS Standard
- AS Standard
- IEC Standard

**Options**
- -D 2 ch Digital Output (for 703155-0642 or 703155-1282)
- -F 4 ch Digital Output (for 703155-0644 or 703155-1284)
- -H 8 ch Digital Output (for 703155-0648 or 703155-1288)
- -Q Analog Summing Out, Sequence Trigger

**Signal Generation Software**

<table>
<thead>
<tr>
<th>Software</th>
<th>Model</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Modulation Signal Generation Software</td>
<td>703381</td>
<td>up to 256 QAM</td>
</tr>
<tr>
<td>OFDM Generation Utility software</td>
<td>703382</td>
<td>IEEE802.11a/g/p OFDM</td>
</tr>
<tr>
<td>OFK Generation Utility</td>
<td>703383</td>
<td>IEEE802.11b OFK</td>
</tr>
<tr>
<td>Multi-path Utilities</td>
<td>703387</td>
<td>Multi-path fading</td>
</tr>
<tr>
<td>WCDMA waveform front Generation Utility (No 3GPP Release 6)</td>
<td>703386</td>
<td>WCDMA 1900/2100 (GSM/PCS)</td>
</tr>
<tr>
<td>VHF/H-FDM OFDM Signal Generation Utility</td>
<td>703374</td>
<td>IEEE802.16-2004</td>
</tr>
<tr>
<td>DVB-T/H Signal Generation option</td>
<td>703360</td>
<td>Needs 703374</td>
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<tr>
<td>IEEE802.16e OFDMA Signal Generation option</td>
<td>703352</td>
<td>Needs 703374</td>
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</table>

**Signal Analysis Software**

<table>
<thead>
<tr>
<th>Software</th>
<th>Model</th>
<th>Note</th>
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</thead>
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<tr>
<td>Equalization Filter</td>
<td>703261</td>
<td>Add on to VN7100</td>
</tr>
<tr>
<td>Wireless LAN Modulation Analysis</td>
<td>703252</td>
<td>Add on to VN7100</td>
</tr>
<tr>
<td>IEEE802.11a/g/p Modulation Analysis Pre-installed</td>
<td>703262</td>
<td>IEEE802.11a/g/p</td>
</tr>
<tr>
<td>Multi-Format OFDM Signal Analysis Utility</td>
<td>703373</td>
<td>IEEE802.16-2004</td>
</tr>
<tr>
<td>DTV Signal Analysis option</td>
<td>703361</td>
<td>Needs 703375</td>
</tr>
<tr>
<td>IEEE802.16e OFDMA Signal Analysis option</td>
<td>703353</td>
<td>Needs 703375</td>
</tr>
</tbody>
</table>

**Revolutional Wideband Modulation Analyzer with Outstanding Performance**

**Features**
- Input Frequency Range: IQ Input -84 MHz to 84 MHz, IF Input DC to 84 MHz
- Maximum Analysis Bandwidth: IQ 168 MHz, IF 84 MHz
- Ultra Long Memory: 128 M points
- Time and Frequency Domain Analysis
- WLAN (802.11a/b/g/j/p) Modulation Analysis (Option)
A wide-band Signal Generator with an Arbitrary Waveform Generating Function that Builds the Future of Mobile Communications.

**VG3000E/VG6000**

Synthesized Vector Signal Generator

- Frequency Range: 250kHz to 3.2GHz (VG3000E) 250kHz to 3.2GHz, 4.96GHz to 6.2GHz (VG6000)
- Modulation Frequency bandwidth: 120MHz (-3dB) AWG function (option):
- Max 64M points memory / 100MHz clock

**Model and Suffix Code**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VG3000E</td>
<td>-D</td>
<td>VG3000E Synthesized Vector Signal Generator</td>
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<tr>
<td>VG6000</td>
<td>-F</td>
<td>VG6000 Synthesized Vector Signal Generator</td>
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<tr>
<td>VG3000E</td>
<td>-S</td>
<td>VG3000E Synthesized Vector Signal Generator</td>
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<td>VG6000</td>
<td>-R</td>
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<td>VG3000E</td>
<td>-H</td>
<td>VG3000E Synthesized Vector Signal Generator</td>
</tr>
<tr>
<td>VG6000</td>
<td>-H</td>
<td>VG6000 Synthesized Vector Signal Generator</td>
</tr>
</tbody>
</table>

**Multi-Format OFDM Signal Generation**

- Training sequence, pilot pattern, modulation format of sub carriers, and other OFDM modulation parameters can be defined.
- Non-standardized OFDM modulation signals can be analyzed by the utility using user definition files.

**IEEE802.16e-2005 OFDMA Signal Generation Option**

Add on software for 703074.
- Support TDD/FDD signals.
- Automatically generate DL-MAP and/or UL-MAP message.
- Automatic allocation of zone / burst.
- Supported zones are DL-PUSC, DL-FUSC, UL-PUSC.

**WCDMA 3GPP Release 6 Compliance**

- Max. 256 channels multiplexed
- HSPA support (up to 960kbps/user)
- HSDPA support
- Uplink: DPDCH, DPCCH, HS-DPCCH, PRACH,
  Compressed DPDCH, Compressed DPCCH, E-DPDCH, E-DPCCH
- Downlink: P-CCPCH, P-SCH, S-SCH, S-CCPCH, CPICH, DPICH, PICH, HS-PDSCH, HS-SCCH, AICH, Compressed DPCH, E-AICH, E-RGCH, E-HICH, F-DPCH, Compressed F-DPCH, MICH

**IEEE802.16e-2005 OFDMA Signal Analysis Option**

Add on software for 703074.
- Decode UL-MAP and/or UL-MAP to determine sub carrier modulation and burst/zone mapping.
- Supported zones are DL-PUSC, DL-FUSC, UL-PUSC.
- Analysis function: EVM, Zone/Burst Structure, CCDF, Spectrum, Bit Error Rate (BER) before vitabi decoder, and others.

**IEEE802.11a/b/g/p Compliance**

- Modulation Type: BPSK/QPSK/16QAM/64QAM
- Framing/Add Preamble/Insert Interval
- IEEE802.11b/g CCX generation (703084)
  - PLCP PPDU Mode: Long/Short

**IEEE802.16-2004 OFDM PHY Signal Generation**

- Modulation Type: BPSK/QPSK/16QAM/64QAM
- Framing/Add Preamble/Insert Interval
- IEEE802.11b/g CCX generation (703084)
  - PLCP PPDU Mode: Long/Short

**IEEE802.11a/b/g/p Compliance**

- Modulation Type: BPSK/QPSK/16QAM/64QAM
- Framing/Add Preamble/Insert Interval
- IEEE802.11b/g CCX generation (703084)
  - PLCP PPDU Mode: Long/Short

**IEEE802.16-2004 OFDM PHY Signal Analysis**

- Modulation Type: BPSK/QPSK/16QAM/64QAM
- Framing/Add Preamble/Insert Interval
- IEEE802.11b/g CCX generation (703084)
  - PLCP PPDU Mode: Long/Short
## Recorders

### Panel mount type

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Series</td>
<td>DACQSTATION</td>
<td>DACQSTATION</td>
<td>DACQSTATION</td>
<td>DACQSTATION</td>
<td>DACQSTATION</td>
<td>DACQSTATION</td>
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<tr>
<td>Models</td>
<td>DX1000/DX1004/DX1008/DX1012</td>
<td>DX1000/DP/DX1008/DX1012</td>
<td>DX1000/DX1004/DX1012</td>
<td>DX1000N/DX1004N/DX1012N</td>
<td>DX1000P/DX1004P/DX1012P</td>
<td>DX1000/P/DX1004/P/DX1012P</td>
</tr>
<tr>
<td>Display</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
</tr>
<tr>
<td>Max measurement interval</td>
<td>25 ms or 125 ms</td>
<td>25 ms or 125 ms</td>
<td>25 ms or 125 ms</td>
<td>125 ms or 1 s</td>
<td>125 ms or 1 s</td>
<td>1 s</td>
</tr>
<tr>
<td>Power supply</td>
<td>90 to 132 or 180 to 264 VAC,</td>
<td>90 to 132 or 180 to 264 VAC,</td>
<td>90 to 132 or 180 to 264 VAC,</td>
<td>90 to 132 or 180 to 264 VAC,</td>
<td>90 to 132 or 180 to 264 VAC,</td>
<td>90 to 132 or 180 to 264 VAC,</td>
</tr>
<tr>
<td>Environmental worthiness</td>
<td>0 to 50 C</td>
<td>0 to 50 C</td>
<td>0 to 50 C</td>
<td>0 to 50 C</td>
<td>0 to 50 C</td>
<td>0 to 50 C</td>
</tr>
<tr>
<td>Memory</td>
<td>80 MB (standard)</td>
<td>200 MB (large)</td>
<td>512 KB (optional)</td>
<td>512 KB (optional)</td>
<td>512 KB (optional)</td>
<td>512 KB (optional)</td>
</tr>
<tr>
<td>Alarm</td>
<td>4 levels/ch</td>
<td>4 levels/ch</td>
<td>4 levels/ch</td>
<td>4 levels/ch</td>
<td>4 levels/ch</td>
<td>4 levels/ch</td>
</tr>
<tr>
<td>External media</td>
<td>CF card</td>
<td>CF card</td>
<td>CF card</td>
<td>Zip disk, CF card</td>
<td>Zip disk, CF card</td>
<td>3.5-inch floppy disk, Zip disk, CF card</td>
</tr>
<tr>
<td>Recorder type</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
</tr>
<tr>
<td>Dimensions (W x H x D) (mm)</td>
<td>144 x 144 x 228.5</td>
<td>288 x 288 x 226</td>
<td>144 x 144 x 258.5</td>
<td>144 x 144 x 218</td>
<td>288 x 288 x 220</td>
<td>144 x 144 x 223.6</td>
</tr>
</tbody>
</table>

### Desktop type

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>MAVAdvanced</td>
<td>MAVAdvanced</td>
<td>DARWIN</td>
<td>DARWIN</td>
<td>DARWIN</td>
<td>DARWIN</td>
</tr>
<tr>
<td>Model type</td>
<td>Portable desktop type</td>
<td>Portable desktop type</td>
<td>150 mm type</td>
<td>250 mm type</td>
<td>250 mm type</td>
<td></td>
</tr>
<tr>
<td>Number of inputs</td>
<td>4/6/8/12/24 ch</td>
<td>8/10/20/30/40/48 ch</td>
<td>10.4 inch TFD color LCD</td>
<td>VFD</td>
<td>VFD</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFD color LCD</td>
<td>VFD</td>
<td>VFD</td>
<td>VFD</td>
<td></td>
</tr>
<tr>
<td>Max measurement interval</td>
<td>25 ms or 125 ms</td>
<td>25 ms or 125 ms</td>
<td>2 s</td>
<td>2 s</td>
<td>500 ms</td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>90 to 132 or 180 to 264 VAC</td>
<td>90 to 132 or 180 to 264 VAC</td>
<td>90 to 132 or 180 to 264 VAC</td>
<td>90 to 132 or 180 to 264 VAC</td>
<td>90 to 132 or 180 to 264 VAC</td>
<td>90 to 132 or 180 to 264 VAC</td>
</tr>
</tbody>
</table>

---

**Selectivity Guide**

- **Recorders**
  - Panel mount type
  - Desktop type

---

**Specifications**

- **Models**: DX1000, DX2000, DX1000N, DX1000P, DX200P, CX1000, CX2000
- **Display**: 5.5 inch TFT color LCD
- **Memory**: 80 MB (standard) to 200 MB (large)
- **Network**: RS232 or RS-422/485
- **Alarm**: 4 levels/ch
- **Power supply**: 90 to 132 or 180 to 264 VAC

---

**Environmental worthiness**: 0 to 50 C

---

**Selectivity Guide**

- **Recorders**
  - Panel mount type
  - Desktop type

---

**Specifications**

- **Models**: DX1000, DX2000, DX1000N, DX1000P, DX200P, CX1000, CX2000
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<table>
<thead>
<tr>
<th>Model</th>
<th>Series</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW100</td>
<td>DAQMASTER</td>
<td></td>
</tr>
<tr>
<td>MX100</td>
<td>DAQMASTER</td>
<td></td>
</tr>
<tr>
<td>DA100-1</td>
<td>DARWIN</td>
<td></td>
</tr>
<tr>
<td>DA100-2</td>
<td>DARWIN</td>
<td></td>
</tr>
<tr>
<td>DC100-1</td>
<td>DARWIN</td>
<td></td>
</tr>
<tr>
<td>DC100-2</td>
<td>DARWIN</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>MW100</th>
<th>MX100</th>
<th>DA100-1</th>
<th>DA100-2</th>
<th>DC100-1</th>
<th>DC100-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recorder type</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
</tr>
<tr>
<td>Number of inputs</td>
<td>Max. 60 ch/unit</td>
<td>Max. 1200 ch/unit (20 units)</td>
<td>Max. 40 ch</td>
<td>Max. 300 ch</td>
<td>Max. 40 ch</td>
<td>Max. 300 ch</td>
</tr>
<tr>
<td>Max measurement interval</td>
<td>10 ms</td>
<td>10 ms</td>
<td>500 ms</td>
<td>500 ms</td>
<td>500 ms</td>
<td>500 ms</td>
</tr>
<tr>
<td>Controlled points</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Types of measurement inputs</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse, Power monitor</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse, Power monitor</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse, Power monitor</td>
<td>DCV, TC, RTD, DI, strain, mA, pulse, Power monitor</td>
</tr>
<tr>
<td>Chart speed</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

| Alarm                 | 4 levels/ch  | 2 levels/ch  | 4 levels/ch  | 4 levels/ch  | 4 levels/ch  | 4 levels/ch  |
| Number of alarm relay outputs | DO module (10 CH) required | DO module (10 CH) required | Alarm contact output option (10 CH) required | Alarm contact output option (10 CH) required | Alarm contact output option (10 CH) required | Alarm contact output option (10 CH) required |
| Internal memory       | –           | –           | –            | –            | –            | –            |
| External media        | CF Card (Max 2 GB, optional) | CF Card (Max 2 GB, optional) | –            | –            | 3.5-inch floppy disk | 3.5-inch floppy disk |
| Standard communication interface | Ethernet (Modbus/TCP) | Ethernet | –            | –            | –            | –            |
| Optional communication interface | RS332, RS422/485, or CANBus | – | Ethernet, RS332, RS422/485, or GP-IB modules | Ethernet, RS332, RS422/485, or GP-IB modules | Ethernet, RS332, RS422/485, or GP-IB modules | Ethernet, RS332, RS422/485, or GP-IB modules |
| Environmental worthiness | -20 to 60°C | 0 to 50°C | 0 to 50°C | 0 to 50°C (subunit: -10 to 60°C) | 5 to 40°C | 5 to 40°C (subunit: 0 to 60°C) |
| Power supply          | 90 to 250 VAC, 10 to 32 VDC | 90 to 250 VAC, 10 to 32 VDC | 90 to 250 VAC, 10 to 32 VDC | 90 to 250 VAC, 10 to 32 VDC | 90 to 250 VAC, 10 to 32 VDC | 90 to 250 VAC, 10 to 32 VDC |
| Dimensions W×H×D (mm) | 456×131×159 | 442×131×159 | 422×176×100 | 336×185×100 | 338×236×157 | 338×236×157 |
With its modular configuration that offers flexible scalability, the MX100 platform enables you to construct the optimal data logging system for your measuring environment with the freedom of high speed Ethernet, minimal wiring, and lack of constraints with regard to wiring distance. The MX gets you up and running in a short amount of time with a highly reliable, real-time data logging system that meets your requirements for R&D, durability testing, quality assurance, and facilities monitoring.

Overview

Maximum Performance...
- High-Speed, Multi-Channel Capability, High withstand Voltage
  - Shortest measurement interval of 10 ms (high-speed measurement of 10 ms on 24 channels or 100 ms on 60 channels is possible).
  - Possible to acquire data from up to 1,200 channels (when using Yokogawa's proprietary software).
  - Reinforced insulation between the input terminal and the case handles 3700 Vrms for one minute, or 600 Vrms/VDC continuous.
- Multi-Interval Measurement
  - Mixed use of three types of measurement intervals is enabled within the system (measurement intervals are set for each module).

Ease of Use...
- Flexible System Configuration
  - By configuring modules, a system can be built or modified to utilize 4 to 1,200 channels, and measurement intervals of 10 ms to 60 s.
- Versatile PC-Based Software Options
  - Software developed by Yokogawa, an API, and a LabVIEW driver are available.
- Easy Software Setup
  - PC software developed by Yokogawa automatically identifies any connected MX100s.
- No Re-Wiring between Measurements
  - A removable terminal unit is available.

Data Acquisition Unit

Overview

With your web browser, access any number of MW100s within a plant or installed on equipment to see real-time site conditions and equipment operating statuses. The functionality of the Web browser allows you to share information from multiple locations, and construct highly distributed remote monitoring data acquisitions systems that are ideal for facilities management and equipment monitoring.

Features

Anytime, Anyplace...
- In a wide range of temperatures: -20 to 60°C
- Reinforced insulation: Between input terminal and case
- A wide variety of network functions: HTTP, FTP, DHCP, SNTP, E-mail, and others.
- DC power supply (12 V–28 V) option available.

Smart Logging...
- High speed measurement with a single unit (10 channels/10 ms or 60 channels/100 ms): Shortest measurement interval of 10 ms
- Multi-interval: Enables mixing of three different measurement intervals in a single unit (measurement intervals can be set for each module)
- Supports CompactFlash (CF) cards of up to 2 GB
- Continuous data acquisition is possible on 60 channels at 100 ms for approximately ten days with a 2-GB card, or for three months on 60 channels at 1 s.
- MATH function on the main module available with the /M1 option.
- Collective data acquisition on 360 channels (via Modbus with the /M1 option)

1. The operating temperature range for the input modules and main module. The operating temperature range of the output modules is -20 to 50°C.
2. Note that the power cord supplied with the main module differs depending on the operating temperature range (see the specifications on page 7). If the operating temperature range specification of the supplied standard power cord does not meet your requirements, we recommend you select a screw-type terminal rather than the plug type for the main module power inlet, and supply your own power input cable.
3. The operating temperature range of the AC adapter used with DC power supplies is 0 to 40°C.
4. Please consult with a representative for applications involving temperatures below -20°C.
5. The withstand voltage value with the MX110 input module. For the withstand voltage values of other input and output modules, please refer to the specifications for those modules (GS /L52160).
6. CF card not included (sold separately).
DAQMASTER

System Configuration

The MX can be configured for your specific measurement needs by combining the main module, input/output modules, and a base plate. Assembled units can be used as-is on the desktop, or can be rack-or panel-mounted with provided DIN rails (DIN rail mounting brackets come standard with the MX150).

Input Modules

**MX100 and MW100**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Number of channels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universal Input Modules</td>
<td>MX110-UNV-H04</td>
<td>4</td>
<td>10 ms DC voltage, thermocouple, 3-wire RTD, DI (non-voltage contact, Level (5 V logic)). Mixed input allowed.</td>
</tr>
<tr>
<td></td>
<td>MX110-UNV-M10</td>
<td>10</td>
<td>100 ms DC voltage, thermocouple, 3-wire RTD, DI (non-voltage contact, Level (5 V logic)). Mixed input allowed.</td>
</tr>
<tr>
<td>4-Wire RTD and Resistance Module</td>
<td>MX110-V4R-M08</td>
<td>6</td>
<td>100 ms DC voltage, 4-wire RTD, 4-wire resistance, DI (non-voltage contact, Level (5 V logic)). Mixed input allowed.</td>
</tr>
<tr>
<td>Strain Input Modules</td>
<td>MX112-B12-M04</td>
<td>4</td>
<td>100 ms Built-in bridge resistance of 120 Ω</td>
</tr>
<tr>
<td></td>
<td>MX112-B35-M04</td>
<td></td>
<td>Built-in bridge resistance of 350 Ω</td>
</tr>
<tr>
<td>Pulse Input Module</td>
<td>MX115-PLS-M10</td>
<td>10</td>
<td>For connection with an external bridge head and strain gauge type sensor (NDIS connector)</td>
</tr>
<tr>
<td>5 V Digital Input Module</td>
<td>MX115-D05-H10</td>
<td>10</td>
<td>Non-voltage contact, open collector, and Level (5 V logic). Mixed input allowed. 10 kΩ/s</td>
</tr>
<tr>
<td>24 V Digital Input Module</td>
<td>MX115-D24-H10</td>
<td>10</td>
<td>Level (24 V logic), Vth = 12 V</td>
</tr>
</tbody>
</table>

Output Modules

**MX100 and MW100**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Number of channels</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Output Module</td>
<td>MX120-VAO-M08</td>
<td>8</td>
<td>Allows mixed voltage (+10 V) and current (4-20 mA) output</td>
</tr>
<tr>
<td>PWM Output Module</td>
<td>MX120-PWM-M08</td>
<td>8</td>
<td>Pulse width modulation output module</td>
</tr>
<tr>
<td>Digital Output Module</td>
<td>MX125-MKC-M10</td>
<td>10</td>
<td>&quot;A&quot; contact (SPST)</td>
</tr>
</tbody>
</table>

Base Plate

Base plates available for mounting the various MX100/MW100 I/O modules.

