Measuring Instruments
All Products Guide

Bulletin 00A02B02-60E
Pick-up Products

Mixed Signal Oscilloscopes
DL9000 Series MSO Models

Digital Oscilloscopes
DL9000 Series

Mixed Signal Oscilloscopes
DLM2000 Series

Vehicle Serial Bus Analyzer
SB5000

Precision Power Analyzer
WT3000

Digital Power Analyzer
WT500

High-Speed Data Acquisition Unit
SL1000

Optical Spectrum Analyzer
AQ6370B/AQ6375

Optical Time Domain Reflectometer
AQ7275

GS Series Accessory Software
765670

Transport Analyzer
NX4000

Data Acquisition Unit DAQMASTER
MW100
MX100

MVAdvanced
MV100
MV2000

DXAdvanced
DX1000
DX2000

For Green Series Controllers
PC-Based Parameter Setting Tool
LL100/LL200/LL1100/LL1200

Data Acquisition Software Suite
DAQWORX

Data Logger
Datum-Y XL120

Application Software for Datum-Y
Datum-Logger XL900

Handy Calibrator
CA150

Digital Multimeter
TY700 Series
TY500 Series

Support for Windows Vista
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Ce 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 can also save and load data to and from internal or external media.
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.

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.

### ScopeCorder Series Selection Guide

#### Waveform Measuring

<table>
<thead>
<tr>
<th>Model</th>
<th>DL750</th>
<th>DL750P</th>
<th>SL1400</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Compact, 16 ch isolated inputs (8 module slots)</td>
<td>GigaZoomEngine and Max 1 GW</td>
<td>Dual Capture&lt;br&gt;Eleven kinds of plug-in input modules&lt;br&gt;Web server functions&lt;br&gt;Universal Input modules&lt;br&gt;Probe power connectors</td>
</tr>
<tr>
<td><strong>Max. sampling rate</strong></td>
<td>10 MS/s (×2)</td>
<td>10 MS/s (×2)</td>
<td>10 MS/s (×2)</td>
</tr>
<tr>
<td><strong>Bandwidth</strong></td>
<td>3 MHz (×2)</td>
<td>3 MHz (×2)</td>
<td>3 MHz (×2)</td>
</tr>
<tr>
<td><strong>Number of analog input channels</strong></td>
<td>Plug-in module: 16 ch (isolation)</td>
<td>Plug-in module: 16 ch (isolation)</td>
<td>Plug-in module: 16 ch (isolation)</td>
</tr>
<tr>
<td><strong>Logic input</strong></td>
<td>Std: 16 (8 bits × 2)</td>
<td>Std: 16 (8 bits × 2)</td>
<td>Std: 16 (8 bits × 2)</td>
</tr>
<tr>
<td><strong>Max. vertical sensitivity (1:1)</strong></td>
<td>500 ns/div (×2)</td>
<td>500 ns/div (×2)</td>
<td>500 ns/div (×2)</td>
</tr>
<tr>
<td><strong>Max. sweep sensitivity</strong></td>
<td>Max. 16 bits (×2)</td>
<td>Max. 16 bits (×2)</td>
<td>Max. 16 bits (×2)</td>
</tr>
<tr>
<td><strong>Max. record length</strong></td>
<td>50 MW max/2.5 MW (16 ch)</td>
<td>50 MW max/2.5 MW (16 ch)</td>
<td>50 MW max/2.5 MW (16 ch)</td>
</tr>
<tr>
<td><strong>Optional</strong></td>
<td>1 GW max/50 MW (16 ch)</td>
<td>1 GW max/50 MW (16 ch)</td>
<td>1 GW max/50 MW (16 ch)</td>
</tr>
<tr>
<td><strong>Internal media drive</strong></td>
<td>selectable</td>
<td>selectable</td>
<td>selectable</td>
</tr>
<tr>
<td><strong>Internal HDD</strong></td>
<td>PC card, FDD and Zip</td>
<td>PC card, FDD and Zip</td>
<td>PC card, FDD and Zip</td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Std</td>
<td>Std</td>
<td>Std</td>
</tr>
<tr>
<td><strong>Internal printer</strong></td>
<td>A6 (112 mm) printer</td>
<td>A6 (112 mm) printer</td>
<td>A4 (210 mm) printer</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>Optional</td>
<td>Optional</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Display (TFT LCD)</strong></td>
<td>10.4-inch color, SVGA</td>
<td>10.4-inch color, SVGA</td>
<td>10.4-inch color, SVGA</td>
</tr>
<tr>
<td><strong>External dimensions</strong></td>
<td>W × H × D (mm)</td>
<td>355 × 250 × 180</td>
<td>355 × 250 × 225</td>
</tr>
<tr>
<td><strong>Weight (kg)</strong></td>
<td>Approx. 6.5</td>
<td>Approx. 8.0</td>
<td>Approx. 8.0</td>
</tr>
</tbody>
</table>

### Specifications

- **Input:**
  - **Analog Voltage:**
    - 701250: 10 MS/s, 12-bit, 2 isolated channels, input ranges: 600 V/250 V.
    - 701251: 1 MS/s, 16-bit, 2 isolated channels, input ranges: 600 V/140 V.
    - 701260: 100 kS/s, 16-bit, 2 isolated channels, input ranges: 1000 V/850 V.
    - 701255: 10 MS/s, 12-bit, 2 non-isolated channels, input ranges: 600 V/250 V.
  - **Temperature:**
    - 701261/62: 100 kS/s, 16-bit, 2 isolated channels, input ranges: 42 V.
    - 701255: 10 MS/s, 12-bit, 2 non-isolated channels, input ranges: 600 V/250 V.
  - **Temperature:**
    - 701265: 500 kS/s, 16-bit, 2 isolated channels, input ranges: 42 V.
    - 720175: 10 kS/s, 16-bit, 2 isolated channels, input ranges: 42 V.
  - **Strain:**
    - 701