<table>
<thead>
<tr>
<th>No. of slots</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MX150-1</td>
</tr>
<tr>
<td>2</td>
<td>MX150-2</td>
</tr>
<tr>
<td>3</td>
<td>MX150-3</td>
</tr>
<tr>
<td>4</td>
<td>MX150-4</td>
</tr>
<tr>
<td>5</td>
<td>MX150-5</td>
</tr>
<tr>
<td>6</td>
<td>MX150-6</td>
</tr>
</tbody>
</table>

Accessories

- Connector Cover
- Connector cover for open slots
- AC Adapter (772075)
- AC adapter for the DC power model
- Operating temperature range: 0 to 40°C

Removable Terminal Plate/Connector

Input/output module’s terminal plate can be removed, making wiring easier (NDIS strain: excluding MX112-NDI-M04)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>772061</td>
<td>Used in combination with the external M4 screw terminal block, RUC (reference junction compensation), and 772062. Applies to MX110-UNV-M10, MX115-D24-H10</td>
</tr>
<tr>
<td>772062</td>
<td>Used in combination with the input module, M4 screw terminal block connection cable and 772061. Applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772063</td>
<td>Plate with clamp terminals with RUC, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772064</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772065</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772066</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772067</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772068</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772069</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772070</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772071</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772072</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
<tr>
<td>772073</td>
<td>Plate with clamp terminals with clamp channel, applies to MX110-UNV-M10 and MX115-D24-H10</td>
</tr>
</tbody>
</table>
MX100 Quick Start Package

Simple! Compact Size! Ready to Run!
Fast set up—attach sensors, connect to your network, and you are ready to measure and record data

- Universal inputs (DCV/TC/RTD/DI)
- 100 ms scan speed
- Multi-interval measurement and logging
- Trending and logging software with historical viewer included

MW100 Quick Start Package

Simple! Compact Size! Ready to Run!
Fast set up—attach sensors, connect to your network, configure with your web browser, and you are ready to measure and record data no special software needed. Built-in data logging to high capacity CompactFlash media

- Real-time data monitoring with a web browser
- Universal inputs (DCV/TC/RTD/DI)
- 100 ms scan speed
- Multi-interval measurement and logging to high capacity CompactFlash media
- Email messaging and file transfer via FTP

### PC-based Data Acquisition System

**Single Unit Data Logging**

- High speed: 30 ch/100 ms (Compact Flash media)
- High reliability: Dual recording (optional)

**Multi Unit Data Logging**

- Max. 1200 ch/system (connect 60 ch/20 units)

**Multi Interval Data Logging**

- Data acquisition intervals set independently by measurement group

**Web-enabled Data Acquisition and Data Logging System**

**On-Demand, Remote Measuring System**

- Web browser monitoring & setting changes
- Supports Internet Explorer 5.0 & later, and JAVA VM/JAVA Script

**Multi-User & Multi-Access**

- Supports Internet Explorer 5.0 & later, and JAVA VM/JAVA Script

**Long Duration Memory & File Transmission**

- CompactFlash: CF 2 GB (60 ch/100 ms: approximately 10 days, 60 ch/100 ms: approximately 20 months)
- Network online (FTP: file transmission)

### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Added Specifications Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MW100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Model Options

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Added Specifications Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MW100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Option setting for measurement group
2. Setting for measurement group
3. Setting for measurement group
4. Setting for measurement group

### Power Supply and Programming

- 100 ms scan speed
- Multi-interval measurement and logging
- Trending and logging software with historical viewer included

### Universal Inputs

- DCV/TC/RTD/DI

### Real-time Data Monitoring

- With Internet Explorer 5.0 & later, and JAVA VM/JAVA Script

### Email Messaging and File Transfer via FTP

- Supports Internet Explorer 5.0 & later, and JAVA VM/JAVA Script
Powerful & Portable Data Acquisition Stations

MV1000/MV2000

Features

- Multi-channel universal inputs
  - MV1000: up to 24 input channels
  - MV2000: up to 48 input channels
- Secure, high capacity memory
  - Internal memory: 200 MB
  - (Example: Save 12 channels of data every second for about 75 days!)
- Choice of CompactFlash and USB removable storage media
- Removable input terminals simplify field wiring
- Lightweight aluminum construction (MV2000)
- Choice of secure binary or versatile text data file formats
- Advanced network connectivity with Email, file transfer, and web server functions.

MV1000/MV2000 Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>Measurement Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV1000</td>
<td>MV1004 (4 channels), MV1008 (8 channels)</td>
<td>125 ms (25 ms)</td>
</tr>
<tr>
<td>MV1000</td>
<td>MV1006 (6 channels), MV1012 (12 channels), MV1024 (24 channels)</td>
<td>1 s (125 ms)</td>
</tr>
<tr>
<td>MV1000</td>
<td>MV1008 (8 channels)</td>
<td>125 ms (25 ms)</td>
</tr>
<tr>
<td>MV2000</td>
<td>MV2010 (10 channels), MV2020 (20 channels), MV2030 (30 channels), MV2040 (40 channels), MV2048 (48 channels)</td>
<td>1 s (125 ms)</td>
</tr>
</tbody>
</table>

*Numbers in parentheses are when in high-speed mode.

Models and Input Capacity

- Input channels and measurement interval

Removable Storage Media

- Type: Compactflash (CF) memory card, USB memory
- Capacity: Up to 2 GB (32 MB CF card included)
- Format: FAT16 or FAT32

Software

- Includes configuration and file viewer and conversion PC software

Dimensions

- MV1000: 189 (W) × 177 (H) × 259 (D) mm
- MV2000: 307 (W) × 273 (H) × 260 (D) mm

Weight

- MV1000: approximately 3.5 kg
- MV2000: approximately 5.6 kg

Standard Universal Inputs With The Capacity You Need

MV1000: up to 24 input channels, MV2000: up to 48 input channels. MV2000 is expandable to 348 channels (48 local plus 300 external) using optional external data acquisition hardware. Measures thermocouples, RTD, DI, and almost any DC voltage sensor.

Fast Setup And Multilingual Menus

Quick setting menu the system is ready to measure after visiting three menus. USB port attach a PC keyboard for setup or use a memory device to transfer setting files and data between a PC and MVAdvanced. Multilingual menus, supporting Chinese, English, French, German, Japanese, and Korean languages.

Large Memory

Up to 200 MB of secure, non-volatile flash memory is used for real-time data storage. Saved data is retained during power outages of any duration, and the MVAdvanced automatically resumes measurement and storage immediately after power is restored. CompactFlash removable media stores archived data files for convenient transport to your PC environment.

Removable Input Terminals

Plug-in connectors attach quickly to your wiring and enhance portability. Extra connectors are a low cost accessory.

Text File Format

MVAdvanced can save data files in a .txt text file format, which allows a wide range of common software applications to readily open and access your test data. For data security, a binary file format can also be used.

Example of saving data to internal memory*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sampling interval</th>
<th>Measurement channel</th>
<th>Binary save mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 sec</td>
<td>12 ch</td>
<td>75 days</td>
</tr>
</tbody>
</table>

*Example: Saving data to internal memory

MV1000: Approx. 30 days
- MV2000: Approx. 75 days

Choice of CompactFlash and USB removable storage media

- Internal memory: 200 MB
  - (Example: Save 12 channels of data every second for about 75 days!)
- Choice of secure binary or versatile text data file formats
- Advanced network connectivity with Email, file transfer, and web server functions.

Secure, high capacity memory

- Internal memory: 200 MB
  - (Example: Save 12 channels of data every second for about 75 days!)
- Choice of compactflash and USB removable storage media
- Removable input terminals simplify field wiring
- Lightweight aluminum construction (MV2000)
- Choice of secure or versatile text file formats
### Recorders

<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LR12000E</strong></td>
<td><strong>Multpen Laboratory Recorder</strong>&lt;br&gt;• Ten- or twelve-pen models&lt;br&gt;• Universal input of voltages, thermocouples, or RTDs&lt;br&gt;• High reliability owing to non-contact technologies&lt;br&gt;• IC memory card (standard), floppy disk drive (optional)</td>
</tr>
<tr>
<td><strong>LR1000E</strong></td>
<td><strong>Laboratory Recorder</strong>&lt;br&gt;• Operating method: digital servo&lt;br&gt;• Number of channels: 10 or 12&lt;br&gt;• Input mode: guarded floating input&lt;br&gt;• Measurement accuracy: 0.05% of reading + 0.03% of range + 1.0 µV (for 1 mV or more)&lt;br&gt;• Measuring range: 0.1 mV to 200 V FS (high sensitivity model), 12 types of thermocouples, and RTDs&lt;br&gt;• Measurement cycle: 135 Hz at fastest&lt;br&gt;• Chart speed: 10 to 600 mm/min or mm/min&lt;br&gt;• Chart paper: effective recording width of 250 mm; fan-folded, 30 m long&lt;br&gt;• Recording pen: disposable felt-pen&lt;br&gt;• Pen gap: about 3.5 mm, provided with phase synchronization function as standard&lt;br&gt;• Printing: wire dot, ink-ribbon (monochromatic)&lt;br&gt;• Display: fluorescent display tube (5 by 7 dots); 6 lines with 20 characters each&lt;br&gt;• Display contents: digital values, bar graph and range&lt;br&gt;• Memory: IC card slot (standard), floppy disk drive (optional)&lt;br&gt;• Power supply: AC&lt;br&gt;• Option: remote control, 12 alarm point output, communication (via GP-IB or RS-232C), floppy disk drive, computation, 10 to 32 V DC drive&lt;br&gt;• Dimension: Approx. 438 (W) x 266 (H) x 343 (D) mm&lt;br&gt;• Weight: Approx. 16 kg (for 8 pens)</td>
</tr>
<tr>
<td><strong>LR8100E</strong></td>
<td><strong>Laboratory Recorder</strong>&lt;br&gt;• Operating method: digital servo&lt;br&gt;• Number of channels: 10 or 12&lt;br&gt;• Input mode: guarded floating input&lt;br&gt;• Measurement accuracy: 0.05% of reading + 0.03% of range + 1.0 µV (for 1 mV or more)&lt;br&gt;• Measuring range: 0.1 mV to 200 V FS (high sensitivity model), 12 types of thermocouples, and RTDs&lt;br&gt;• Measurement cycle: 135 Hz at fastest&lt;br&gt;• Chart speed: 10 to 1200 mm/min or mm/min&lt;br&gt;• Chart paper: effective recording width of 250 mm; fan-folded, 30 m long&lt;br&gt;• Recording pen: disposable felt-pen&lt;br&gt;• Pen gap: about 4 mm, provided with phase synchronization function as standard&lt;br&gt;• Printing: wire dot, ink-ribbon (monochromatic)&lt;br&gt;• Display: fluorescent display tube (5 by 7 dots); 8 lines with 20 characters each&lt;br&gt;• Display contents: digital values, bar graph and range&lt;br&gt;• Memory: IC card slot (standard), floppy disk drive (optional)&lt;br&gt;• Power supply: AC or DC (optional)&lt;br&gt;• Option: remote control, 8 alarm point output, communication (via GP-IB or RS-232C), floppy disk drive, computation, 10 to 32 V DC drive&lt;br&gt;• Dimension: Approx. 438 (W) x 266 (H) x 310 (D) mm&lt;br&gt;• Weight: Approx. 16 kg (for 8 pens)</td>
</tr>
<tr>
<td><strong>LR4100E</strong></td>
<td><strong>Laboratory Recorder</strong>&lt;br&gt;• Operating method: digital servo&lt;br&gt;• Number of channels: 1, 2, 3, or 4&lt;br&gt;• Input mode: guarded floating input&lt;br&gt;• Measurement accuracy: 0.05% of reading + 0.03% of range + 1.0 µV (for 1 mV or more)&lt;br&gt;• Measuring range: 0.1 mV to 200 V FS (high sensitivity model), 12 types of thermocouples, and RTDs&lt;br&gt;• Measurement cycle: 135 Hz at fastest&lt;br&gt;• Chart speed: 10 to 1200 mm/min or mm/min&lt;br&gt;• Chart paper: effective recording width of 250 mm; fan-folded, 20 m long&lt;br&gt;• Recording pen: disposable felt-pen&lt;br&gt;• Pen gap: about 4 mm, provided with phase synchronization function as standard&lt;br&gt;• Printing: wire dot, ink-ribbon (monochromatic)&lt;br&gt;• Display: fluorescent display tube (5 by 7 dots); 4 lines with 20 characters each&lt;br&gt;• Display contents: digital values, bar graph and range&lt;br&gt;• Memory: IC card slot (standard), floppy disk drive (optional)&lt;br&gt;• Power supply: AC or DC (optional)&lt;br&gt;• Option: remote control, 4 alarm point output, communication (via GP-IB or RS-232C), floppy disk drive, computation, 10 to 32 V DC drive&lt;br&gt;• Dimension: Approx. 438 (W) x 199 (H) x 323 (D) mm&lt;br&gt;• Weight: Approx. 14 kg (for 4 pens)</td>
</tr>
<tr>
<td><strong>LR8100E</strong></td>
<td><strong>Flat-Bed Laboratory Recorder</strong>&lt;br&gt;• Operating method: digital servo&lt;br&gt;• Number of channels: 10 or 12&lt;br&gt;• Input mode: guarded floating input&lt;br&gt;• Measurement accuracy: 0.05% of reading + 0.03% of range + 1.0 µV (for 1 mV or more)&lt;br&gt;• Measuring range: 0.1 mV to 200 V FS (high sensitivity model), 12 types of thermocouples, and RTDs&lt;br&gt;• Measurement cycle: 135 Hz at fastest&lt;br&gt;• Chart speed: 10 to 1200 mm/min or mm/min&lt;br&gt;• Chart paper: effective recording width of 250 mm; fan-folded, 20 m long&lt;br&gt;• Recording pen: disposable felt-pen&lt;br&gt;• Pen gap: about 4 mm, provided with phase synchronization function as standard&lt;br&gt;• Printing: wire dot, ink-ribbon (monochromatic)&lt;br&gt;• Display: fluorescent display tube (5 by 7 dots); 8 lines with 20 characters each&lt;br&gt;• Display contents: digital values, bar graph and range&lt;br&gt;• Memory: IC card slot (standard), floppy disk drive (optional)&lt;br&gt;• Power supply: AC or DC (optional)&lt;br&gt;• Option: remote control, 8 alarm point output, communication (via GP-IB or RS-232C), floppy disk drive, computation, 10 to 32 V DC drive&lt;br&gt;• Dimension: Approx. 438 (W) x 266 (H) x 310 (D) mm&lt;br&gt;• Weight: Approx. 16 kg (for 8 pens)</td>
</tr>
</tbody>
</table>

CE*: Except the -/B model
The DC100 can be equipped with an Ethernet (10BASE-T) port so you can build a simple networking capability.

The DC100 is capable of high-speed, high-precision measurements with a maximum scanning speed of 500 ms for all channels.

Tremendous function expandability

The DC100 gives you the flexibility to change and expand your configuration, from a small-scale 10-channel standalone unit up to a large-scale 300-channel data acquisition system. A variety of input types are available, including DC voltage, temperature (thermocouple, RTD), contact, distortion, pulse, power monitor, strain, DI, etc.

High-speed, high-precision measurements

The large array of modules also includes a communication module and alarm output module.

An economically sensible choice

Remote measurement at distances up to 500 meters reduces wiring requirements, and the unit's small size helps you save space.

The DA100 data acquisition unit provides a data acquisition environment that is expandable and has a high level of design freedom, using a PC as the user interface.

• High level of design freedom

The DA100 is available as a small standalone model capable of data acquisition on as many as 40 channels, and an expandable model that can be expanded up to 300 channels directly by the user.

• Networking capability

The DA100 can be equipped with an Ethernet (10BASE-T) port so you can build a simple network or connect to an on-premises LAN for remote data acquisition and centralized data management.

• PC-friendly

The included data logging software makes it easy to create a PC-based data acquisition environment.

• High-speed, high-precision measurements

The DA100 is capable of high-speed, high-precision measurements with a scanning speed of 300 channels per 500 ms.

• Wide variety of I/O modules

A wide variety of input modules are available, including voltage, temperature (thermocouple, RTD), contact, distortion, pulse, power monitor, strain, mA (DC current).

• Expandable/changeable at the individual module level

Inputs can be changed directly by the user.

• Inputs

Support for efficient data processing

With its large memory capacity, the DA100 unit can meet a variety of user needs, such as mobility in terms of ease of handling in the field and portability; environmental durability with a PC-free, chart-free design; and economics in terms of effective use of measurement data and superior cost performance.

• Superior mobility

With a lightweight (approximately 5 kg)*, compact (approximately 20 cm depth) design, the DA100 is ideal for vehicle installations or use as a portable data collector.

With 40-channel input module attached to DA100 main unit.

Tremendous function expandability

The DC100 gives you the flexibility to change and expand your configuration, from a small-scale 10-channel standalone unit up to a large-scale 300-channel data acquisition system. A variety of input types are available, including DC voltage, temperature (thermocouple, RTD), contacts, power monitor, pulse, strain, and DC current (mA).

High-speed, high-precision measurements

The DC100 is capable of high-speed, high-precision measurements with a maximum scanning speed of 500 ms for all channels.

Networking capability

The DC100 can be equipped with an Ethernet (10BASE-T) port so you can build a simple network or connect to an on-premises LAN for remote data acquisition and centralized data management.

DA100 Specifications (some specifications are for separately sold options)

Inputs:
Expandable/changeable at the individual module level
Standalone model: 10 to 40 channels
Expandable model: 10 to 300 channels
Input types:
DC voltage (±20 mV to ±50 V), thermocouples (R, S, B, K, E, J, T, N, W, L, U), RTD, mA, pulse, power monitor, strain, DI, etc.
Remote measurement (expandable model):
Maximum total distance using special cables: 500 meters
Maximum number of connected subunits: 6
Measurement interval: 0.5–60 seconds
Integration time: 50 ms, 60 ms, 100 ms
Other: Alarm output
Options: Computation function, report computation function
PC software: DAQ 32Plus, DAQLOGGER
Dimension:
Standalone: Approx. 422 (W) × 176 (H) × 100 (D) mm
Expandable model: Approx. 336 (W) × 165 (H) × 100 (D) mm
Subunit: Approx. 422 (W) × 176 (H) × 100 (D) mm
Weight: Approx. 4 kg (with module attached)

DC100 Specifications (some specifications are for separately sold options)

Input channels:
Standalone model: 10 to 40 channels
Expandable model: 10 to 300 channels
Measurement interval: 0.5–60 seconds
A/D integration time: 20 ms (50 Hz), 16.7 ms (60 Hz), 100 ms (10 Hz)
Input types: DC voltage, thermocouples, RTD, mA, pulse, power monitor, strain, DI
Other: Alarm output, remote functions
Internal memory capacity:
1 MB standard; 2 MB or 4 MB available as options (specify when ordering)
External storage media: 3.5-inch floppy drive (standard), optional SCSI interface
Remote measurement (expandable model):
Maximum total distance using special cables: 500 meters
Maximum number of connected subunits: 6
PC software: DAQ 32Plus, DAQLOGGER
Dimension:
DC100 main unit: Approx. 338 (W) × 176 (H) × 100 (D) mm
Subunit: Approx. 422 (W) × 176 (H) × 100 (D) mm
Weight: Approx. 5.3 kg (with module attached)
A wide variety of input modules are available, including voltage, temperature, and many others. You can easily create a PC-based data acquisition environment. In addition, a floppy drive makes it easy to exchange data with a PC.

**Recorders**

### DR230

**Hybrid Recorder**

- **DR230 Specifications**
  - **Inputs**: 10 or 20 channels (specify when ordering)
  - **Input types**: DC voltage, thermocouple, RTD, DI
  - **Communication standards**: GP-IB, RS-232, Ethernet
  - **Recording specifications**: 10-color dot recording, 250 mm effective recording width
  - **Display**: VFD 5 × 7 dot matrix, 3-line display
  - **Memory**: 3.5-inch floppy drive with 512 KB SRAM
  - **Options**: Computation function, alarm output, remote function, power monitor, report computation function
  - **PC software**: DAQ 32Plus, DAQLOGGER
  - **Dimension**: Approx. 336 (W) × 221 (H) × 335 (D) mm
  - **Weight**: Approx. 13 kg (with module attached)

### DR130

**Portable Hybrid Recorder**

- **DR130 Specifications**
  - **Inputs**: 10 or 20 channels (specify when ordering)
  - **Input types**: DC voltage, thermocouple, RTD, DI
  - **Communication standards**: GP-IB, RS-232, Ethernet
  - **Recording specifications**: 10-color dot recording, 150 mm effective recording width
  - **Display**: VFD 5 × 7 dot matrix, 3-line display
  - **Memory**: 3.5-inch floppy drive with 512 KB SRAM
  - **Options**: Computation function, alarm output, remote function, power monitor, report computation function
  - **PC software**: DAQ 32Plus, DAQLOGGER
  - **Dimension**: Approx. 338 (W) × 301 (D) mm
  - **Weight**: Approx. 9.3 kg

**Universal input**

The input unit, which isolates each channel, has a built-in signal conditioner function that enables universal measurement of a variety of inputs (voltage, thermocouple, RTD, contacts).

**Networking capability**

The DR130 can be equipped with an Ethernet (10BASE-T) port so you can build a simple network or connect to a LAN to support remote data acquisition and centralized data management.

**Floppy drive for saving data**

Settings and measurement data can be saved to the floppy drive. Measurement data is saved via the included 512 KB of SRAM for better reliability. The included 32Plus data acquisition software lets you convert measurements to Excel and Lotus 1-2-3 formats.

**Universal design freedom**

The DR230 provides flexibility to change or expand from small-scale data logging up to multi-point data collection. The DR230 is available as a simple 30-channel (maximum) standalone model and an expandable model that can be expanded from 10 to 300 channels directly by the user.

**Networking capability**

The DR230 can be equipped with an Ethernet (10BASE-T) port so you can build a simple network or connect to an on-premises LAN for remote data acquisition and centralized data management.

**An economically sensible choice**

Remote measurement at distances up to 500 meters reduces wiring requirements, and the unit’s small size helps you save space.

**High-speed, high-precision measurements**

The DR230 is capable of high-speed, high-precision measurements with a scanning speed of 300 channels per 500 ms.

**PC-friendly**

You can easily create a PC-based data acquisition environment. In addition, a floppy drive can be added.

**Wide variety of I/O modules**

A wide variety of input modules are available, including voltage, temperature (thermocouple, RTD), contact, strain, pulse, power monitor, and mA (DC current). The large array of modules also includes a communication module and alarm output module.

**Input types**

- DC voltage, thermocouples, RTD, mA, pulse, power monitor, distortion, DI

**Options**

- Computation function, alarm output, remote function, power monitor, report computation function

**Memory**

- 3.5-inch floppy drive with 512 KB SRAM

**Hardware**

- 3.5-inch floppy drive

**Dimensions**

- **DR230**: Approx. 336 (W) × 221 (H) × 335 (D) mm
- **DR130**: Approx. 338 (W) × 301 (D) mm

**Weight**

- **DR230**: Approx. 13 kg (with module attached)
- **DR130**: Approx. 9.3 kg
Evolved to the Next Generation Daqstation!!

DX1000/DX2000 Specifications

**Inputs**
- Number of inputs:
  - DX1000: 2, 4, 6, 12 channels
  - DX2000: 4, 8, 10, 20, 30, 40, 48 channels
- Measurement interval:
  - DX1002, DX1004, DX2004, DX2008: 125 ms, 250 ms, 25 ms (fast sampling mode)
  - DX1006, DX1012, DX2010, DX2020, DX2030, DX2040, DX2048: 1 s, 2 s, 5 s, 125 ms (fast sampling mode)
- Inputs: Universal inputs
  - DCV (20, 60, 200 mV, 2, 6, 20, 50 V, 1-5 V)
  - RTD (Pt100, JPt100)
  - DI (Contact input, TTL level)
  - DCA (With external shunt resistor attached)

**Display**
- Display unit:
  - DX1000: 5.5-inch TFT color LCD (320×240 pixels)
  - DX2000: 10.4-inch TFT color LCD (640×480 pixels)

**Data saving function**
- External storage medium: CompactFlash memory card (CF card)
- Internal memory:
  - Medium: Flash memory
  - Capacity: Selectable from 80 MB or 200 MB

**Alarm function**
- Number of alarm levels: Up to four levels for each channel
- Alarm types: High and low limits, differential high and low limits, high and low rate-of-change limits and delay high and low

**Ethernet communication function**
- Connection: Ethernet (10Base-T)
- Protocols: TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP, SMTP, SNTP, Modbus, DX private

**Construction**
- Front panel: Water and dust-proof (based of IEC529-IP65 and NEMA No.250 TYPE4*)
- *Except external icing test.
- Dimensions:
  - DX1000: 144(W)×144(H)×229(D) *mm max.
  - DX2000: 288(W)×288(H)×226(D) *mm max.
CX1000/CX2000

Control and Measurement Station

DAQSTATION CX1000/CX2000 have up to 6 embedded loops. CX is a control and measurement station to control/display control data of up to 16 external Green series controllers. CX standard control operation screens allow to monitor control data. With a program control (option), CX realizes functional program operation.

• Using DAQSTATION CX as a Data Collector
  DAQSTATION CX can record embedded loop data, measurement data, and external controller data. Control statuses and operation statuses can be recorded. It is easy to collect data for quality control and creating reports.

• Using DAQSTATION CX as a Control Terminal
  DAQSTATION CX lets you control, monitor, and collect data from controllers in various locations. The screens needed for controller operation and monitoring are included as standard features. The user-friendly display function lets you set operation parameters for Green series units.

• Fewer Cables
  Measurements from Green series units are transmitted to a DAQSTATION CX through an RS-485 interface. As all Green series controllers do not have to wire to CX, it can eliminate the need for individual twisted pair input wiring from the controller to CX.

• Network-Based Monitoring
  DAQSTATION CX can be set to transmit an E-mail when a controller outputs an alarm. This lets you monitor for alarms even if you are not on site. In addition, the DAQSTATION CX screen can be displayed on any PC Web browser.

• Internet Functions
  Standard Ethernet easily enables CX1000/CX2000 to be operated in existing LAN/WAN environment. The internet functions are E-mail notification, Web browser remote monitoring, and FTP file transfer.

DAQSTATION

CX1000/CX2000 Specifications

Display: 5.5-inch TFT color LCD (CX1000)
10.4-inch TFT color LCD (CX2000)

Control mode: Single loop, cascade control, and loop control with PV switching.

Control computation functions: Continuous PID control, relay ON/OFF control, time-proportionate PID control, overshoot control function (Super)

Control interval: 250, 500, 1000 ms
Number of control loop: 0, 2 (CX1000)
0, 2, 4, 6 (CX2000)

Measurement interval: 1, 2 seconds
Measurement channels: 0, 6 (CX1000)
0, 10, 20 (CX2000)

Universal output type: 4-20 mA current output/Voltage pulse/Relay contact output
Contact input: 6 points per each 2 loops
Open collector transistor output: 4 points per each 2 loops
Make contact relay output: 2 points per each 2 loops

Ethernet: Standard feature
RS422A/485 or RS232: Only one can be specified
Program control function: Program patterns: 4 max (PG1) or 30 max (PG2)

Segments: Max. 99 per pattern
Total segments: 300 max

External storage media: Floppy disks, Zip disks, CompactFlash memory card

Number of connecting Green series controllers: 4 (CX1000), 16 (CX2000)

Dimensions:
CX1000: 144 (W) x 288 (H) x 225.5 (D) mm
CX2000: 288 (W) x 288 (H) x 220 (D) mm

Weight:
CX1000: Approx. 3.0 kg
CX2000: Approx. 6.3 to 7.7 kg

DX100/DX200

Data Acquisition Station with Networking Capabilities

DX100/DX200 Specifications

Inputs: 2, 4, 6, or 12 channels (DX100)
4, 8, 10, 20, or 30 channels (DX200)

Input types: DC voltage ±20 mV to ±50 V
RTD: Pt100, JPt100

Operation recording
DC current (externally attached shunt resistor)
Any mix of inputs

Display: 5.5-inch TFT color liquid crystal display (DX100)
10.4-inch TFT color liquid crystal display (DX200)

External storage media: Specify any of the following when placing your order:
3.5-inch floppy drive (1.44 MB), CompactFlash memory card, Zip disk

Recording capacity:
Approximately 1 month on 6 channels (with no computation channel, at 60-second sampling interval)
A variety of sampling intervals can be set.

Alarm types:
Upper and lower limits, delay upper and lower limits, difference upper and lower limits, change rate upper and lower limits

Option specifications:
Alarm output, RS-422A, RS-232, FOUNDATION™ Fieldbus communication function, remote control, FAIL/memory end output, computation/report function, batch function, 24 V DC transmitter power output, 24 V DC/AC power driving, VGA output (DX200), etc.

Dimensions: DX100: 144 (W) x 144 (H) x 218 (D) mm
DX200: 288 (W) x 288 (H) x 220 (D) mm

Weight:
DX100: Approx. 3.0 kg
DX200: Approx. 6.6 to 7.3 kg

Yokogawa’s DX Series of next-generation data acquisition stations go beyond conventional recorders to provide leading-edge networking functions and powerful information processing capabilities.

• Leading-edge networking functions
  The DX100/DX200 are standard-equipped with an Ethernet port so you can immediately connect to an existing LAN or WAN. Networking functions such as email notifications, remote monitoring through a Web browser, and FTP file transfers are supported.

• A variety of display functions
  The DX100/DX200 have wide-viewing-angle, high-resolution TFT color liquid crystal displays. The display size is 5.5 inches on the DX100 and 10.4 inches on the DX200. In addition to trend displays, the DX100/DX200 have a variety of other display functions, such as bar graph display, digital display, overview display, and past trend display.

• Flexible storage options
  The DX100/DX200 support the following external storage media: 3.5-inch floppy drive (1.44 MB), CompactFlash memory card, Zip disk.

• Robust design for maximum reliability
  Internal memory is flash memory, which does not require a battery backup. The case front has a dust-proof, drip-proof design, and conforms to the IEC529-IP65 standard and NEMA No. 250 TYPE4 (excluding icing test).

• Integration through application software
  The application software can be used to enter settings whether the DX Series is online or offline, and to easily build networked systems for data monitoring, file transfer, data logging, etc. The DAQOPC (OPC server) interface package lets you interface your DX Series with other equipment and build network systems in a timely manner.
### DX100P/DX200P Specifications

**Inputs:**
- 2, 4, 6, or 12 channels (DX100P)
- 4, 8, 10, 20, or 30 channels (DX200P)

**Input types:**
- DC voltage (20 mV to 50 V), thermocouple, RTD, operation recording, DC current (externally attached shunt resistor)
  - *Any mix of inputs*

**Contacts:**
- 5-point T-shaped liquid crystal display (DX100P)
- 6.5-point T-shaped liquid crystal display (DX200P)

**External storage media:** Specify any of the following when placing your order:
- CompactFlash memory card
- Zip disk
- Backup data to multiple destinations through your network.

**Recording capacity:**
- Approximately 100 days on 6 channels (with no computation channel) at 60-second sampling interval
- A variety of sampling intervals can be set.

**Alarm types:**
- Upper and lower limits, delay upper and lower limits, difference upper and lower limits, change rate upper and lower limits

**Option specifications:**
- Alarm output, RS-422A, RS-232, Fail/memory end output, computation/report function, remote control, 24 V DC transmitter power output, 24 V DC/AC power driving, VGA output (DX200P), etc.

**Dimensions:**
- DX100P: 144 (W) × 144 (H) × 218 (D) mm
- DX200P: 288 (W) × 288 (H) × 220 (D) mm

**Weight:**
- DX100P: Approx. 3.0 kg
- DX200P: Approx. 6.6 to 7.3 kg

### DX100P/DX200P

**Comply with the requirements of FDA regulation 21 CFR Part 11**
- Electronic recording standards are supported through the following capabilities: binary data saving, batch function, login function, and operation history saving.
- Electronic signature standards are supported by the sign-in function and login function.

**Sign-in information is stored as attachments to measurement files to protect the security of the original data.**

**Leading-edge networking functions**
- The DX100P/DX200P are standard-equipped with an Ethernet port so you can immediately connect to an existing LAN or WAN. Networking functions such as email notifications, remote monitoring through a Web browser, and FTP file transfers are supported.

**A variety of display functions**
- The DX100P/DX200P have wide-viewing-angle, high-resolution TFT color liquid crystal displays for superior screen clarity. In addition, they have a variety of display functions, including trend, bar graph, digital, and overview displays.

**Flexible storage options**
- The following storage media options can be selected according to your applications:
  - CompactFlash memory card
  - Zip disk
  - In addition, a variety of file formats are supported, so you can efficiently save just the data you need. Because the DX Series do not use paper or ink for recording, efficiency is improved and total cost of ownership is reduced.

**Maximum durability**
- Internal memory is flash memory, which does not require a battery backup. You can also back up data to multiple destinations through your network.

### DR240 Specifications (some specifications are for separately sold options)

**Inputs:**
- Standalone model: 10, 20, or 30 channels (specify when ordering)
- Expandable model: 10 to 300 channels (can be expanded or changed)

**Input types:**
- DC voltage, thermocouples, RTD, mA, pulse, power monitor, strain, DI

**Communication standards:**

**Other:**
- Alarm output, remote function
- Remote measurement (expandable model):
  - Maximum total distance using special cables: 500 meters
  - Maximum number of connected subunits: 6

**Measurement interval:**
- 0.5 second (expandable model) to 60 seconds (measurement interval range for standalone model starts at 2 seconds)

**Recording interval:**
- Minimum 2 seconds

**Recording specifications:**
- 10-color dot recording, 250 mm effective recording width

**Display:**
- VFD 5 × 7 dot matrix, 3-line display

**Memory:**
- 3.5-inch floppy drive with 512 KB SRAM

**Options:**
- Computation function, report computation function

**PC software:**
- DAQ 32Plus, DAQLOGGER

**Dimension:**
- Standalone: Approx. 444 (W) × 144 (H) × 343 (D) mm
- Expandable model: Approx. 444 (W) × 288 (H) × 308 (D) mm

**Subunit:**
- Approx. 422 (W) × 176 (H) × 100 (D) mm

**Weight:**
- Approx. 16 kg (with module attached)
µR10000

Intelligent Industrial Recorder (100 mm recording chart)

µR10000 has carried over µR series high reliability and basic functions. The 101 × 16 full-dot matrix display allows it to monitor various on-site data.

- High reliability and high quality
  Fully contact-less technology
  High degree of integration using custom IC
  Dust and splash proof front door
- Variety of line-up
  1 to 4 pen model, 6 dot model
- Variety of input types
  Universal inputs
- Many input sensors available (35 input types such as Pt50, PR20-40 etc)
- Superior ease-of-operation
  VFD 101 × 16 full dot matrix display
  Versatile operation display
  Easily navigable interactive setting
  New chart cassette
  White LED
- Analog record of computed result
  (with the computation option /M1)
- Network function
  Ethernet, RS422A/485 communication option

µR10000 Specifications

- Recording width: 100 mm
- Chart length: 16 m
- Number of inputs
  Pen model: 1-4 pens
  Dot model: 6 dot model
- Input type:
  ±20 mV to ±50 V, 1-5 V range
  RTD (Pt100, Jpt100)
  DC current (with external shunt register)
- Measurement interval
  Pen model: 125 ms/channel
  Dot model: 1 s/6 dot or 2.5 s/6 dot
- Recording method
  Pen model: Disposable felt pens, plotter pen
  Dot model: 6 color wire dot
- Recording period
  Pen model: Consecutive recording
  Dot model: Max. 6 channel/10 sec
- Display:
  VFD 101 × 16 full dot matrix display
- Display types
  Multiple displays
  digital, bar, flag, DIO/DIO display etc can be displayed.
  15 display types can be selected from approx. 80 display types.
- Alarm levels: Up to 4 levels for each channel
- Alarm type:
  High and low limit, differential high and low limit,
  high and low rate-of-change, delay high and low
- Optional specification:
  Alarm output, RS422A/485 communication,
  Ethernet communication, Computation function,
  Expansion inputs, Remote input Calibration Correction,
  Header printout, Portable Type, 24 V DC/AC Power Supply etc.
- Dimension: Approx. 144 (W) × 144 (H) × 220 (D) mm
- Weight: 2.1 to 2.5 kg

µR20000

Intelligent Industrial Recorder (180 mm recording chart)

µR20000 has carried over µR series high reliability and basic functions. The 181 × 16 full-dot matrix display allows it to monitor various on-site data.

- High reliability and high quality
  Fully contact-less technology
  High degree of integration using custom IC
  Light weight (8.4 kg for 6 dot-model)
  Dust and splash proof front door
- Variety of line-up
  1, 2, 3, 4 pen models, 6, 12, 18, 24 dot models
- Variety of input types
  Universal inputs
- Many input sensors available (35 input types such as Pt50, PR20-40 etc)
- Superior ease-of-operation
  VFD 181 × 16 full dot matrix display
  Versatile operation display
  Easily navigable interactive setting
  New chart cassette
  White LED
- Analog record of computed result
  (with the computation option /M1)
- Network function
  Ethernet, RS422A/485 communication option

µR20000 Specifications

- Recording width: 180 mm
- Chart length: 20 m
- Number of inputs
  Pen model: 1, 2, 3, 4 pens
  Dot model: 6, 12, 18, 24 dots
- Input type:
  ±20 mV to ±50 V, 1-5 V range
  RTD (Pt100, Jpt100)
  DC current (with external shunt register)
- Measurement interval
  Pen model: 125 ms/channel
  Dot model: 1 s/6 dot, 2.5 s/12 to 24 dot or 2.5 s/6 dot, 5 s/12 dot, 10 s/18 to 24 dot
- Recording method
  Pen model: Disposable felt pens, plotter pen
  Dot model: 6 color wire dot
- Recording period
  Pen model: Consecutive recording
  Dot model: Max. 6 ch/10 s, 7 to 12 ch/15 s, 13 to 18 ch/20 s, 19 to 24/30 s
- Display:
  VFD 181 × 16 full dot matrix display
- Display types
  Multiple displays
  digital, bar, flag, DIO/DIO display etc can be displayed.
  15 display types can be selected from approx. 80 display types.
- Alarm levels: Up to 4 levels for each channel
- Alarm type:
  High and low limit, differential high and low limit,
  high and low rate-of-change, delay high and low
- Optional specification:
  Alarm output, RS422A/485 communication,
  Ethernet communication, Computation function,
  Expansion inputs, Remote input Calibration Correction,
  Header printout, Portable Type, 24 V DC/AC Power Supply etc.
- Dimension: Approx. 288 (W) × 288 (H) × 220 (D) mm
- Weight: Pen model: 7.5 to 7.6 kg
  Dot model: 8.4 to 9.0 kg
A Meter for Power Facility and a Monitor for Monitoring Energy Consumption

**PR300**

**Power and Energy Meter**

- Serves on cost, wiring, and space
- Integrates a wide selection of functions for measuring things like energy (active, regenerative, reactive, and apparent), voltage, current, frequency, and power factor into a single unit.
- Universal design
  - Converts the phase and wire system of an AC power system and an input voltage circuit to a universal format.
  - The PR300 can select the phase and wire system from among single-phase two-wire, single-phase three-wire, three-phase four-wire systems. Also it can select the input voltage up to 600 V AC.
- Compatible with ANSI 4-inch round form size, DIN 96-square instrument size, and JIS 110-square instrument size.
- Employs a large, three-row LED display
  - Capable of confirming three-phase voltage and current on the three-row display simultaneously.
- Three desired measurement items such as power, current, and energy assigned to the three-row display can be confirmed by changing up to 8 patterns.
- Equipped with a phase switch key. Phase indication format A, B, and C provided for overseas use, in addition to R, S, and T.
- Equipped with a multichannel of functions
  - Measures the maximum and minimum values of power, voltage, frequency, and power factor and the maximum value of current.
  - Transducer function: Transmits power, voltage, current, power factor, and frequency to the external instrument at 4 to 20 mA DC.
- Demand measuring function: Demand current and demand power with alarm output prevents excess of contract power
- Pulse output function: Transmits pulses proportional to energy (active, regenerative, reactive, and apparent)
- Optional integrating function: Measures energy at arbitrary times. Also measures energy of each process of productive facility.
- Standard equipped with an RS-485 communication and capable of Ethernet communication.

**PR300 Specifications**

- Phase and wire system: Universal phase and wire system (single-phase two-wire, single-phase three-wire, three-phase three-wire, and three-phase four-wire systems)
- Three-phase four-wire system (2.5 element)
- Input frequency: 45 to 65 Hz
- Input voltage: Universal voltage (150 V AC, 300 V AC, 600 V AC)
- Input current: 1 A AC, 5 A AC
- Accuracy rating:
  - Voltage and current: ±0.25% of F.S.
  - Active power: ±0.5% of F.S.
  - Active energy: ±0.5% (EN60687 accuracy: class 0.5 or equivalent)
- Analog output: Measurement accuracy of measurement item for output ± (±0.5% of F.S.)
- Control signal for optional integration or demand alarm release (optional): Voltage 1 point
- Analog output: 4 to 20 mA DC 1 point (optional)
- Allowable load resistance: 0 to 600 Ω
- Electric energy pulse output: Open collector 1 point (optional)
- Output capacity: 30 V DC at 200 mA DC
- Demand alarm output: Open collector 1 point (optional)
- Output capacity: 30 V DC at 200 mA DC
- Communication
  - Communication specifications: RS-485 interface (standard equipment)
  - Communication protocol: [RS 485] PC link, MODBUS, and PR201 protocol
  - Ethernet communication (optional)
- Measured Value display: 3-row, 5-digit, 7-segment red LED display
- Accuracy rating:
  - Input current: 1 A AC, 5 A AC
  - Input frequency: 45 to 65 Hz
  - Three-phase four-wire system (2.5 element)
  - Input current: 1 A AC, 5 A AC
  - Input power: 100-240 V AC ±10% ±5060 Hz or 130-300 V DC ±15%
- External dimensions: 110 (W) × 110 (H) × 126.5 (D) mm (ANSI 4-inch round form size)
- 96 (W) × 96 (H) × 124.5 (D) mm (DIN 96-square instrument size)
- Weight: approx. 0.7 kg (for both the PR300 and PR201)

**Easy-to-operate Simple Controller**

**UT130/UT150/UT152/UT155 Specifications**

- Input accuracy: ±0.3%, control cycle 500 ms
- Universal input: TC, RTD, DCV (except UT130)
- Control output: 4 to 20 mA (except UT130), voltage pulse, and relay
- Digital input: Max. 2 points (UT130: Not available)
- Communication function via RS485 interface compatibility
- Simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- Coordinated operation available
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to UT130/150: IP65
- UT152/155 or equivalent (dust-and drip-proof): IP55
- Dimensions: UT130/150: 48 (W) × 48 (H) × 100 (D) mm
- UT152: 48 (W) × 96 (H) × 100 (D) mm
- UT155: 96 (W) × 96 (H) × 100 (D) mm
- Weight: UT130/150: approx. 0.2 kg
- UT152: approx. 0.3 kg
- UT155: approx. 0.4 kg

**Economical, High-performance Type**

**UT351/UT321 Specifications**

- Input accuracy: ±0.1%, control cycle 250 ms
- Dimensions:
  - UT351: 96 (W) × 96 (H) × 100 (D) mm
  - UT321: 48 (W) × 96 (H) × 100 (D) mm
- Universal input: TC, RTD, DCV
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function and auto-tuning (standard)
- Alarm output: 3 points (standard)
- Heater burnout alarm specificable
- Communication function via RS485 interface compatibility
- Simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- Coordinated operation available
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Weight: approx. 0.7 kg (for both the UT351 and UT321)
- Parameter settings on a PC is available with the LL100 parameters setting tool.

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**Control Products**

http://www.yokogawa.com/na/pr300/
**Control Products**

**UT450/UT420/UT550/UT520/UT750/US1000**

**GREEN Series Digital Indicating Controllers**

**UT450/UT420**
- Digital Indicating Controller
- Simple operation
- Large clear PV display
- Heating/cooling control and position proportional control (UT450) included
- Remote setpoint input available
- Retransmission output (standard)
- Number of setpoint and PID parameter combinations: up to 8
- 24 VDC loop power supply (option for UT450)

**UT550/UT520**
- Digital Indicating Controller
- High performance controllers with lots of functions
- Large clear PV display
- Heating/cooling control and position proportional control (UT550) included
- Remote setpoint input available
- Retransmission output (standard) (also usable as the power supply for the sensor)
- Number of setpoint and PID parameter combinations: up to 8
- Easily applied to cascade control or input switching control by selecting function modes
- 24 VDC loop power supply (option for UT550)

**US1000**
- Digital Indicating Controller
- 30-segment LED PV bar graph
- Comes standard with a universal input that can directly accept sensor input
- Powerful dual-loop control function
- Custom computation function that covers a wide range of applications and is created by users combining controls and computations. (This is easily created using the LL1200 PC-Based Custom Computation Building Tool.)
- Weight: Approx. 1 kg

**UT750**
- Digital Indicating Controller
- Advanced highly functional indicating controller
- Large clear PV display
- Legible LCD indication
- Applicable to dual-loop control
- Easy selection of functions
- Control functions, such as temperature and humidity control or cascade control, are easily set up by selecting control function modes prepared in advance
- Easily applied to cascade control or input switching control by selecting function modes
- Customized computation function

**UT550/UT520 Specifications**
- Input accuracy: ±0.1%, control cycle 50 ms (fastest)
- Dimensions: UT550: 96(W) × 96(H) × 100(D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- DI/O increase available (using I/O extension modules): up to 23 points
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- DI/O increase and coordinated operation available
- High reliability: conforms to UL, CSA and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Parameter settings on a PC is available
- Security function using password
- High reliability: conforms to UL, CSA and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Parameter settings on a PC is available
- Weight: Approx. 1 kg or less (for both the UT550 and UT520)

**UT450/UT420 Specifications**
- Input accuracy: ±0.1%, control cycle 200 ms
- Dimensions: UT450: 96(W) × 96(H) × 100(D) mm
- UT420: 48(W) × 96(H) × 100(D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function, and auto-tuning (standard)
- Alarm output: 4 points
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- Coordinated operation available
- High reliability: conforms to UL, CSA and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Simple operation
- Large clear PV display
- Heating/cooling control and position proportional control (UT450) included
- Remote setpoint input available
- Retransmission output (standard) (also usable as the power supply for the sensor)
- Number of setpoint and PID parameter combinations: up to 8
- 24 VDC loop power supply (option for UT450)

**US1000 Specifications**
- Input accuracy: ±0.1%, control cycle 50 ms (fastest)
- Universal input: TC, DCV, RTD
- Control output: voltage pulse, 4 to 20 mA, and relay
- Digital input/output: Max. 7 points for each
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/Modbus protocol)
- Communicated operation available
- High reliability: conforms to FM, CSA, and CE-mark certification
- Front panel conforms to IP65 or equivalent (dust- and drip-proof)
- Option Software
- LL1100 Parameters Setting Tool
- LL1200 Custom Computation & Parameter Setting Tool
- Weight: Approx. 0.8 kg

**Programmable Controller with Bar Graph Displays**

**Excellent Control, Multifunction Type**

**UT750**
- Digital Indicating Controller
- Advanced highly functional indicating controller
- Large clear PV display
- Legible LCD indication
- Applicable to dual-loop control
- Easy selection of functions
- Control functions, such as temperature and humidity control or cascade control, are easily set up by selecting control function modes prepared in advance
- Easily applied to cascade control or input switching control by selecting function modes
- Customized computation function

**US1000**
- Digital Indicating Controller
- High performance controllers with lots of functions
- Large clear PV display
- Heating/cooling control and position proportional control (UT450) included
- Remote setpoint input available
- Retransmission output (standard) (also usable as the power supply for the sensor)
- Number of setpoint and PID parameter combinations: up to 8
- Easily applied to cascade control or input switching control by selecting function modes
- 24 VDC loop power supply (option for UT550)

**UT550/UT520**
- Digital Indicating Controller
- High performance controllers with lots of functions
- Large clear PV display
- Heating/cooling control and position proportional control (UT550) included
- Remote setpoint input available
- Retransmission output (standard) (also usable as the power supply for the sensor)
- Number of setpoint and PID parameter combinations: up to 8
- Easily applied to cascade control or input switching control by selecting function modes
- 24 VDC loop power supply (option for UT550)

**UT450/UT420**
- Digital Indicating Controller
- Simple operation
- Large clear PV display
- Heating/cooling control and position proportional control (UT450) included
- Remote setpoint input available
- Retransmission output (standard)
- Number of setpoint and PID parameter combinations: up to 8
- 24 VDC loop power supply (option for UT450)
### Simple, General Purpose-program Type

**UP351**
- **Program Controller**
  - Practical general-purpose program controller
  - Large clear PV display (with Active Color PV Display)
  - Program capacity: 2 patterns (10 segments/pattern)
  - PV event 2 points: time event one point
  - Retransmission output (standard) (also usable as the power supply for the sensor)

**UP351 Specifications**
- Input accuracy: ±0.1%, control cycle 250 ms
- Dimension: 96 (W) x 96 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function and auto-tuning (standard)
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- Coordinated operation available
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Parameter settings on a PC is available with the LL100 parameters setting tool
- Weight: Approx. 0.7 kg

### Complete, High-performance Program Type

**UP550**
- **Program Controller**
  - Function-completed high performance program controller
  - Large clear PV display and legible LCD pattern display
  - Capacity: 30 patterns/300 segments
  - Heating/cooling control and position proportional control included
  - Event setting: settable for up to 16 time events and 8 PV events (output up to 8 points)
  - Retransmission output (standard) (also usable as the power supply for the sensor)
  - Easily applied to cascade control or input switching control by selecting function modes

**UP550 Specifications**
- Input accuracy: ±0.1%, control cycle 100 ms (fastest)
- Dimension: 96 (W) x 96 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function and auto-tuning (standard)
- DI/O extendable (up to 8 points for both DI and DO)
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- Coordinated operation available
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Parameter settings on a PC is available with the LL100 parameters setting tool
- Weight: Approx. 1 kg or less

### Large Capacity, Multifunction Program Type

**UP750**
- **Program Controller**
  - Advanced highly functional program controller
  - Large clear 5-digit PV display and LCD display
  - Large capacity: 300 patterns/3000 segments
  - Applicable to dual-loop control
  - Easy selection of functions (UP mode)
  - Difficult control functions, such as temperature and humidity control or cascade control, are easily set up by selecting control function modes prepared in advance
  - Customized computation function

**UP750 Specifications**
- Input accuracy: ±0.1%, control cycle 100 ms (fastest)
- Dimension: 96 (W) x 96 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- DI/O increase and coordinated operation available
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Parameter settings on a PC is available with the LL100 parameters setting tool
- User preferable and definable I/O computation using the LL200 custom computation building tool
- Weight: Approx. 1 kg

### Exceptionally Clear and Large Display, General Purpose Indicator

**UM351/UM331**
- **Digital Indicator with Alarms**
- Easy-to-use general-purpose indicating alarm meters
- Large clear PV display (with Active Color PV Display)
- Alarm output available for up to 4 points
- Retransmission output (standard) (also usable as the power supply for the sensor)
- 24 VDC loop power supply (optional)

**UM351/UM331 Specifications**
- Input accuracy: ±0.1%, sampling cycle of 250 ms
- Dimensions UM351: 96 (W) x 96 (H) x 100 (D) mm UM331: 96 (W) x 48 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Alarm output: 3 points (standard), the addition of one more point available
- Communication function via RS485 interface compatibility: simple communication with graphic panel/PLC/PC (PC link/ladder communication/Modbus protocol)
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Weight: Approx. 0.7 kg (for both the UM351 and UM331)
UT351- •A/UT551- •A to •D

Simple, High-performance Type

UT351- •A Specifications
- Input accuracy: ±0.1%, control cycle 250 ms
- Dimension: 96 (W) x 96 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function and auto-tuning (standard)
- Alarm output: 3 points (standard)
- Heater burnout alarm specifiable
- Ethernet communication function
- Gate way function
- High reliability: conforms to UL, CSA, and CE-mark certification
- Front panel conforms to IP55 or equivalent (dust- and drip-proof)
- Security function using password
- Weight: Approx. 0.7 kg
- Parameter settings on a PC is available with the LL100 parameters setting tool.

UT351- •A to •D

UT551 Specifications
- Input accuracy: ±0.1%, control cycle 100 ms/200 ms/500 ms
- Dimension: 96 (W) x 96 (H) x 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- Overshoot suppression “super” function, hunting suppression “super2” function and auto-tuning (standard)
- Remote setpoint input available
- Alarm output: 3 points (standard)
- Reattachment output (standard) (also usable as the power supply for the sensor)
- Number of setpoint and PID parameter combinations: up to 8
- Easily applied to cascade control or input switching control by selecting function modes

PC-Based Parameters Setting Tools

LL100/LL200, LL1100/LL1200 (for US1000)

LL100/LL1100 Parameters Setting Tool

The LL100/LL1100 Parameters Setting Tool is a software package used to set the setup parameters, operating parameters, and program patterns of the GREEN Series controllers from a personal computer. This tool allows users to download, upload, print out parameters, and display PV trend data during PID tuning etc.

*1: The LL1100 is for US1000 controller only.
*2: For program controllers only.

LL200/LL1200 Custom Computation Building Tool
- Applicable Controllers: US1000, UT750, UP750

The LL200/LL1200 Custom Computation Building Tool is a software package used to create custom computation and custom display functions. This tool also covers the functions of the LL100/LL1100 PC-based Parameters Setting Tool. The custom computation building function, the main function of this package, enables users to formulate computations graphically. This tool has an online help function that provides explanations of the computation modules.

*1: The LL1200 is for US1000 controller only.

1: Ethernet is the trademark of XEROX Corporation.
2: Please prepare Ethernet cable individually.
VJ Series
Compact, Plug-in Signal Conditioners

VJ Series signal conditioners have a compact, space-saving plug-in style design. The lineup includes a universal input type, versatile I/O specifications, wide-range of power supply, isolated two outputs and field configurable models. Optional 2 relay alarm outputs or RS-485 communication function can be equipped for multi-function models.

**Features**
- Compact design for space saving
  - The dimension is 76 (H) \( \times \) 29.5 (W) \( \times \) 124.5 (D) mm.
- Two isolated outputs
  - Second isolated current or voltage (pulse) output is available as optional feature.
- Communication function
  - Optional MODBUS (RS-485) communication function can be obtained simultaneously with analog output signal from one VJ unit.
- Alarm outputs
  - Optional Hi/Low relay alarm outputs can be output simultaneously with analog (pulse) output signal from one VJ unit.
- Field configuration
  - A field configuration of the microprocessor based VJ is possible from your PC (with VJ77 PC-based parameters setting tool) or using our Handy Terminal (JHT200).
- Compliance with international safety standards; CE, CSA and UL.

**Specifications (Isolator VJH7)**
- Accuracy rating: ±0.1% of Span
- Response speed: 200 ms, 63% (10 to 90%)
- Power supply: 100-240 AC/DC (-15, +10%), 50/60 Hz or 15-30 VDC (+20%)
- Alarm output (optional 2nd output)
  - N.O relay contact, 2 points, COM common
- Communication output (optional 2nd output)
  - Protocol: Modbus ASCII, Modbus RTU, number of connectable instruments: up to 31 units
  - Communication distance: up to 1200 m
  - Communication rate: 1200, 2400, 4800, 9600 bps

**Lineup**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VJH7</td>
<td>Isolator</td>
</tr>
<tr>
<td>VJA7</td>
<td>Distributor</td>
</tr>
<tr>
<td>VJU7</td>
<td>Universal Temperature Converter (Free Range Type)</td>
</tr>
<tr>
<td>VJS7</td>
<td>Universal Temperature Converter (2-output, Free Range Type)</td>
</tr>
<tr>
<td>VJP7</td>
<td>Pulse to Analog Converter</td>
</tr>
<tr>
<td>VJQ7</td>
<td>Analog to Pulse Converter</td>
</tr>
<tr>
<td>VJX7</td>
<td>Universal Computing Unit</td>
</tr>
<tr>
<td>VJ77</td>
<td>Parameter Setting Tool</td>
</tr>
</tbody>
</table>

**Feature**
- Easy for settings of the input/output range by using VJ77, Parameter Setting Tool, or JHT200, Handy Terminal. (All 8 models of M series)
- Adjustment can be made easily by using a screwdriver. (All 8 models of M series)
- Output testing is possible by setting arbitrary percentage values via JHT200 or VJ77. (All 8 models of M series)
- Universal Temperature Converter can change the type of its input sensors via JHT200 or VJ77.
- Also the wiring resistance can be easily adjusted using a screw driver.
- Input range of the Potentiometer Converter can be set easily by using a screwdriver.

**M Series**
Standard, Plug-in Signal Conditioner

The JUXTA M Series, 8 models of free range type, is signal converters that offers good maintainability. It enables easy and reliable adjustment on site using a screwdriver. On site configuration of JUXTA, such as for input/output range, type of the sensors, burnout operation etc., is possible by using the setting tools from your PC.

**Standard, Quantity Stability, Easy Adjustment**

**Feature**
- Easy for settings of the input/output range by using VJ77, Parameter Setting Tool, or JHT200, Handy Terminal. (All 8 models of M series)
- Adjustment can be made easily by using a screwdriver. (All 8 models of M series)
- Output testing is possible by setting arbitrary percentage values via JHT200 or VJ77. (All 8 models of M series)
- Universal Temperature Converter can change the type of its input sensors via JHT200 or VJ77.
- Also the wiring resistance can be easily adjusted using a screw driver.
- Input range of the Potentiometer Converter can be set easily by using a screwdriver.

**Lineup**

<table>
<thead>
<tr>
<th>Model</th>
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</tr>
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<tbody>
<tr>
<td>MA5</td>
<td>Distributor (Free Range Type)</td>
</tr>
<tr>
<td>MA5D</td>
<td>Distributor (2-output, Free Range Type)</td>
</tr>
<tr>
<td>MB5</td>
<td>Isolator (Free Range Type)</td>
</tr>
<tr>
<td>MB5D</td>
<td>Isolator (2-output, Free Range Type)</td>
</tr>
<tr>
<td>MU5</td>
<td>Universal Temperature Converter (Free Range Type)</td>
</tr>
<tr>
<td>MU5D</td>
<td>Universal Temperature Converter (2-output, Free Range Type)</td>
</tr>
<tr>
<td>MS5</td>
<td>Universal Temperature Converter (Free Range Type)</td>
</tr>
<tr>
<td>MUSD</td>
<td>Universal Temperature Converter (2-output, Free Range Type)</td>
</tr>
</tbody>
</table>

**Universal Temperature Converter MU5, MUSD**

Input signal: Selection of input type (Thermocouple, RTD or mV signal)

Output signal: It can set up the following specification.
- A: 0 to 20 mA DC Span is 5 mA or more
- B: 0 to 5 mA DC Span is 1 mA or more
- C: ±10 V DC Span is 0.1 V or more
- D: ±100 mV DC Span is 10 mV or more

Power supply: 85-264 V AC/DC or 12-48 V DC

Accuracy rating: ±0.1% of span

Accuracy of reference junction compensation (RJC):
- Other than Type R and S: ±1ºC (0 to 50ºC)
- Type R and S: ±2ºC (0 to 50ºC)

External dimensions: 86.5 (H) \( \times \) 51 (W) \( \times \) 123 (D) mm (including a socket)

Weight: Main unit: Approx. 200 g Socket: approx. 60 g
The VJET Ethernet/RS-485 converter is a compact, plug-in type communication converter that uses the Modbus/TCP protocol for connecting to host devices with Ethernet capability, and uses the Modbus/RTU protocol for connecting to devices with RS-485 communication function.

Features

- Enables monitoring of multiple widely separated sensor signals from a single location via Ethernet. Up to 31 sources can be monitored per VJET unit.
- Monitoring systems can be set up quickly using DAQWORX* software (recommended).
- *DAQWORX Data Acquisition Software Suite
- Installs in your existing LAN with a minimum of additional wiring.
- 29.5 mm wide (installed) space-saving design. Mounts easily on the wall or on DIN rails. Can be rack-mounted when installed in the VJCE-01A mounting base for communication.
- Choose 24 VDC or 100-240 VAC/DC power supply specifications.
- Supports CSA, CE, and UL safety standards.

Specifications

- Ethernet communication
  - Interface: Conforms to IEEE802.3 (10BASE-T/100BASE-TX)
  - Protocol: Modbus/TCP
  - Access control: CSMA/CD
  - Transfer rate: 10/100 Mbps
  - Maximum segment length: 100 m (the length between Hub and converter)
  - Maximum connecting configuration: Up to 4 cascade connection per hub (10BASE-T)
  - Up to 2 cascade connection per hub (10BASE-TX)
- RS-485 communication
  - Interface: Conforms to EIA RS-485
  - Protocol: Modbus/RTU
  - Transfer system: Half-duplex communication
  - Synchronous system: Start-stop synchronization
  - Transfer rate: 9600 bps
  - Data length: 8
  - Stop bit: 1
  - Parity: Even, odd or none
  - Power supply: 24 VDC ±10% or 100-240 VAC/DC (-15, +10%), (50/60 Hz)
  - Power consumption: 1.8 W at 24 VDC, 1.5 W at 110 VDC, 2.6 VA at 100 VAC, 4.0 VA at 200 VAC

VJET Setting Tool version 1.02
VJET communication parameter can easily be set via Ethernet. High-speed response mode, parity, IP address, subnet mask,TCP/IP port, default gateway. Visit our web site and download this software http://www.yokogawa.com/ns/cis/field/ns-vjet_01.htm
See the VJET user’s manual (IM 77J01E11-01E) for the detailed specifications.

Modbus/TCP Protocol
This is an open protocol compatible with TCP/IP. It is one of the protocols that can perform communication in the application layer of TCP/IP packets, and uses port 502.
Data Acquisition Software Suite

DAQWORX

Our integrated data acquisition software package responds to changeable market conditions with a high degree of scalability.

Features

DAQWORX comprises four data acquisition “Base” software programs, six “Add-on” programs with high-value-added functions, eight “Gate” interface programs, and a common viewer program for a total of nineteen software components. These can be combined as desired to build a data acquisition and monitoring system that is ideal for the user’s application. DAQWORX can be categorized into two packages depending on the data acquisition software selected.

- Integrated Package
  
  Centered around DAQLOGGER data acquisition software, this package allows you to build a data acquisition and monitoring system with not only recorders and data acquisition equipment, but also by integrating a wide variety of measuring instruments and devices through interface programs. Furthermore incorporating various high-value-added software programs will enable you to record on a group-by-group basis, set up triggered recording, monitor on user-created screens, and perform many other specialized functions.

- Product Specific Packages
  
  These are data acquisition software programs designed to maximize hardware performance; DAQ32Plus for DARWIN, MXLOGGER for MX100 using DAQMASTER MX, and DAQEXPLORE for DAQSTATION DX/CX and MobileCorder MV. High-value-added software can be combined, and acquired data can be integrated with DAQLOGGER.

Examples:

1. MX100 analog pattern output and data acquisition using MXLOGGER
2. Integrated data acquisition on WT1600 and MX100 using DAQLOGGER
3. Data recording and monitoring on a group-by-group basis using AddMulti
4. Display and compare data files across groups and lots using DataBrowser
5. Ethernet support for DARWIN, MX100, DX100P, DX200P, DX3200P, MX100/MW
6. DAQlogger Client: Remote monitor for DAQLOGGER
7. AddObserver: Real time monitoring on user-created screens (with “Builder” screen editor)
8. AddObserver Runtime: Real time monitoring on user-created screens (runtime version)
9. AddMulti: Acquisition on a group-by-group basis (32 ch × 50 groups)
10. AddTrigger: Acquisition using a wide array of trigger conditions

- Product Specific Package
  
  DAQ32Plus: For DARWIN, shortest acquisition interval of 0.5 seconds
  MXLOGGER: For the MX100, shortest acquisition interval of 10 ms
  DAQEXPLORE: For DAQAdvanced/DX/CMV, automatic data file transfer
  AddObserver/Runtime/AddMulti/AddTrigger:
  
  Remote monitor for DAQ32Plus
  see the integrated package.

- Viewer (Common to All)
  
  DataBrowser: File searching and multi-waveform display

OPC Interface Package

DAQOPC

- DAQOPC is an OPC server which supports OPC Data Access Version 2.0.
- DAQOPC provides OPC clients with custom interfaces and automation interfaces.
- DAQOPC supports the browser function, enabling OPC clients to browse information on OPC servers.

Function Specifications

DAQOPC provides the following OPC specification interfaces.

- Data Access (DA) server function
  
  The DA server reads process data using item IDs as identifiers, and writes process data through communication input channels (C01 through C60).

- System configuration
  
  Server/client configuration
  
  DAQOPC users (OPC clients) can be configured in the following two ways:
  
  - OPC client coexisting on the same PC as DAQOPC
  - OPC client present on host computer (Windows 2000/XP)

- Multiple-server configurations
  
  A single OPC client can access multiple DAQOPC servers.

Compatible Equipment

- DXA410: DX100/DX200/DX100/DR200/DC100/DC200P/DX2300P/DX2000/DC1000/DC2000/MV100/MV200
- DP410: DA100/DC100/DR130/DR230/DR240
- Communication standards: Ethernet All models listed above (RS-232/RS-422A/RS-485: All models listed above except DXA3200P / DR420)
- Operating systems: Windows 2000 or XP Professional

- Application capacity
  
  A number of connected clients: Up to 100
  A number of group objects: Up to 1000
  A number of registered item IDs: Up to 10,000/group
  A number of cache updated item IDs: Up to 100,000
  Cache updating interval: 1 to 3600 sec
  A number of connected units (DXA410): Up to 24
  A number of connected units (DP410): Up to 16
Datum-Y (XL120 Series)

**Portable Data Station (Data Logger)**
- All channels adopt universal insulated inputs: The temperature and voltage can be set independently for each channel.
- Easy-to-read screen display: A wide view color TFT LCD makes it easy to read even outdoors.
- Data can be saved at the maximum speed of 100 ms: Reliably measures temperature changes.
- Large amounts of data can be acquired: Employs compact flash and SD cards.
- USB memory enables support for a data copy function.
- Comes standard with a LAN port: Also supports remote data acquisition.

**Web Server Function**
You can easily monitor the Datum-Y screens with the Internet Explorer Web browser (Screen display can be updated every 5, 10, or 30 seconds automatically, or manually). You can use Operator Page to remotely operate Datum-Y, except for turning the power on and off and key locking. You can use Monitor Page just to check and switch the Datum-Y screens. You can set access authentication for each screen to enhance security.

**FTP Server Function**
You can output a list of files stored in Datum-Y’s internal memory and connected external storage media, and you can transfer and delete files.

**Model Number and Suffix Code**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>XL121</td>
<td>8ch, with Screw in type terminal block unit</td>
<td></td>
</tr>
<tr>
<td>XL122</td>
<td>16ch, with Screw in type terminal block unit</td>
<td></td>
</tr>
<tr>
<td>XL124</td>
<td>16ch, with M3 screws type terminal block unit</td>
<td></td>
</tr>
<tr>
<td>-D</td>
<td>Power cord(UL/CSA Standard)</td>
<td></td>
</tr>
<tr>
<td>-F</td>
<td>Power cord(VDE Standard)</td>
<td></td>
</tr>
<tr>
<td>-M</td>
<td>Power cord(GB Standard)</td>
<td></td>
</tr>
<tr>
<td>-R</td>
<td>Power cord(AS Standard)</td>
<td></td>
</tr>
<tr>
<td>-S</td>
<td>Power cord(BS Standard)</td>
<td></td>
</tr>
</tbody>
</table>

**Optional Accessories**

- Application Software “Datum-LOGGER”
Datum-LOGGER allows you to connect up to ten Datum-Ys to analyze and process data after you perform real-time measurement and acquire data with a PC.
- Real-time measurement at the maximum speed of 1 second
- Zooming to analyze acquired data in the waveform view
- A variety of data saving functions available (selective and partial saving)

**Model Number**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type-K TC</td>
<td>90060</td>
<td>5 meter x 4 sets</td>
</tr>
<tr>
<td>Carrying case</td>
<td>93037</td>
<td>To store the main unit and accessories</td>
</tr>
<tr>
<td>Lithium ion battery</td>
<td>94009</td>
<td>2,400 mAh, 7.4V</td>
</tr>
<tr>
<td>Stand</td>
<td>93039</td>
<td>Supports tilted installation on the desktop, wall mounting, and DIN rail mounting</td>
</tr>
<tr>
<td>Digital I/O cable</td>
<td>91029</td>
<td>For pulse/logic inputs and alarm outputs, 3 m</td>
</tr>
<tr>
<td>Application Software Datum-LOGGER</td>
<td>XL900</td>
<td>For Datum-Y</td>
</tr>
<tr>
<td>Communication cable</td>
<td>91011</td>
<td>RS-232 communication cable for PC (9 pin)</td>
</tr>
<tr>
<td>Printer cable</td>
<td>91010</td>
<td>RS-252 cable for printer</td>
</tr>
<tr>
<td>Printer</td>
<td>97010</td>
<td>Includes 1 roll thermal paper and 1 battery pack</td>
</tr>
<tr>
<td>Printer thermal paper</td>
<td>97080</td>
<td>10 rolls/set</td>
</tr>
<tr>
<td>AC adapter for printer</td>
<td>94006</td>
<td>Power supply 200-240 V</td>
</tr>
<tr>
<td>AC adapter for printer</td>
<td>94007</td>
<td>Power supply 100-120 V</td>
</tr>
</tbody>
</table>
CW240 Specifications

Measuring Mode:
All items can be measured at the same time
Instantaneous value (Wave form/Electric Energy/Demand/Harmonics/Voltage Fluctuation
Wiring:
1P2W, 1P3W and 3P3W
Multiple system Load Measurement:
1P2W × 2, 1P3W × 2, 3P3W × 2, SCOTT Wiring (1P3W + 3P3W)
Range:
Voltage: 150/300/600/1000 V
Current: 20.0 mA (96036) to 3000 A (96034/35)
Accuracy:
Voltage: ±(0.2% rdg. + 0.1% rng.)
Current/active power: ±(0.6% rdg. + 0.4% rng.) when using clamps 96030, 96031, 96033 and 96036
±(1.0% rdg. + 0.8% rng.) when using clamps 96032, 96034 and 96035

General Specifications
- External dimensions: 206 (W) × 184 (H) × 65 (D) mm
- Weight: Approx. 1.2 kg (without batteries)
- Power: AC adaptor, AA size alkaline battery

CW120 Series Specifications

Measurement Item:
Voltage rms (V), Current rms (A), Active Power (W) and Frequency (Hz)
Wiring:
CW120: 1P2W, 1P3W, 3P3W, 1P2W × 2
CW121: 1P2W, 1P3W, 3P3W, 3P4W, 1P2W × 2 and 1P2W × 3
Range:
Voltage: 150/300/450 V
Current: 5/10/20/50/100/200/500/1000 A
Basic Accuracy:
Voltage: ±(0.3% rdg. + 0.2% rng.)
Current/active power: ±(0.8% rdg. + 0.4% rng.) when using clamps 96030, 96031 and 96033
±(1.2% rdg. + 0.8% rng.) when using clamp 96032

General Specifications
- External dimensions: 117 (W) × 161 (H) × 51 (D) mm
- Weight: Approx. 600 g
- Power: AC 100 to 240 V ±10%, 50/60 Hz

AP240E Data Analysis Program for CW series

- Data Management
- Data Display Selection
- Graph Display
- Harmonic Graph Display
- Harmonics Instant Value Display
- Waveform Data Display
- Voltage Change Display

Clamp Probes for CW240/CW121 series

<table>
<thead>
<tr>
<th>Model</th>
<th>96038</th>
<th>96033</th>
<th>96030</th>
<th>96031</th>
<th>96032</th>
<th>96034</th>
<th>96035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp Probes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Need AC adapter

<table>
<thead>
<tr>
<th>Measuring Range</th>
<th>± 40 mm</th>
<th>± 18 mm</th>
<th>± 30 mm</th>
<th>± 30 mm</th>
<th>± 65 mm</th>
<th>65 × 100 mm</th>
<th>± 170 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring Range</td>
<td>AC 2 A</td>
<td>AC 50 A</td>
<td>AC 200 A</td>
<td>AC 500 A</td>
<td>AC 700 A (1000 A 5 min)</td>
<td>AC 1000/2000/3000 A</td>
<td>AC 3000/3000 A</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>AC 50 mV</td>
<td>AC 500 mV</td>
<td>AC 500 mV</td>
<td>AC 500 mV</td>
<td>AC 250 mV</td>
<td>AC 500 mV</td>
<td>AC 500 mV</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>20 Hz to 5 kHz</td>
<td>20 Hz to 20 kHz</td>
<td>20 Hz to 20 kHz</td>
<td>20 Hz to 5 kHz</td>
<td>45 Hz to 66 Hz</td>
<td>30 Hz to 1.5 kHz</td>
<td>10 Hz to 20 kHz</td>
</tr>
<tr>
<td>External dimensions</td>
<td>70 × 120 × 25 mm</td>
<td>52 × 106 × 25 mm</td>
<td>73 × 130 × 30 mm</td>
<td>73 × 130 × 30 mm</td>
<td>106 × 172 × 32 mm</td>
<td>140 × 64 × 48 mm</td>
<td>140 × 64 × 48 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 300 g</td>
<td>Approx. 220 g</td>
<td>Approx. 300 g</td>
<td>Approx. 300 g</td>
<td>Approx. 300 g</td>
<td>Approx. 500 g</td>
<td>Approx. 1,390 g</td>
</tr>
</tbody>
</table>

- Need to purchase AC adapter separately
Portable Test Instruments

Features

- Highly accurate within 0.02% of the DC voltage range for source and measure
- Source and measurement can be performed simultaneously
- Vertical body with large-screen display
- Loop power supply function (24 VDC at a load of max 22 mA)
  It is possible to measure current in the mA range while supplying power
- Sink function
- Sweep functions that allow 3 types of continuous outputs:
  - Step sweep function
  - Linear sweep function
  - Program sweep function

Applications

**Two-wire Type Transmitter Applications**

- **Two-wire type transmitter (measurement function) application**
  - Loop check function
  - Measures mA signals output while supplying transmitter power at 24 VDC.

- **Two-wire type transmitter (source function) application**
  - Sink function
  - Receives current (Sink) from the power supply at voltages of up to 28 VDC and transmits mA signals to the loop.

Specifications

**Source Unit**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td></td>
</tr>
<tr>
<td>500 mV</td>
<td>10 µV</td>
</tr>
<tr>
<td>5 V</td>
<td></td>
</tr>
<tr>
<td>10 V</td>
<td></td>
</tr>
<tr>
<td>50 V</td>
<td></td>
</tr>
<tr>
<td>100 mA</td>
<td></td>
</tr>
</tbody>
</table>

**Measurement Unit**

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td></td>
</tr>
<tr>
<td>5 V</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>10 V</td>
<td>1 mV</td>
</tr>
<tr>
<td>50 V</td>
<td>5 mV</td>
</tr>
</tbody>
</table>

**Common source specifications**

- Power supply: 6 AA size alkaline batteries / AC adapter (sold separately) or dedicated NiMH battery (sold separately)
- Battery life Conditions: Simultaneous source/measurement
  - When 6 batteries are used: Approx. 8 hours
  - When NiMH battery is used: Approx. 10 hours
- Auto power-off: Approx. 10 minutes
- Insulation resistance: Between input terminal and output terminal: 500 VDC, 50 MΩ or more
- Withstand voltage: Between measurement terminal and generation terminal: 350 V AC, 1 minute
- Operating temperature/humidity range: 0 to 40°C, 20 to 80% RH (no condensation)
- Storage temperature range: -20 to 70°C, 20 to 80% RH (no condensation)
- External dimensions: Approx. 251 × 124 × 70 mm
- Weight: Approx. 1000 g (with Batteries)
- Accessories:
  - Lead cable for generation: 1 set
  - Lead cable for measurement: 1 set
  - Carrying case: 1
  - Terminal adapter: 1
  - Size AA battery: 6
  - Fuse for measurement: 1 (spare)
- Conforming Standards:
  - Safety: EN61010-1
  - EMC: EN 61326 Class B, EN 55011 Class 2 Group I
  - EN 61000-3-2, EN 61000-3-3, EN 61326

Optional Accessories (sold separately)

<table>
<thead>
<tr>
<th>Product name</th>
<th>AC adapter</th>
<th>RJ sensor</th>
<th>Accessory storage case</th>
<th>NiMH battery</th>
<th>Main body case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model name</td>
<td>94010</td>
<td>B9108WA</td>
<td>B9108XA</td>
<td>94015</td>
<td>93027</td>
</tr>
<tr>
<td>Remark</td>
<td>D</td>
<td>F</td>
<td>H</td>
<td>R</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>For UL/CSA Standard</td>
<td>For VDE Standard</td>
<td>For CE Standard</td>
<td>For All Standard</td>
<td>For BS Standard</td>
</tr>
<tr>
<td></td>
<td>For reference junction compensation</td>
<td>Lead cables, RJ sensor, etc. can be stored.</td>
<td>NiMH battery Dedicated</td>
<td>With strap and accessory storage case</td>
<td></td>
</tr>
</tbody>
</table>
Handy Calibrators

CA51/CA71, CA11E, CA12E

Simultaneous Signal Source and Measurement Capability

Source Unit

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reference</th>
<th>Range</th>
<th>Accuracy (23°C per year)</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 V</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25 V</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 V</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 V</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC current</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.1 mA</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25 mA</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 mA</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mA</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTD</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTD</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measurement Unit

- Both CA51 and CA71
- CA71 only

Simulator of Common Thermocouples and RTD Sensors

Source Unit

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reference</th>
<th>Accuracy (23°C per year)</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>K</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>E</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>0-0.05% + 0.1 mV</td>
<td>0.1 mV</td>
<td></td>
</tr>
</tbody>
</table>

Source and Measuring of Voltage and Current

CA11E Specifications

Source
DCV: 30/10/5/3 V/100 mV
DCA: 20/4-20 mA SINK

Measurement
DCA: 30/10/5/3 V/100 mV
DCA: 20 mA

General Specifications
- External Dimensions: 92 (W) × 90 (H) × 42 (D) mm
- Weight: Approx. 440 g
- Power Supply: Four AA (R6) dry cells or AC adapter

CA12E Specifications

Source
TC: RTD PT100, 100 mA, 400Ω

Measurement
TC: RTD PT100, 100 mA, 400Ω

General Specifications
- External Dimensions: 192 (W) × 90 (H) × 42 (D) mm
- Weight: Approx. 440 g
- Power Supply: Four AA (R6) dry cells or AC adapter
Portable Test Instruments

### Selection Guide, 734 series

#### Display
- Max. Value
- Bar Graph
- AC/DC
- AC + DC
- DC + AC
- Resistance
- Continuity Check
- Diode Test
- Temperature
- Capacitance
- Communication
- Data Memory
- Max./Min. Value Memory
- Data Hold
- Auto Hold
- Peak Hold
- Overvoltage Input Warning
- Auto Power Off

#### Measurement Items
- AC RMS Voltage
- AC + DC Current
- Resistance
- Continuity Check
- Diode Test
- Temperature
- Capacitance
- Communication
- Data Memory
- Max./Min. Value Memory
- Data Hold
- Auto Hold
- Peak Hold
- Overvoltage Input Warning
- Auto Power Off

#### Additional Functions
- AC RMS Value
- AC + DC Current
- Resistance
- Continuity Check
- Diode Test
- Temperature
- Capacitance
- Communication
- Data Memory
- Max./Min. Value Memory
- Data Hold
- Auto Hold
- Peak Hold
- Overvoltage Input Warning
- Auto Power Off

#### 734 Series Specifications

**Detection**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>50.000 mV/500.00 mV/2400.0 mV/5.000 V/500.0 V/1000.0 V</td>
<td>0.1%+10</td>
</tr>
<tr>
<td>ACV</td>
<td>50.000 mV/5.000 V/500.00 V/1000.0 V</td>
<td>0.7%+30</td>
</tr>
<tr>
<td>DCV + ACV</td>
<td>5.000 V/500.0 V/500.0 V/1000.0 V</td>
<td>1.5%+10</td>
</tr>
<tr>
<td>DCA</td>
<td>500.00 µA/500.00 µA/50.000 mA/50.000 mA/5.000 A/10.000 A</td>
<td>0.2%+2</td>
</tr>
<tr>
<td>ACA</td>
<td>500.00 µA/500.00 µA/50.000 mA/50.000 mA/5.000 A/10.000 A</td>
<td>1.5%+20</td>
</tr>
<tr>
<td>DCA + ACA</td>
<td>50.00 µA/5000 µA/500.00 mA/500.00 mA/5.000 A/10.000 A</td>
<td>2.0%+10</td>
</tr>
<tr>
<td>Resistance</td>
<td>500.0 Ω</td>
<td>0.1%+2</td>
</tr>
<tr>
<td>Frequency</td>
<td>2.000 Hz to 9999 Hz</td>
<td>0.02%+1</td>
</tr>
<tr>
<td>Capacitance</td>
<td>5.000 nF/5000.0 nF/500.00 nF/500.00 nF/50.000 µF/500.000 µF</td>
<td>1.0%+5</td>
</tr>
<tr>
<td>Continuity check</td>
<td>500.0 Ω</td>
<td>1.0%+2</td>
</tr>
<tr>
<td>Diode test</td>
<td>2.400 V</td>
<td>1.0%+2</td>
</tr>
<tr>
<td>Temperature</td>
<td>–50.0 to 800.0°C</td>
<td>1.0%+1.5°C</td>
</tr>
</tbody>
</table>

**Accuracy**: (23°C ±5°C, Less than 80% RH), ±(% rdg + dgt)

**Additional Functions**
- RS-232C, data memory, max/min value memory, relative/percentage value computation, logarithm computation, data/auto hold, peak hold (73402), overvoltage warning, backlight (73402)

**Power Supply**
- Two AA (R6) dry cells

**Battery Life**
- Approx. 120 hours

**Dimensions**
- 85 (W) × 191 (H) × 40 (D) mm

**Weight**
- Approximately 450 g (including batteries)

---

A New De Facto Standard for Handheld DMM

- Maximum Measurement Accuracy: 0.020% rdg + 2 dgt (73402, DC voltage)
- 0.040% rdg + 2 dgt (73401, DC voltage)
- Highly Reliable: Calibration screw/dials eliminated
- Full Support of Data Management: Measured data stored in internal memory
- Safe Design: Shutters prevent erroneous insertion of test leads into current measurement-terminals (terminal shutters)
- Shockproof elastomer casing

---

**General Specifications**

- Additional Functions: RS-232C, data memory, max/min value memory, relative/percentage value computation, logarithm computation, data/auto hold, peak hold (73402), overvoltage warning, backlight (73402)
- Power Supply: Two AA (R6) dry cells
- Battery Life: Approx. 120 hours
- Dimensions: 85 (W) × 191 (H) × 40 (D) mm
- Weight: Approximately 450 g (including batteries)
Portable Test Instruments

73101 Pocket Digital Multimeter

4300 count display
Continuity Check and Diode Test
Auto Hold
Auto Power Off

733 Series
Digital Multimeters

3.5 digits (4,000-count, 40-segment bar graph display)
Mean value type (73301, 73302, RMS type (73303)
Measurement Functions: Voltage, Current, Resistance, Continuity Check, Diode Test, Frequency, Capacitance, Temperature
Features: User calibration function (73302, 73303), Hi-impact overmold case

732 Series
Digital Multimeters

3.5 digits (4,300-count), Mean value type
Measurement Functions: Voltage, Current, Resistance, Continuity Check, Diode Test, Capacitance
Features: Auto hold, Auto power-off

731 Series
Pocket Digital Multimeter

4300 count display
Continuity Check and Diode Test
Auto Hold
Auto Power Off

Provides Safety Levels Demanded in Field Work

733 Series Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>DCV (400 mV/4.000 V)</th>
<th>ACV (400 mV/4.000 V)</th>
<th>DCA (400 µA/4000 µA)</th>
<th>ACA (400 µA/4000 µA)</th>
<th>Resistance</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>73301</td>
<td>0.3%±1</td>
<td>0.5±5</td>
<td>0.5%±4</td>
<td>1.2%±5</td>
<td>0.75%±2</td>
<td>0.0%±2</td>
</tr>
<tr>
<td>73302</td>
<td>0.2%±1</td>
<td>0.75%±1</td>
<td>0.3%±1</td>
<td>0.5%±1</td>
<td>0.75%±2</td>
<td>0.0%±1</td>
</tr>
<tr>
<td>73303</td>
<td></td>
<td></td>
<td></td>
<td>1.5%±5</td>
<td></td>
<td>0.0%±2</td>
</tr>
</tbody>
</table>

General Specifications
• External dimensions: 85 (W) x 191 (H) x 40 (D) mm
• Weight: Approx. 450 g
• Power Supply: Two AA (R6) dry cells

Low-cost Handheld DMM

732 Series Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>DCV (400 mV/4.000 V)</th>
<th>ACV (400 mV/4.000 V)</th>
<th>DCA (400 µA/4000 µA)</th>
<th>ACA (400 µA/4000 µA)</th>
<th>Resistance</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>73201</td>
<td>0.3%±1</td>
<td>1.0%±5</td>
<td>0.7%±1</td>
<td>1.2%±5</td>
<td>0.75%±2</td>
<td>0.0%±2</td>
</tr>
<tr>
<td>73202</td>
<td>0.2%±1</td>
<td>2.0%±2</td>
<td>0.3%±1</td>
<td>2.0%±2</td>
<td>0.75%±2</td>
<td>0.0%±2</td>
</tr>
<tr>
<td>73203</td>
<td></td>
<td></td>
<td></td>
<td>5.0%±3</td>
<td></td>
<td>0.0%±2</td>
</tr>
</tbody>
</table>

General Specifications
• External dimensions: 74 (W) x 155 (H) x 31 (D) mm
• Weight: Approx. 240 g
• Power Supply: Two AAA (LR03 or R03) dry cells

Pocket DMM with Superb Portability

73101 Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>DCV (400 mV/4.000 V)</th>
<th>ACV (400 mV/4.000 V)</th>
<th>Resistance</th>
<th>Continuity check</th>
<th>Diode test</th>
</tr>
</thead>
<tbody>
<tr>
<td>73101</td>
<td>1.2%±2</td>
<td>2.0%±6</td>
<td>1.2%±2</td>
<td>1.5%±1</td>
<td>2.00 V</td>
</tr>
</tbody>
</table>

General Specifications
• External dimensions: 76 (W) x 117 (H) x 18 (D) mm
• Weight: Approx. 110 g
• Power Supply: Two LR-44 dry cells
### Portable Test Instruments

#### Clamp-on Testers

**Selection Guide, CL120, CL130/CL135, CL150/CL155, CL220**

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter of measurable conductor</th>
<th>Range</th>
<th>Accuracy</th>
<th>AC current</th>
<th>DC current</th>
<th>Leakage current</th>
<th>DC voltage</th>
<th>AC voltage</th>
<th>Resistance</th>
<th>Centrality check</th>
<th>Frequency</th>
<th>True RMS</th>
<th>Output</th>
<th>Data hold</th>
<th>Peak hold</th>
<th>Filter</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL120</td>
<td>ø24</td>
<td>20 to 200 A</td>
<td>2.0±7</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL130</td>
<td>ø33</td>
<td>200 to 600 A</td>
<td>1.5±6</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL135</td>
<td>ø33</td>
<td>200 to 600 A</td>
<td>1.5±4</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL150</td>
<td>ø54</td>
<td>400 to 2000 A</td>
<td>1.0±3</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL155</td>
<td>ø54</td>
<td>400 to 2000 A</td>
<td>1.0±3</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL220</td>
<td>ø24</td>
<td>400 to 3000 A</td>
<td>1.0±4</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL235</td>
<td>ø33</td>
<td>400 to 6000 A</td>
<td>1.0±5</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL250</td>
<td>ø55</td>
<td>400 to 2000 A</td>
<td>1.5±2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL255</td>
<td>ø55</td>
<td>400 to 2000 A</td>
<td>1.5±2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL320</td>
<td>ø24</td>
<td>20 mA to 200 A</td>
<td>2.0±4</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL340</td>
<td>ø40</td>
<td>40 mA to 400 A</td>
<td>1.0±5</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL345</td>
<td>ø40</td>
<td>40 mA to 400 A</td>
<td>1.0±5</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>30031</td>
<td>ø40</td>
<td>3 mA to 60 A</td>
<td>1.0±5</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>CL360</td>
<td>ø68</td>
<td>200 mA to 10000 A</td>
<td>1.0±2</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

### Light weight & compact design

**CL120 Clamp-on Tester**
- ACA
- ø 24
- AC/20 to 200A

**CL150/CL155 Clamp-on Testers**
- ACA
- ø 54
- AC/400 to 2000 A
- AC V/DC V/V
- RMS for CL155

### Wide Range of Current Measurement

**CL150/CL155 Clamp-on Testers**
- ACA
- ø 54
- AC/400 to 2000 A
- AC V/DC V/V
- DC Output
- RMS for CL155

### Both AC/DC Current Measurement

**CL130/135 Clamp-on Testers**
- ACA
- ø 33
- AC/200 to 600A
- AC V/V
- RMS for CL155

**CL130/CL150/CL155 Specifications**
- Item: Range
- Accuracy: ±(% rdg + dgt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>200A</td>
<td>2.0/7 (50 to 1kHz)</td>
</tr>
<tr>
<td>ACA</td>
<td>20A</td>
<td>2.0/6 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>200A</td>
<td>3.0/10 (40 to 1kHz)</td>
</tr>
<tr>
<td>ACV</td>
<td>200V/600V</td>
<td>1.5/4 (40 to 1kHz)</td>
</tr>
<tr>
<td>DCV</td>
<td>2000Ω/2000Ω</td>
<td>1.2/4, Beeps at below 30Ω (continuity check)</td>
</tr>
</tbody>
</table>

**CL120 Specifications**
- Item: Range
- Accuracy: ±(% rdg + dgt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>200A</td>
<td>2.0/7 (50 to 1kHz)</td>
</tr>
<tr>
<td>ACA</td>
<td>20A</td>
<td>2.0/6 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>200A</td>
<td>3.0/10 (40 to 1kHz)</td>
</tr>
</tbody>
</table>

**CL130 Specifications**
- Item: Range
- Accuracy: ±(% rdg + dgt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>200A</td>
<td>1.5/6 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>600A</td>
<td>1.5/4 (50/60Hz)</td>
</tr>
<tr>
<td>ACV</td>
<td>200V/600V</td>
<td>1.5/4 (40 to 1kHz)</td>
</tr>
</tbody>
</table>

**CL135 Specifications**
- Item: Range
- Accuracy: ±(% rdg + dgt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>200A</td>
<td>1.5/6 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>600A</td>
<td>1.5/4 (50/60Hz)</td>
</tr>
<tr>
<td>ACV</td>
<td>200V/600V</td>
<td>1.5/4 (40 to 1kHz)</td>
</tr>
</tbody>
</table>

**CL220 Clamp-on Tester**
- ACA/DCA
- ø 24
- AC/40 to 300 A
- DC/40 to 300 A

**CL220 Specifications**
- Item: Range
- Accuracy: ±(% rdg + dgt)

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>40 A</td>
<td>1.0/4</td>
</tr>
<tr>
<td>DCA</td>
<td>300 A (20 to 200 A)</td>
<td>1.0/4</td>
</tr>
</tbody>
</table>

---

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Portable Test Instruments

**RMS ACA/DCA measurement**

**CL235**
- Clamp-on Tester
- ACA/DCA
- φ 31
- AC4/40 to 600A, DC4/400 to 1000A
- AC V/DC V/µHz
- RMS

**CL235 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>400/600A</td>
<td>1.5± (50/60Hz)</td>
</tr>
<tr>
<td>DCA</td>
<td>400/1000A</td>
<td>1.0±</td>
</tr>
<tr>
<td>ACV</td>
<td>40/400/600V</td>
<td>1.5± (50/60Hz)</td>
</tr>
<tr>
<td>DCV</td>
<td>40/400/600V</td>
<td>1.0±</td>
</tr>
<tr>
<td>Resistance</td>
<td>400/4000Ω</td>
<td>1.0±, Beeps at below 20Ω (continuity check)</td>
</tr>
<tr>
<td>Frequency</td>
<td>10 to 3000Hz</td>
<td>1.5±</td>
</tr>
</tbody>
</table>

**Compact design of Leakage current measurement**

**CL320**
- Leakage Clamp-on Tester
- ACA
- φ 31
- AC/20mA to 200A

**CL320 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>20mA/200mA</td>
<td>WIDE (40 to 400Hz) 50/60Hz</td>
</tr>
<tr>
<td>20A (100.1 to 200A)</td>
<td>2.0± (50/60Hz) 3.0± (50/60Hz)</td>
<td></td>
</tr>
<tr>
<td>200A (0 to 100A)</td>
<td>2.0± (50/60Hz) 3.0± (50/60Hz)</td>
<td></td>
</tr>
</tbody>
</table>

**Wide Range of Leakage current measurement**

**CL360**
- Leakage Clamp-on Tester
- ACA
- φ 66
- AC/20mA to 1000A
- DC/AC Output

**CL360 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>20mA/20A</td>
<td>WIDE (40 to 1kHz) 50/60Hz</td>
</tr>
<tr>
<td>20A (0 to 100A)</td>
<td>1.0± (50/60Hz) 1.5±2</td>
<td></td>
</tr>
<tr>
<td>200A (0 to 500A)</td>
<td>3.0± (50/60Hz) 3.5±2 (50/60Hz)</td>
<td></td>
</tr>
<tr>
<td>1000A (501 to 1000A)</td>
<td>3.0± (50/60Hz) 3.5±2 (50/60Hz)</td>
<td></td>
</tr>
</tbody>
</table>

**Wide Range of ACA/DCA measurement**

**CL250/CL255**
- Clamp-on Testers
- ACA/DCA
- φ 55
- AC4/400 to 2000A, DC4/400 to 2000A
- AC V/DC V/Ω
- DC Output
- Hz/RMS for CL255

**CL250 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>400/2000A</td>
<td>1.5±2</td>
</tr>
<tr>
<td>ACA</td>
<td>400A/2000A</td>
<td>3.0±4 (40 to 500Hz) 5.0±4 (500 to 1kHz)</td>
</tr>
<tr>
<td>3000A (100 to 200A)</td>
<td>3.0±2 (50/60Hz)</td>
<td></td>
</tr>
</tbody>
</table>

**CL255 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>400A/2000A</td>
<td>1.5±3 (50/60Hz) 3.0±4 (30 to 1kHz)</td>
</tr>
<tr>
<td>ACA</td>
<td>2000A (0 to 350A)</td>
<td>3.0±3 (50/60Hz)</td>
</tr>
</tbody>
</table>

**Leakage current measurement**

**CL340/CL345**
- Leakage Clamp-on Testers
- ACA
- φ 46
- AC/40mA to 400A
- RMS for CL345

**CL340 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>400A/4000A</td>
<td>1.5±3 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>400mA (0 to 350A)</td>
<td>2.0±10 (20 to 1kHz) 1.0±5 (50/60Hz)</td>
</tr>
<tr>
<td>400A (350 to 400A)</td>
<td>2.0±10 (40 to 1kHz) 1.0±5 (50/60Hz)</td>
<td></td>
</tr>
<tr>
<td>2000A (150 to 1700A)</td>
<td>2.0±10 (20 to 1kHz) 1.0±5 (50/60Hz)</td>
<td></td>
</tr>
</tbody>
</table>

**CL345 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>400A/4000A</td>
<td>2.0±10 (20 to 1kHz) 1.0±5 (50/60Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>400A (0 to 300A)</td>
<td>2.5±10 (40 to 1kHz) 1.0±5 (50/60Hz)</td>
</tr>
<tr>
<td>400A (360 to 400A)</td>
<td>5.0 (40 to 1kHz)</td>
<td></td>
</tr>
</tbody>
</table>

**Leakage Currents of 1 mA measurement**

**CL360**
- Leakage Clamp-on Tester
- ACA
- φ 66
- AC/20mA to 1000A
- DC/AC Output

**CL360 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>20mA/20A</td>
<td>WIDE (40 to 1kHz) 50/60Hz</td>
</tr>
<tr>
<td>200A (0 to 100A)</td>
<td>1.0± (50/60Hz) 1.5±2</td>
<td></td>
</tr>
<tr>
<td>200A (0 to 500A)</td>
<td>3.0± (50/60Hz) 3.5±2 (50/60Hz)</td>
<td></td>
</tr>
<tr>
<td>1000A (501 to 1000A)</td>
<td>3.0± (50/60Hz) 3.5±2 (50/60Hz)</td>
<td></td>
</tr>
</tbody>
</table>

**30031**
- Leakage Clamp-on Tester
- ACA
- φ 40
- AC/1mA to 60 A

**30031 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>0 to 30 mA</td>
<td>1.0± (50/60 Hz)</td>
</tr>
<tr>
<td>50 to 50 A</td>
<td>1.0± (50/60 Hz)</td>
<td></td>
</tr>
<tr>
<td>50 to 50 A</td>
<td>1.5± (50/60 Hz)</td>
<td></td>
</tr>
<tr>
<td>50 to 50 A</td>
<td>2.0± (50/60 Hz)</td>
<td></td>
</tr>
</tbody>
</table>
## Selection Guide, MY40

### Insulation Testers

#### Portable Test Instruments

**MY40**

- **Model Rating Range**
  - 125V/200\(\Omega\)M2
  - 250V/2000\(\Omega\)M2
  - 500V/2000M2
  - 1000V/2000M2

<table>
<thead>
<tr>
<th>Type</th>
<th>Series/Model</th>
<th>Suffix Code &amp; Backlight</th>
<th>Rating</th>
<th>AC Voltage Measuring range</th>
<th>Display</th>
<th>Additional Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Insulation</td>
<td>4 ranges</td>
<td>MY40</td>
<td>01 (EL-illuminated)</td>
<td>125V/200(\Omega)M2</td>
<td>0–600V</td>
<td>3 1/2-digit LCD Automatic discharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>250V/2000(\Omega)M2</td>
<td></td>
<td>Conductance measurement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500V/2000(\Omega)M2</td>
<td></td>
<td>Comparator function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1000V/2000M2</td>
<td></td>
<td>Memory function</td>
</tr>
</tbody>
</table>

#### Analog Insulation Testers

**2 & 3 ranges**

- **Type**
  - 2406E
  - MY10
  - 3213A

<table>
<thead>
<tr>
<th>Type</th>
<th>Series/Model</th>
<th>Suffix Code &amp; Backlight</th>
<th>Rating</th>
<th>AC Voltage Measuring range</th>
<th>Display</th>
<th>Additional Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>250V/2000(\Omega)M2</td>
<td></td>
<td>Automatic discharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500V/2000(\Omega)M2</td>
<td></td>
<td>Battery check</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1000V/2000(\Omega)M2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Digital model with 4 voltage/resistance ratings

**MY40**

#### Digital Insulation Tester

- **Features**
  - Multifunction: Insulation resistance, AC voltage and conductor resistance measurement
  - Insulation test mode: Comparator, memory, auto-hold and discharge functions
  - All test modes: Live-line alarm (excluding AC voltage measurement), battery check and automatic power-off
  - Easy-to-view, fluctuation-free display
  - Double-action safety mechanism

#### General Specifications

- Dimensions: 125 (W) x 103 (H) x 53 (D) (mm), excluding protrusions
- Weight: 430 g (main unit and batteries only, excluding accessories)
- Batteries: Four AA (R6P) batteries

### Testing Performance Specifications

#### Model Rating Range Resolution Accuracy

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Range</th>
<th>Option</th>
<th>Resolution</th>
<th>Measuring Range</th>
<th>Tolerance</th>
<th>Lower Limit of measured value</th>
<th>Rated Current</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>125V/200(\Omega)M2</td>
<td>4.000</td>
<td>1kΩ</td>
<td>1Ω</td>
<td>±(5% of rdg)</td>
<td>0–0.199MΩ</td>
<td>0.125MΩ</td>
<td>3ma 5Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250V/2000(\Omega)M2</td>
<td>4.000</td>
<td>1kΩ</td>
<td>10kΩ</td>
<td>±(5% of rdg)</td>
<td>0–0.999MΩ</td>
<td>25mA</td>
<td>1mA 32Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500V/2000(\Omega)M2</td>
<td>4.000</td>
<td>1kΩ</td>
<td>100kΩ</td>
<td>±(5% of rdg)</td>
<td>0–5.000MΩ</td>
<td>25mA</td>
<td>1mA 32Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000V/2000(\Omega)M2</td>
<td>4.000</td>
<td>1kΩ</td>
<td>1MΩ</td>
<td>±(5% of rdg)</td>
<td>0–10.000MΩ</td>
<td>2mA</td>
<td>0.5mA 50Ω</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### AC Voltage measurement (45–400 Hz)

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
<th>Resistor</th>
<th>Accuracy</th>
<th>Input Impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY40-01</td>
<td>600V</td>
<td>1V</td>
<td>(2% of rdg + 6dgt)</td>
<td>Approx. 2 MΩ</td>
</tr>
</tbody>
</table>

### Conductor resistance measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
<th>Resistor</th>
<th>Accuracy</th>
<th>Open-circuit Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY40-01</td>
<td>400Ω</td>
<td>1Ω</td>
<td>(2% of rdg + 6dgt)</td>
<td>&lt;40Ω</td>
</tr>
</tbody>
</table>
2406E Series
Analog Insulation Testers

2406E series, MY10 series, 3213A series

Analog models with two and three ratings

Features
- AC voltage measurement
- Automatic discharge
- Sky blue EL backlight
- Increased safety (covered battery charger)

General Specifications
Dimensions (main unit): Approx. 120 (W) x 110 (H) x 60 (D) (mm)
Weight: Approx. 500 g (including batteries)
Batteries: Six AA (R6P) batteries

Testing Performance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Effective Measuring Range</th>
<th>Central Scale Value</th>
<th>AC Voltage Measuring Range</th>
<th>Lower Limit of Measured (%)</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>2406A1</td>
<td>250V/50MΩ</td>
<td>0.5–50MΩ</td>
<td>0.5MΩ</td>
<td>0–300V</td>
<td>0.05MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>2406A2</td>
<td>500V/100MΩ</td>
<td>0.5–100MΩ</td>
<td>0.5MΩ</td>
<td>0–300V</td>
<td>0.05MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>2406A3</td>
<td>500V/100MΩ</td>
<td>0.5–100MΩ</td>
<td>0.25MΩ</td>
<td>0–500V</td>
<td>0.125MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>2406A4</td>
<td>500V/100MΩ</td>
<td>0.5–100MΩ</td>
<td>0.1MΩ</td>
<td>0–500V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>2406A5</td>
<td>500V/100MΩ</td>
<td>0.5–100MΩ</td>
<td>0.05MΩ</td>
<td>0–500V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
</tbody>
</table>

Analog models with single rating

Features
- AC voltage measurement
- Automatic discharge
- A wide choice of accessories
- Designed for shared use with the MY40

General Specifications
Dimensions: Approx. 125 (W) x 103 (H) x 53 (D) (mm), excluding protrusions
Weight: Approx. 400 g (main unit and batteries only, excluding accessories)
Batteries: Four AA (R6P) batteries

Testing Performance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Effective Measuring Range</th>
<th>Central Scale Value</th>
<th>AC Voltage Measuring Range</th>
<th>Lower Limit of Measured (%)</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY10-01</td>
<td>125V/20MΩ</td>
<td>0.01–20MΩ</td>
<td>0.5MΩ</td>
<td>0–250V</td>
<td>0.125MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-02</td>
<td>250V/50MΩ</td>
<td>0.01–50MΩ</td>
<td>1MΩ</td>
<td>0–250V</td>
<td>0.25MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-03</td>
<td>500V/100MΩ</td>
<td>0.05–100MΩ</td>
<td>2MΩ</td>
<td>0–500V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-04</td>
<td>500V/100MΩ</td>
<td>0.5–100MΩ</td>
<td>20MΩ</td>
<td>0–500V</td>
<td>1MΩ</td>
<td>0.5–0.6mA</td>
</tr>
<tr>
<td>MY10-05</td>
<td>1000V/2000MΩ</td>
<td>1–2000MΩ</td>
<td>50MΩ</td>
<td>0–500V</td>
<td>2MΩ</td>
<td>0.5–0.6mA</td>
</tr>
</tbody>
</table>

3213A Series
Analog Insulation Testers

3213A series, MY10 series, 3213A series

Analog models with single rating

Features
- AC voltage measurement and check live lines such as motive power lines
- One-touch operation Press-and-lock switch for continuous measurement
- A wide choice of accessories to meet various testing requirements
- Vibration- and shock-resistant hand-held compact testers

General Specifications
Dimensions: Approx. 110 (W) x 180 (H) x 60 (D) (mm)
Weight: Approx. 700 g including hard case, handle, test leads and batteries
Batteries: Eight AA (R6P) batteries

Testing Performance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Effective Measuring Range</th>
<th>Central Scale Value</th>
<th>AC Voltage Measuring Range</th>
<th>Lower Limit of Measured (%)</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>3213A1</td>
<td>100V/20MΩ</td>
<td>0.02–20MΩ</td>
<td>0.5MΩ</td>
<td>0–150V</td>
<td>0.1MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>3213A2</td>
<td>250V/50MΩ</td>
<td>0.05–50MΩ</td>
<td>0.5MΩ</td>
<td>0–250V</td>
<td>0.25MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>3213A3</td>
<td>500V/100MΩ</td>
<td>0.1–100MΩ</td>
<td>2MΩ</td>
<td>0–300V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>3213A4</td>
<td>500V/100MΩ</td>
<td>1–1000MΩ</td>
<td>20MΩ</td>
<td>0–300V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>3213A5</td>
<td>1000V/2000MΩ</td>
<td>2–2000MΩ</td>
<td>50MΩ</td>
<td>0–300V</td>
<td>1MΩ</td>
<td>1mA**</td>
</tr>
</tbody>
</table>

* The minimum value at which the rated voltage can be maintained; ** 0.55 mA in the case of the first effective measuring range
Instruments
Portable Test Instruments

• Three input resistance ranges – 1, 1.5 and 2 kΩ
• Shielded case, resistant to high-frequency fields
• Handy and easy to carry
• Built-in overload protection circuit
• Shockproof indicator using taut band movement
• 100 µA full scale value
• ±2.5% full scale accuracy
• Four functions – AC current, DC current, DC + AC current and AC voltage measurements

Portable Test Instruments

• Portable yet rugged and shockproof
• AC potentiometer bridge, synchronous detector
• Accurate, wide-range logarithmic scale
• 3 terminal measurement of earth resistance
• AC voltage... 150, 300 V (50 and 60 Hz)

Leakage Current Tester

322610 Specifications
Measuring Range:
Earth Resistance: 0 to 10 to 100 to 1,000 Ω
Earth Voltage: 0 to 30 V
Scale:
Earth Resistance: 3-digit logarithmic continuous scale on measuring dial
Earth Voltage: Uniform scale on galvanometer
Accuracy:
Earth Resistance: ±5% of 2 Ω in the range of 0 to 2 Ω
±2.5% of 20 Ω in the range of 2 to 20 Ω
±2.5% of 200 Ω in the range of 20 to 200 Ω
±5% of 1,000 Ω in the range of 200 to 1,000 Ω
Earth Voltage: ±5% of full scale value
Measuring Frequency: 500 Hz
Ambient Temperature Influence: Variation in indication is within the corresponding one scale division for temperature change by 20±20°C
Battery Voltage Influence: The accuracy is maintained within the specified limit even if the voltage decreases down to approx. 4 V under operating condition.
Earth Voltage Influence: Variation in indication is within the corresponding one scale division for the earth voltages of up to 10 V at commercial frequency.
Power Source: Four 1.5 V batteries.
Insulation Resistance: More than 20 MΩ at 500 V DC between terminals and case
Dimensions: Approx. 122 × 190 × 124 mm not including accessories.
Weight: Approx. 1.5 kg for Instrument only.
Approx. 3.5 kg including all accessories.

Handy Universal Tester for Checking Electrical Appliances

322610 Specifications
Range: DC current... 0.1, 1, 10 mA,
AC current... 0.1, 1, 10 mA,
(DC + AC) current... 0.1, 1, 10 mA
AC Voltage... 150, 300 V (50 and 60 Hz)
Accuracy: ±2.5% of full scale value on current and voltage ranges
Input Impedance: Current range: 1 kΩ, 1.5 kΩ, and 2 kΩ
Voltage range: More than 100 MΩ
Frequency Range: 20 Hz to 5 kHz
Power Source: Two 9 V dry cells,
Overload Protection: Up to 30 mA AC for one minute will not damage instrument on current ranges
Dimensions: Approx. 190 × 124 × 38 (D) mm not including handle
Weight: Approx. 1.0 kg

Earth Tester

323511 Specifications
• 3 terminal measurement of earth resistance
• Accurate, wide-range logarithmic scale
• AC potentiometer bridge, synchronous detector
• Portable yet rugged and shockproof

323511 Earth Tester

Intensity of illumination can be adjusted at noon

510 Series Specifications
Photoelectric Element: Silicon Photodiode
Measuring Range: 0.0 to 99.9/999/9999/99999/999999/00000X
Response Time: 5 sec. (Auto Range)
2 sec. (Manual Range)
Accuracy: ±4% rdg. ±1 dgt.
±2% rdg. ±1 dgt.
General Specifications
• External dimensions (main unit):
Approx. 67 (W) × 177 (H) × 38 (D) (mm)
• Batteries: One 9 V 6F22(S-006P)
• Weight: Approx. 260 g

510 Series Digital Illuminance Meters
510 Series

Digital Thermometers
1-channel Single-function to 2-channel Multifunction

TX10 Series Specifications
• Thermocouple measurement ranges
Type K: -200 to 1372 deg.C
Type J: -200 to 1000 deg.C
Type E: -200 to 700 deg.C
Type T: -200 to 400 deg.C
• Resolution
-200.0 to 199.9 deg.C: 0.1 deg.C, 200 deg.C: 1 deg.C (TX1001)
-200.0 to 199.9 deg.C: 0.1 deg.C or 1 deg.C when resolution is set at 1 deg.C,
200 deg.C: 1 deg.C (TX1002, 03)
• Accuracy
-200.0 to -100.1 deg.C: ±/-(0.1% of rdg + 1 deg.C);
-100.0 to 199.9 deg.C: ±/-(0.1% of rdg + 0.7 deg.C);
200 deg.C and when resolution is set at 1 deg.C: ±/-(0.2% of rdg + 1 deg.deg.C)
General Specifications
• External dimensions:
56 (W) × 151 (H) × 33 (D) mm
• Weight: Approx. 180 g
• Power: Two AA size (LR6) dry batteries

TX10 Series

1-channel Single-function with data hold function
TX1001:
2-channel Multifunction with data hold, internal memory, user-calibration and relative display function
TX1003:
2-channel Multifunction with data hold, internal memory, user-calibration and relative display function

510 Series Digital Illuminance Meters

510 Series

Digital Thermometers

TX10 Series

TX1001:
1-channel Single-function with data hold function
TX1002:
2-channel Multifunction with data hold, internal memory, user-calibration and relative display function
TX1003:
2-channel Multifunction with data hold, internal memory, user-calibration and relative display function

Leakage Current Tester

322610

• Three input resistance ranges – 1, 1.5 and 2 kΩ
• Four functions – AC current, DC current, DC + AC current and AC voltage measurements

Leakage Current Tester

• Shielded case, resistant to high-frequency fields
• Handy and easy to carry
• Built-in overload protection circuit

Digital Illuminance Meters
510 Series

510 Series

Digital Illuminance Meters

Measuring range: 9.99 (51002)/99.9/999/9999/99999/999999/00000 lx
Accuracy: ±(4% rdg. + 1 dgt) (51001),
±(2% rdg. + 1 dgt) (51002)

Features: Timer hold, Ripple measurement,
Average illuminance computation function
Portable Test Instruments

**TM10, TM20**

**Temperature measurement and management of temperature data records**

**Optional Accessories for TM10/TM20**

<table>
<thead>
<tr>
<th>Product name</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-232C cable for PC connection (5pin)</td>
<td>97011</td>
</tr>
<tr>
<td>Printer</td>
<td>97010</td>
</tr>
<tr>
<td>AC adapter for printer (Europe)</td>
<td>94006</td>
</tr>
<tr>
<td>AC adapter for printer (USA)</td>
<td>94007</td>
</tr>
<tr>
<td>Thermal paper for printer (10 rolls)</td>
<td>97080</td>
</tr>
<tr>
<td>RS-232C cable for printer connection</td>
<td>91010</td>
</tr>
</tbody>
</table>

**Probes for TM10**

<table>
<thead>
<tr>
<th>Probe type</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Response (time)</th>
<th>Sensor Diameter / Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90020 Standard Needle Probe</td>
<td>-50 to 150 °C</td>
<td>±0.2 °C</td>
<td>0.6 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90021 Round end</td>
<td>-20 to 200 °C</td>
<td>±0.5 °C</td>
<td>0.4 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90022 Surface Probe</td>
<td>-20 to 500 °C</td>
<td>±1.0 °C</td>
<td>0.75 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90023 Needle</td>
<td>-20 to 500 °C</td>
<td>±1.5 °C</td>
<td>0.4 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90024 Needle</td>
<td>-50 to 500 °C</td>
<td>±1.0 °C</td>
<td>0.6 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90025 Surface straight</td>
<td>-20 to 250 °C</td>
<td>±0.75 °C</td>
<td>2 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90026 Surface angled</td>
<td>-20 to 250 °C</td>
<td>±0.75 °C</td>
<td>2 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90027 Surface angled</td>
<td>-20 to 500 °C</td>
<td>±2.0 °C</td>
<td>0.5 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>90028 Surface angled</td>
<td>-50 to 500 °C</td>
<td>±1.75 °C</td>
<td>0.5 s</td>
<td>5.6 / 150</td>
</tr>
</tbody>
</table>

Note: The accuracy ratings above were obtained with the measurement of liquids being agitated.

**External Dimensions**

**TM10**

- Standard needle probe (90010) / Round end probe (90013) / Material: SUS316
- High-speed needle probe (90011) / Material: SUS316
- Surface probe (90012) / Material: SUS316

**TM20**

- Bead TC: -40 to 260 °C (±0.05 °C or 0.2% of range)
- Bead M: -40 to 250 °C (±0.1% of range or 0.3% of range)
- Bead L: -40 to 250 °C (±0.1% of range or 0.3% of range)
- Bead TL: -40 to 260 °C (±0.2% of range or 0.3% of range)

**Summary**

- Effective for HACCP program implementation.
- Collect up to 5000 data items with time-stamp, tag name and inspector name.
- Save 2 weeks continuous data logging with 1 minute interval, (up to 20000 data items, measuring interval is 1sec. to 24 hours.)
- Information on when, by whom and what is measured is saved along with the data.

**TM10/TM20 Specifications**

<table>
<thead>
<tr>
<th>Product number (Model)</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Response time (sec)</th>
<th>Sensor Diameter / Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM10 Thermocolector</td>
<td>-50 to 500 °C</td>
<td>±0.2 °C</td>
<td>0.6 s</td>
<td>5.6 / 150</td>
</tr>
<tr>
<td>TM20 Thermocolector</td>
<td>-20 to 500 °C</td>
<td>±0.75 °C</td>
<td>0.5 s</td>
<td>5.6 / 150</td>
</tr>
</tbody>
</table>

**Probes for TM20/TX10**

<table>
<thead>
<tr>
<th>Probe type</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Response time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90020</td>
<td>-50 to 600 °C</td>
<td>±0.4%</td>
<td>1.4</td>
</tr>
<tr>
<td>90021</td>
<td>-50 to 600 °C</td>
<td>±0.4%</td>
<td>0.4</td>
</tr>
<tr>
<td>90022</td>
<td>-50 to 600 °C</td>
<td>±0.4%</td>
<td>1.4</td>
</tr>
<tr>
<td>90023</td>
<td>-50 to 500 °C</td>
<td>±0.5%</td>
<td>0.4</td>
</tr>
<tr>
<td>90024</td>
<td>-50 to 500 °C</td>
<td>±0.5%</td>
<td>1</td>
</tr>
<tr>
<td>90025</td>
<td>-20 to 250 °C</td>
<td>±0.75%</td>
<td>2</td>
</tr>
<tr>
<td>90026</td>
<td>-20 to 250 °C</td>
<td>±0.75%</td>
<td>2</td>
</tr>
<tr>
<td>90027</td>
<td>-20 to 500 °C</td>
<td>±1.5%</td>
<td>2</td>
</tr>
<tr>
<td>90028</td>
<td>-50 to 500 °C</td>
<td>±1.5%</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: 90030 is using polyimide to insulate from objects to be measured.

Manufacturers of polyimide are announcing not to apply polyimide directly for food, internal and body fluid.
Portable Test Instruments

279A series

Standarad Resistors

- Traced to the national standard for high accuracy; test (calibrated) accuracy of ±5 ppm
- Resistance temperature coefficient
- A variety of models
- Eight models with nominal resistance values ranging between 0.001 Ω and 10 kΩ
- Precision temperature control equipment, such as an oil bath, not needed for calibration due to marked improvement in resistance temperature coefficient
- Included document: Test certificate

279A series Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Value</th>
<th>Resistance Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>279A02</td>
<td>±0.01 Ω</td>
<td>±150ppm</td>
</tr>
<tr>
<td>279A03</td>
<td>±0.1 Ω</td>
<td>±75ppm</td>
</tr>
<tr>
<td>279A04</td>
<td>1 Ω</td>
<td>±30ppm</td>
</tr>
<tr>
<td>279A05</td>
<td>10 Ω</td>
<td>±15ppm</td>
</tr>
<tr>
<td>279A06</td>
<td>100 Ω</td>
<td>±30ppm</td>
</tr>
<tr>
<td>279A07</td>
<td>1 MΩ</td>
<td>±30ppm</td>
</tr>
<tr>
<td>279A08</td>
<td>10 MΩ</td>
<td>±30ppm</td>
</tr>
</tbody>
</table>

Operating temperature and humidity ranges:
- 0.05°C / 20-80% RH
- Maximum allowable power: 3 W
- Power characteristics: ±100 ppm/W
- Insulation resistance:
  - More than 1000 MΩ at 500 V DC
  - At 500 V DC between measurement terminal and casing
  - At temperature 23 ± 2°C, humidity 45% to 75%, and 0.1 W power application

2792A series

Standard Resistors

- 2792A08 10 kΩ
- 2792A07 1 kΩ
- 2792A06 100 Ω
- 2792A05 10 Ω
- 2792A04 1 Ω
- 2792A03 0.1 Ω
- 2792A02 0.01 Ω
- 2792A01 0.001 Ω

Resolution: ± (0.05% + 0.05 Ω) per decade dials

- 0.01 (10 kΩ to 1 MΩ steps)
- 0.1 Ω
- 1 Ω
- 10 Ω
- 100 Ω
- 1 kΩ
- 10 kΩ
- 30ppm
- 50ppm
- 100ppm

Maximum Circuit Voltage: 250 V.

Using in laboratory and industrial test

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal Value</th>
<th>Allowable Input Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>279102</td>
<td>100 Ω</td>
<td>0.01 A</td>
</tr>
<tr>
<td>279103</td>
<td>1 kΩ</td>
<td>0.1 A</td>
</tr>
<tr>
<td>279104</td>
<td>10 kΩ</td>
<td>1 A</td>
</tr>
<tr>
<td>279105</td>
<td>100 kΩ</td>
<td>5 A</td>
</tr>
<tr>
<td>279106</td>
<td>1 MΩ</td>
<td>10 A</td>
</tr>
<tr>
<td>279107</td>
<td>10 MΩ</td>
<td>15 A</td>
</tr>
</tbody>
</table>

- 0.1 mΩ to 110 Ω with four plugs and one measuring dial

2769 Specifications

- Measuring Range: 0.1 mΩ to 110 Ω
- Measuring: 1.000 ± 0.001 Ω, 0.001, 0.01, 0.1, 1, 10 (plug-in system)
- Min. Division: 0.001 mΩ
- Maximum: 110 Ω
- Accuracy: ±0.05 Ω + multiplier + 0.05% mΩ
- Current Range: 10 A at ±0.0001* (0.01 Ω), 1 A at ±0.001 (0.1 Ω), 100 mA at ±0.01 (1 Ω), 10 mA at ±0.1 (10 Ω), 1 mA at ±1 (100 Ω), 0.1 mA at ±10 (1 kΩ), 0.01 mA at ±100 (10 kΩ)
- Galvanometer: Built-in electronic DC galvanometer, voltage sensitivity: ±0.20 V/µA ±0.001 V/µA, External power source is also usable
- Operating Temperature Range: 5 to 35°C
- Humidity Range: Less than 85%
- Power Source: 115 VAC

2788610/2788200 Decade Resistance Boxes

Models 278610 and 278620 six-dial decade resistance boxes allow quick and easy setting of a wide range of resistance. These resistance boxes are used in combination with voltage or current standards to adjust voltage or current, as dummy load resistances or as an arm of AC bridges.

2788610/2788200 Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Resistance Range</th>
<th>Available Models:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2788610</td>
<td>0.1 nΩ to 1 MΩ</td>
<td>0.1 nΩ to 11.1111 MΩ</td>
</tr>
<tr>
<td>2788200</td>
<td>0.1 nΩ to 11.1111 MΩ</td>
<td></td>
</tr>
</tbody>
</table>

- Quick and easy setting

Model 2791 is composed of resistance wire with an insulating coating wound on a frame of special ceramic and a sliding brush that maintains contact with the wire. Resistance is continuously variable and can be increased or decreased as desired.

2791 series

<table>
<thead>
<tr>
<th>Code</th>
<th>Nominal Value</th>
<th>Allowable Input Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>279102</td>
<td>100 Ω</td>
<td>0.01 A</td>
</tr>
<tr>
<td>279103</td>
<td>1 kΩ</td>
<td>0.1 A</td>
</tr>
<tr>
<td>279104</td>
<td>10 kΩ</td>
<td>1 A</td>
</tr>
<tr>
<td>279105</td>
<td>100 kΩ</td>
<td>5 A</td>
</tr>
<tr>
<td>279106</td>
<td>1 MΩ</td>
<td>10 A</td>
</tr>
<tr>
<td>279107</td>
<td>10 MΩ</td>
<td>15 A</td>
</tr>
</tbody>
</table>

- 1.1 mΩ to 1.1111 MΩ

2769 Portable Double Bridge

Model 2769 is a compact, portable Kelvin double bridge designed for measuring low resistance from 0.1 mΩ to 110 Ω with four multiplication plugs and one measuring dial. It has built-in standard resistors, bridge power source and high-sensitivity taut-band suspension system electronic DC galvanometer.
### Portable Instruments

**Line-up**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Ammeters and Voltmeters</td>
<td>2011, 2012</td>
</tr>
<tr>
<td>AC Ammeters and Voltmeters</td>
<td>2013, 2014</td>
</tr>
<tr>
<td>High-frequency AC Ammeters and Voltmeters</td>
<td>2016</td>
</tr>
<tr>
<td>Audio-frequency AC Voltmeters</td>
<td>2017</td>
</tr>
<tr>
<td>Frequency Meters</td>
<td>2038</td>
</tr>
<tr>
<td>Power Factor Meters</td>
<td>2039</td>
</tr>
<tr>
<td>Wattmeters</td>
<td>2041, 2042</td>
</tr>
<tr>
<td>Miniature DC Ammeters and Voltmeters</td>
<td>2051</td>
</tr>
<tr>
<td>Miniature AC Ammeters and Voltmeters</td>
<td>2052, 2053</td>
</tr>
</tbody>
</table>

- Compliance with JIS C1102-1997
- Taut-band suspension system eliminates friction and provides strong resistance to shock impact.
- Stable performance for long term use.
- Products have been widely used over many years as an industry standard at various customers such as industries, power plants, research laboratories and schools, etc.

### Switchboard Instruments

**Line-up**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Ammeters and Voltmeters</td>
<td>2010A, 2011A</td>
</tr>
<tr>
<td>AC Ammeters and Voltmeters</td>
<td>2012A, 2013A</td>
</tr>
<tr>
<td>Wattmeters</td>
<td>2015A, 2016A</td>
</tr>
<tr>
<td>Varmeters</td>
<td>2018A, 2019A</td>
</tr>
<tr>
<td>Power Factor Meters</td>
<td>2020A, 2021A</td>
</tr>
<tr>
<td>Frequency Meters</td>
<td>2022A</td>
</tr>
<tr>
<td>Synchroscope</td>
<td>2023A</td>
</tr>
</tbody>
</table>

- Compliance with JIS C1102-1997

### Panel Meters

**Line-up**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearline Series (2071 to 2076A, 2081 to 2086A, 2093A and 2094A)</td>
<td>- Clearline Series (2071 to 2076A, 2081 to 2086A, 2093A and 2094A)</td>
</tr>
<tr>
<td>- AC Ammeters and Voltmeters, AC Ammeters and Voltmeters and Frequency Meters</td>
<td></td>
</tr>
<tr>
<td>- FS,FL Series (2074A, 2084A, FL80: 82x69 (FL80: 80x67))</td>
<td>- FS,FL Series (2074A, 2084A, FL80: 82x69 (FL80: 80x67))</td>
</tr>
<tr>
<td>- DC Ammeters and Voltmeters, AC Ammeters and Voltmeters, Frequency Meters, Wattmeters, Varmeters and Power Factor Meters</td>
<td></td>
</tr>
</tbody>
</table>

- Compliance with JIS C1101-1997
- Two types of movement suspension systems: Taut-band and Pivot & Jewel, are available to fit to various applications.
- FS,FL Series (2074A, 2084A, FL80: 82x69 (FL80: 80x67))
  - High visibility by adopting clear front cover.

### 0.5 Class Transducer for Power Applications

**Line-up**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC-DC isolator</td>
<td>2371A</td>
</tr>
<tr>
<td>AC Voltage, current (average rectified)</td>
<td>2372A</td>
</tr>
<tr>
<td>AC Voltage, current (RMS rectified)</td>
<td>2373A</td>
</tr>
<tr>
<td>AC Voltage, current (True RMS rectified)</td>
<td>2374A</td>
</tr>
<tr>
<td>Power</td>
<td>2375A</td>
</tr>
<tr>
<td>Reactive power</td>
<td>2376A</td>
</tr>
<tr>
<td>Phase</td>
<td>2377A</td>
</tr>
<tr>
<td>Power factor</td>
<td>2377A</td>
</tr>
<tr>
<td>Frequency</td>
<td>2378A</td>
</tr>
</tbody>
</table>

- Compliance with JIS C1111-1989
- Available for DIN rail and panel mountings

### Dimensions (mm)

- 2371A, 2372A, 2373A, 2374A, 2378A, 2377A: 127(H) x 40(W) x 130(D)
- 2375A, 2376A, 2378A: 127(H) x 55(W) x 130(D)
## Worldwide Network

**TMI:** test and measurement  
**PCI:** industrial automation and control  
**COMM:** communication and network  
*(incl. former ANDO products)*

### NORTH AMERICA

#### U.S.A.

Yokogawa Corporation of America  
TMI & PCI & COMM  
Headquarters & Plant  
2 Dart Road, Newman  
Georgia 30265-1094  
Tel: (1)-770-251-6427  
Fax: (1)-770-251-6427  
URL: www.yokogawa.com/us/

#### CANADA

**Electro Meters**  
TMI  
900 McKay Road, Unit 2  
Pickering, Ontario L1W 3X8  
Tel: (1)-905-428-3413  
Fax: (1)-905-428-6086  
URL: www.electro-meters.com

**CB Engineering Ltd.**  
PCI  
TORONTO (East)  
Unit #2, 110 Snow Blvd.  
Vaughan ON L4K 4B8  
Tel: (1)-905-760-9399  
Fax: (1)-905-760-9319  
URL: www.cbeng.com

**Calgary (West)**  
#20, 5920 11th Street, SE  
Calgary, AB T2H 2M4  
Tel: (1)-403-259-6220  
Fax: (1)-403-259-3377

### CENTRAL & SOUTH AMERICA

#### ARGENTINA

**Hertig S.A.**  
TMI  
Calle Bolívar, 1335  
Buenos Aires  
Tel: (5411)-4361-7136  
Fax: (5411)-4300-3372

**CV Control S.A.**  
PCI  
Av. Independencia, 3700  
Buenos Aires  
Tel: (5411)-4932-2322  
Fax: (5411)-4932-1186

#### BOLIVIA

**TRITEC S.R.L.**  
TMI & PCI  
Av. Oquendo, 0452 Edif. Santa Maria 4to.  
Piso, Cochabamba  
Tel: (591)-4425-6993  
Fax: (591)-4425-0981

**OMTEC S.R.L.**  
TMI & PCI  
B. Petrolero Guaracachi UV 80 C/E No. 88  
Santa Cruz  
Tel: (591)-3346-8439  
Fax: (591)-3347-0516

### BRAZIL

**Yokogawa America Do Sul Ltda**  
TMI & PCI  
Praca Acapulco, 31  
04675-190  
Sao Paulo/SP  
Tel: (55)-11-56812400  
Fax: (55)-11-5525291  
URL: www.yokogawa.com.br/

### CHILE

**Y.E.W Chile Ltda**  
TMI & PCI  
Calle Roxario Sur, 91 Oficina 508  
Las Condes Santiago  
Tel: (56)-2-229-0648  
Fax: (56)-2-229-1513

### COLOMBIA

**Soluciones Automatica**  
TMI & PCI  
Diagonal 152A, No.35 A-44  
Bogota, DC  
Tel: (57)-5681-7136  
Fax: (57)-5681-7136

**IA-INDUSTRIAL AUTOMATION**  
TMI & PCI & SYSTEMS  
CLL 22F No.40 - 10 OFC. 301  
Bogota  
Tel: (57)-244-0804  
Fax: (57)-269-6547

### COSTA RICA

**DITESA**  
TMI & PCI  
Carretera Interamericana  
Entrada a Cartago Barrio La Lima  
Cartago  
Tel: (506)-573-5656/5757  
Fax: (506)-573-7800

### CUBA

**Yokogawa Cuba S.A.**  
TMI & PCI  
Calle Manzana 111, No. 303  
Habana  
Tel: (53)-7-202-0489  
Fax: (53)-7-202-0489

### ECUADOR

**Ciapromase Cia. Ltda.**  
TMI & PCI  
Ciudadela Kennedy Calle  
B. Petrolero Guaracachi UV 80 C/E No. 88  
Santa Cruz  
Tel: (593)-4228-0631/2  
Fax: (593)-4228-7803

### MEXICO

**Power Process Controls S.A de C.V.**  
Zacatecas 206-7  
Col Guadalupe  
Tampico-Tamaulipas CP 89120  
Tel: (52)-832-174649  
Fax: (52)-832-174651  
URL: www.ppcesco.com/

**Nasa 2000 S.A. de C.V.**  
Chichimeca Frac. Azteca Guadalupe Nuevo Leon CP 697150  
Tel: (52)-818-367-8712  
Fax: (52)-818-367-9177

### PERU

**LOGYTEC S.R.L.**  
TMI  
Isidoro Suarez 219 San Miguel  
Lima 32  
Tel: (51)-562-3179  
Fax: (51)-452-3111

**RTS AUTOMATION S/A**  
PCI  
Calle Papini 152 San Borja  
Lima 41  
Tel: (511)-475-2346/476-1020  
Fax: (511)-226-2977

**CIMEC INGENIEROS S.A.**  
PCI  
Jr.Chinchon 830 6to. piso San Isidro  
Lima 27  
Tel: (511)-221-1344/440-9469  
Fax: (511)-421-2206

### VENEZUELA

**SINCOTEC C.A.**  
TMI & PCI  
Urb.Industrial La Trinidad Edif. 446-A  
Piso 1 Av. Luis Camoens con Calle San Rafael, Caracas Edo. Miranda  
Tel: (58)-212-944-1243/2832  
Fax: (58)-212-944-5171  
URL: www.sincotec.net/

### EUROPE & RUSSIA

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**nbn Elektronik**  
TMI & COMM  
Handelsge. m.b.H. & Co. KG  
Riesstr. 146, A-8010 Graz  
Tel: (43)-316402-805  
Fax: (43)-316402-506  
URL: www.nbn.at

**Yokogawa GesmbH, Central East Europe**  
PCI  
Franzosengraben 1, P.O.B. 27  
A-1034 Wien  
Tel: (43)-1206-340  
Fax: (43)-1206-3400  
URL: www.yokogawa.com/cee-at/

### BELGIUM

**Yokogawa Belgium N. V. / S. A.**  
PCI  
Minervastraat 16  
Zaventem 1930  
Tel: (32)-2-7195511  
Fax: (32)-2-7235499  
URL: www.yokogawa.be

**Simac Electronics B.V.**  
COMM  
Eindstraat 53  
5151 AE Drunen  
Tel: (31)-416-387-700  
Fax: (31)-416-387-707  
*For TMI products, please contact to Yokogawa Europe B.V. in the Netherlands*

### CZECH REPUBLIC

**NBN Electronik s.r.o.**  
TMI & PCI  
Na Bojisti 257  
CZ 375 021 Tyn n Vlt  
Tel: (420)-385-724-308  
Fax: (420)-385-724-191  
URL: www.nbn.cz

**OPTOKON Co., Ltd.**  
COMM  
Cerveny Kriz 250  
586 02 Uhlava  
Ceska` Republika  
Tel: (420)-564-040-111  
Fax: (420)-564-040-134  
URL: www.optokon.cz

### SALES/SERVICE OFFICES & REPRESENTATIVES
<table>
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<tr>
<th>Country</th>
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<tr>
<td><strong>DENMARK</strong></td>
<td>Insatech A/S</td>
<td>PCI 133, 4760 Vordingborg</td>
<td>(+45) 55-37-2095</td>
<td>(+45) 55-37-018</td>
<td><a href="http://www.insatech.com">www.insatech.com</a></td>
</tr>
<tr>
<td><strong>FINLAND</strong></td>
<td>Yokogawa Measurement Technologies AB</td>
<td>TMI, Finlandsgatan 52, 164 74 Kista, Stockholm, Sweden</td>
<td>Juha Arola (Responsible Finland)</td>
<td>Tel: (+358)-9-6150-0140</td>
<td>Fax: (+358)-9-6150-0140</td>
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<tr>
<td><strong>FRANCE</strong></td>
<td>MB Electronique</td>
<td>TMI, 606, Rue Fourny-Z.I. Centre, 78553 Buc Cedex</td>
<td>Tel: (+33)-1-3967-6767</td>
<td>Fax: (+33)-1-3965-3344</td>
<td>URL: <a href="http://www.mbelectronique.fr">www.mbelectronique.fr</a></td>
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<tr>
<td><strong>GREECE</strong></td>
<td>TCB - Avgidis Automation S.A</td>
<td>191 Doirani Street, 17673 Kallithea-Athens</td>
<td>Tel: (+30)-210-9402-260</td>
<td>Fax: (+30)-210-9402-200</td>
<td>URL: <a href="http://www.tcb.gr">www.tcb.gr</a></td>
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<td><strong>HUNGARY</strong></td>
<td>Prinotakis S.A.A., I.C.</td>
<td>TMI, 17 Manolissas Str, 161 21 Athens</td>
<td>Tel: (+30)-210-722-7719</td>
<td>Fax: (+30)-210-723-4251</td>
<td>URL: <a href="http://www.prinotakis.gr">www.prinotakis.gr</a></td>
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<td><strong>ITALY</strong></td>
<td>Yokogawa Italia S.r.l.</td>
<td>TMI &amp; PCI, H-1145 Budapest, Torokor u. 31</td>
<td>Tel: (+36)-1-221-1045</td>
<td>Fax: (+36)-1-221-2541</td>
<td>URL: kora.rencal.hu</td>
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<td><strong>IRELAND</strong></td>
<td>Yokogawa United Kingdom Ltd.</td>
<td>PCI, 18-20 Rue Grande Dame Rose, 78140 Velizy Villacoublay</td>
<td>Tel: (+33)-1-3926-1000</td>
<td>Fax: (+33)-1-3926-1030</td>
<td>URL: <a href="http://www.yokogawa.com/ir/">www.yokogawa.com/ir/</a></td>
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<td><strong>POLAND</strong></td>
<td>NDN</td>
<td>TMI, 15 Janowskiego str, 02-784 Warsaw</td>
<td>Tel: (+48)-22-641-1547</td>
<td>Fax: (+48)-22-641-1547</td>
<td>URL: <a href="http://www.ndn.com.pl">www.ndn.com.pl</a></td>
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<td><strong>THE NETHERLANDS</strong></td>
<td>Yokogawa Europe B.V.</td>
<td>TMI &amp; PCI, Regional Headquarters Europe, Databankweg 20, 3821 AL, Amersfoort</td>
<td>Tel: (+31)-33-4641-858</td>
<td>Fax: (+31)-33-4641-859</td>
<td>URL: <a href="http://www.yokogawa.com/eu/">www.yokogawa.com/eu/</a></td>
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<td><strong>Yokogawa Netherland B.V.</strong></td>
<td>TMI &amp; PCI, Hoofdveste 11, 3992 DH, Houten</td>
<td>Tel: (+31)-30-635-7777</td>
<td>Fax: (+31)-30-635-7770</td>
<td>URL: <a href="http://www.yokogawa.com/nl/">www.yokogawa.com/nl/</a></td>
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<td><strong>Simac Electronics B.V.</strong></td>
<td>COMM, Eindstraat 53, 5151 AE Drunen</td>
<td>Tel: (+31)-416-387-700</td>
<td>Fax: (+31)-416-387-707</td>
<td>URL: <a href="http://www.simacelectronics.nl">www.simacelectronics.nl</a></td>
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<td><strong>LATVIA</strong></td>
<td>Megatek SIA</td>
<td>COMM, P. Brieza Street 35, LV-1045 Riga</td>
<td>Tel: (+371)-732-44-22</td>
<td>Fax: (+371)-732-11-99</td>
<td>URL: <a href="http://www.megatek.lv">www.megatek.lv</a></td>
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<td>URL: <a href="http://www.megatek.lv">www.megatek.lv</a></td>
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<td><strong>NORWAY</strong></td>
<td>Leif Kolner Ingeniofirm</td>
<td>PCI, P. O. Box 353, 3101 Tonsberg</td>
<td>Tel: (+47)-3303-3301</td>
<td>Fax: (+47)-3300-3301</td>
<td>URL: <a href="http://www.iiking.no">www.iiking.no</a></td>
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<td><strong>PHI Fiberoptik A/S</strong></td>
<td>COMM, 0275 Oslo</td>
<td>Tel: (+47)-22-33-6611</td>
<td>Fax: (+47)-22-33-1266</td>
<td>URL: <a href="http://www.phi-fiber.com">www.phi-fiber.com</a></td>
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<td><strong>Yokogawa Measurement Technologies AB in Sweden</strong></td>
<td>Tel: (+46)-18-22-89-50</td>
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<th>Country</th>
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<tr>
<td><strong>ROMANIA</strong></td>
<td>Celesta Comexim</td>
<td>TMI &amp; COMM P.O. Box 61-13 76206 Bucharest Tel: (40)-21-410-3064 Fax: (40)-21-410-3117</td>
</tr>
<tr>
<td><strong>Russia and CIS countries</strong></td>
<td>Yokogawa Electric CIS Ltd.</td>
<td>TMI &amp; PCI Grokholskiy per. 13, Build. 2 4th Floor 129090, Moscow Tel: (7)-495-737-7868 Fax: (7)-495-737-7869</td>
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<td>URL: <a href="http://www.yokogawa.ru/">www.yokogawa.ru/</a></td>
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<td><strong>Telecom Komplect Service</strong> COMM Kronštádtský bvd., 12A 125212, Moscow Tel: (7)-495-956-7687 Fax: (7)-495-956-7688</td>
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<td>URL: <a href="http://www.tkc.ru">www.tkc.ru</a></td>
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<td><strong>Ukraine office</strong> Yokogawa Electric CIS Ltd. TMI &amp; PCI Popidruženko str., 52, office 204 02660, Kiev Tel: (380)-44-499-1915</td>
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<td><strong>Kazakhstan office</strong> Yokogawa Electric CIS Ltd. TMI &amp; PCI Baishaeva str., 3A 050002, Almaty Tel: (7)-327-300-569, 303-660</td>
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<td>Fax: (7)-327-303-658</td>
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<tr>
<td><strong>SLOVAKIA</strong></td>
<td>Yokogawa Representative Office</td>
<td>PCI Stefanikova 12 811 05 Bratislava Tel: (421)-2-5262-1062 Fax: (421)-2-5262-1052</td>
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<tr>
<td><strong>SWEDEN</strong></td>
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<td><strong>Yokogawa Measurement Technologies AB</strong> TMI Finlandsgatan 52, 2 floor S-164 74 Kista Stockholm Tel: (46)-8-477-1900 Fax: (46)-8-477-1999 URL: <a href="http://www.yokogawa.se/">www.yokogawa.se/</a></td>
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<td><strong>Omni process AB</strong> PCI Vretenvagen 10 171 54 Solna Tel: (46)-8-56480840 Fax: (46)-8-56480850 URL: <a href="http://www.omni">www.omni</a> process.se</td>
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<td><strong>PHI Fiberoptik AB</strong> COMM Domnarvsugatan 11 163 53 Spanga Tel: (46)-8-653-0404 Fax: (46)-8-653-0147 URL: <a href="http://www.phi-fiber.com">www.phi-fiber.com</a></td>
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<td><strong>SWITZERLAND</strong></td>
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<td><strong>nbn Elektronik AG</strong> TMI Birmensdorfer Str. 30 CH-8142 Uitikon Tel: (41)-1-4043434 Fax: (41)-1-4930532 URL: <a href="http://www.nbn-elektronik.ch">www.nbn-elektronik.ch</a></td>
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<td><strong>Zimmerli Messtechnik AG</strong> PCI Schlossgasse 10 CH-4125 Riehen Tel: (41)-61-6459800 Fax: (41)-61-6459801 URL: <a href="http://www.zimmerliag.com">www.zimmerliag.com</a></td>
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<td><strong>Mesomatic Messtechnik AG</strong> COMM Hinterbergstrasse 9 CH-6330 Cham Tel: (41)-41-748-6022 Fax: (41)-41-748-6023</td>
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<td><strong>TURKEY</strong></td>
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<td><strong>Mates A.S.</strong> TMI Sancak Mah. 245 Sok No :8/A-B Yildiz Cankaya 06550 Ankara Tel: (90)-312-491-8818 Fax: (90)-312-491-8808</td>
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<td><strong>Best A.S.</strong> PCI Kibris Sehileri Cad. No.185/5 Aksoy Ishani 501 - 502 35220 Alsancak Izmir Tel: (90)-232-4636426 Fax: (90)-232-4636068</td>
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<td><strong>B S Sistem Entegrayon Elektronik Bилич Hiz. Tic. Ltd. Şti.</strong> COMM Uzunçayır Cad. No:31 A1/15, 81010 Kadıköy, İstanbul, Turkey Tel: (90)-216 326 16 15 Fax: (90)-216 326 16 15 URL: <a href="http://www.bissistem.com">www.bissistem.com</a></td>
</tr>
<tr>
<td><strong>UNITED KINGDOM</strong></td>
<td></td>
<td><strong>Yokogawa Measurement Technologies Ltd.</strong> TMI Solar House, Mercury Park Wycombe Lane Wooburn Green Bucks HP10 0HH Tel: (44)-1628-535830 Fax: (44)-1628-535839</td>
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<td><strong>Yokogawa United Kingdom Ltd.</strong> PCI Stuart Road, Manor Park Runcorn, Cheshire WA7 1TR Tel: (44)-1928-597100 Fax: (44)-1928-597101 URL: <a href="http://www.yokogawa.com/uk/">www.yokogawa.com/uk/</a></td>
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<td><strong>DM Optics Ltd</strong> COMM Slade House, Slade Lane, Lympsham Somerset, BS24 0DP Tel: (44)-1934-750655 Fax: (44)-1934-750754</td>
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<tr>
<td><strong>MIDDLE EAST AND AFRICA</strong></td>
<td></td>
<td><strong>BAHRAIN</strong> Yokogawa Middle East B.S.C.(c) TMI &amp; PCI P.O.Box 10070, Manama Building No. 577 Road 2516, Busaiseen 225 Muharrak Tel: (973)-17358100 Fax: (973)-17336100 URL: <a href="http://www.yokogawa.com/bh/">www.yokogawa.com/bh/</a></td>
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<td><strong>Abdulrahman M. Juma Est.</strong> TMI &amp; PCI P.O. Box 355 Suite 2, Juma Building 47 Horaira Tel: (973)-233295 Fax: (973)-275425</td>
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<tr>
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<td><strong>EGYPT</strong> Giza Systems Engineering TMI &amp; PCI P.O. Box 43 Dokki 17 Tiba St. - Mohandseen Cairo 11511 Tel: (20)-2-3360851 Fax: (20)-2-3385799/3385775</td>
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<td><strong>ISRAEL</strong> Horn Engineering Control &amp; Processes Ltd. PCI P.O. Box 8608 45, Hamelacha Str., Suite 334 Poleg Ind. Zone Natania 42505 Tel: (972)-9-835-2722 Fax: (972)-9-835-2725 URL: <a href="http://www.horn-ecp.co.il">www.horn-ecp.co.il</a></td>
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<td><strong>Testec Ltd.</strong> TMI &amp; PCI 7 Imbar Street, Kiryat Arie Petah Tikva 49130 Tel: (972)-3-923-4470 Fax: (972)-3-923-4465 URL: <a href="http://www.appi-com.co.il">www.appi-com.co.il</a></td>
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<td><strong>Fibernet Ltd.</strong> COMM 3 Hatmar st., P.O.Box 51, Yokneam elit, 20692, Ireland Tel: (972)-4-9590046 Fax: (972)-4-9590047 URL: <a href="http://www.fibernet.co.il">www.fibernet.co.il</a></td>
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<td><strong>JORDAN</strong> General Distributors Company TMI &amp; PCI P.O. Box 5226 Gedco House, 4th Circle Jebel Amman Tel: (962)-6-4644348/4641607 Fax: (962)-6-4642547</td>
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<td><strong>QATAR</strong> Laffan Trading and Contracting TMI &amp; PCI P.O. Box 6363 Abdul Hadi Suliman Haider Lari Bldg. Ground Floor, Salwar Road, Doha Tel: (974)-329739 Fax: (974)-320898</td>
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<td>SAUDI ARABIA</td>
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<td>Adwan Marketing Co., Ltd. TMI &amp; PCI P. O. Box 64273 Al-Kharj Road Riyadh 11536 Tel: (966)-1-495-5332 Fax: (966)-1-495-1929</td>
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<tr>
<td>Republic of South Africa</td>
<td>Yokogawa South Africa (Pty) Ltd. TMI &amp; PCI Block A, Constantia Ridge Office Park 764 Golf Club Terrace Constantia Kloof, Roodepoort, 1915 Tel: (27)-11-831-6300 Fax: (27)-11-831-6350 URL: <a href="http://www.yokogawa.com/za/">www.yokogawa.com/za/</a></td>
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<tr>
<td>South &amp; Southeast Asia</td>
<td>INDIA</td>
<td>Yokogawa India Ltd. TMI &amp; PCI &amp; COMM Head office Plot No.96, Electronic City Complex, Hosur Road, Bangalore 560 100 Tel: (91)-80-2852-1430/2852-1450 Fax: (91)-80-2852-0625/2852-1363 URL: <a href="http://www.yokogawa.com/in/">www.yokogawa.com/in/</a></td>
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<td>Western Regional Office (Mumbai) Elegant Business Park, A-101,MIDC Cross Road B, Off. Andheri Kurla Road, Andheri(E), Mumbai 400 059 Tel: (91)-22-67021241/67021242 Fax: (91)-22-67033262/67033263 Fax: (91)-22-67021243</td>
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<td>Gujarat Regional Office (Baroda) A/201, East Wing Taksh Complex, 2nd Floor Near ESI Hospital, Gotri Road Baroda 390 021 Tel: (91)-265-233-3762 Fax: (91)-265-233-0130</td>
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<td>Eastern Regional Office (Kolkata) Metro Towers, 6th Floor Room No. 6/1 1, Ho Chi Minh Sarani Kolkata-700 071</td>
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<td>Southern Regional Office (Chennai) India Garage Bldg., 3rd Floor 184 Mount Road Chennai 600 006 Tel: (91)-44-8522-720/521 Fax: (91)-44-8522-814</td>
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<td>Northern Regional Office (New Delhi) 203 Sumdutt Chambers II 9 Bikaji Cama Place New Delhi 110 066 Tel: (91)-11-26108740/6103873 Fax: (91)-11-26167985</td>
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<td>SINGAPORE</td>
<td>Yokogawa Engineering Asia Pte. Ltd. TMI &amp; PCI &amp; COMM Head Office &amp; Factory 5 Bedok South Road Singapore 469270 Tel: (65)-62419933 Fax: (65)-62412606 URL: <a href="http://www.yokogawa.com/sg/">www.yokogawa.com/sg/</a></td>
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<td>THAILAND</td>
<td>Yokogawa (Thailand) Ltd. TMI &amp; PCI &amp; COMM Head Office 798 Ramkhamheang Road Bangkapi, Huaykwang, Bangkok 10310 Tel: (66)-2-7158600 Fax: (66)-2-7158688 URL: <a href="http://www.yokogawa.com/th/">www.yokogawa.com/th/</a></td>
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<td>THE PHILIPPINES</td>
<td>Yokogawa Philippines Inc. TMI &amp; PCI &amp; COMM Topy Industries Building No. 3 Economia Street, Bagumbayan Libis, Quezon City Tel: (63)-2-834-7574/838-4934 Fax: (63)-2-834-7155 URL: <a href="http://www.yokogawa.com/ph/">www.yokogawa.com/ph/</a></td>
</tr>
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</table>
SALES/SERVICE OFFICES & REPRESENTATIVES

Beijing Branch
9F Jinbao Tower, No. 89 Jinbao Street
Dongcheng District
Beijing 100005
Tel: (86)-10-8522-1800
Fax: (86)-10-8522-1801

Shanghai Branch
K. Wah Centre 28, 29F
1010 Hui Hai Zhong Road
Shanghai 200031
Tel: (86)-21-5405-0077
Fax: (86)-21-6303-8554/5405-1017

Guangzhou Branch
Room 3306, 18th Floor, Peace World Plaza.
362-366 Huan Shi Dong Road
Guangzhou 510060
Tel: (86)-20-8384-3520/3610/358

Korea
Yokogawa Measuring Instruments Korea Corp. TMI & COMM
Head Office
Rm. 405-9, City Air Terminal Bldg.,
#159-6 Samsung-dong, Kangnam-ku, Seoul
Tel: (82)-2-551-0660
Fax: (82)-2-551-0665
URL: www.yokogawa-yik.co.kr

Chang-Won Office
Rm. 402, Kyeongnam Local Administration Friends Association B/D
#4-1 Yongho-dong, Changwon-City,
Kyungnam, Korea
Tel: (82)-55-266-2588
Fax: (82)-55-266-2587

Kwang-Ju Office
Hyundai B/D 9F, #415-12 Nongsung-dong
Seo-Ku, Kwangiu, Korea
Tel: (82)-62-364-0177/0178
Fax: (82)-62-364-0179

Ku-Mi Office
4F, Gumi Chamber of Commerce B/D,
454, Songjeong-dong, Gumi City, Kyungbuk
Tel: (82)-54-443-4674
Fax: (82)-54-443-4676

Cheon An Office
Rm. 401, Sejong Plaza,
784-16 Shinbang-Dong,
Cheonan-shi, Chungnam-Do
Tel: (82)-31-202-0615
Fax: (82)-31-202-1687

Yokogawa Electric Korea Co. Ltd.
14-1, Yangpyongdong-4 Ga,
Youngdeungpo-Gu, Seoul, 150-866
Tel: (82)-2-2628-6000
Fax: (82)-2-2628-6400
URL: www.yokogawa.com/kr/

Kyongnam Branch (Sales & Service)
1266-16, Shinjeong 2-dong Nam-ku
Ulsan 680-014
Tel: (82)-52-272-3412
Fax: (82)-52-274-7286

Taiwan
Yokogawa Taiwan Corporation PCI
Head Office
17F, No. 39, Sec. 1
Chung Hwa Road
Taipei 100
Tel: (886)-2-2314-9166
Fax: (886)-2-2314-9198
URL: www.yokogawa.com.tw/

Kaohsiung Office
25F-1, No. 6 Ming-Chuan 2nd Rd.
Kaohsiung 806
Tel: (886)-7-331-3315
Fax: (886)-7-331-3325

Taichung Liaison Office
Room A, 11F, No. 540, Sec. 1
Wunsin Rd., Nantun District,
Taichung 408
Tel: (886)-4-2327-1063
Fax: (886)-4-2327-1058

Kaizer Trading Co. Ltd. TMI
Head Office
7F., 71 Sung-chiang Road
Taipei 104
Tel: (886)-2-2506-0980
Fax: (886)-2-2506-8181
URL: www.kaizer.com.tw

Kaohsiung Office
7th Floor, No. 265, Chung Cheng 1st Road
Kaohsiung 802
Tel: (886)-7-721-1626
Fax: (886)-7-711-6349

Taichung Office
9th Floor, 296-1, Sec.3, Wen Hsin Road
Taichung 407
Tel: (886)-4-2313-5022
Fax: (886)-4-2313-4973

EVERWORTH ENTERPRISES, LTD. COMM
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Sec.3, Taipei
Tel: (886)-2-2733-4335
Fax: (886)-2-2733-4335
URL: www.ew-group.com

Japan
Yokogawa Electric Corporation TMI & PCI & COMM
Communication & Measurement Business
Headquarters
9-32, Nakacho 2-chome, Musashino-shi
Tokyo
Tel: (81)-422-52-6768
Fax: (81)-422-52-6624
URL: www.yokogawa.com/tm/
www.yokogawa.com/ns/

Oceania
Australia
Yokogawa Australia Pty. Ltd. TMI & PCI & COMM
Head Office
Tower A 112-118 Talavera Road,
Macquarie Park NSW 2113
Tel: (61)-2-9870-1100
Fax: (61)-2-9870-1111
URL: www.yokogawa.com/au/

Melbourne Office
9 Lakeside Drive
Burwood East
Melbourne, VIC 3151
Tel: (61)-3-9803-1100
Fax: (61)-3-9803-1155

Brisbane Office
18A Metroplex Avenue
Murarrie
QLD 4172
Tel: (61)-7-3902-6600
Fax: (61)-7-3899-6888

SENKO Advanced Components (Australia) Pty. Ltd. COMM
Unit 4, No 19 Viewtech Place
Rowville, VIC 3178
Tel: (61)-3-9755-7922
Fax: (61)-3-9755-7933

New Zealand
Yokogawa New Zealand Ltd. TMI & PCI
Unit C, 55 Richard Pearce Drive
Airport Oaks Auckland
P.O. Box 201188
Tel: (64)-9-255-0496
Fax: (64)-9-255-0589

Melbourne Office
9 Lakeside Drive
Burwood East
Melbourne, VIC 3151
Tel: (61)-3-9803-1100
Fax: (61)-3-9803-1155

Brisbane Office
18A Metroplex Avenue
Murarrie
QLD 4172
Tel: (61)-7-3902-6600
Fax: (61)-7-3899-6888

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New Zealand
Yokogawa New Zealand Ltd. TMI & PCI
Unit C, 55 Richard Pearce Drive
Airport Oaks Auckland
P.O. Box 201188
Tel: (64)-9-255-0496
Fax: (64)-9-255-0589
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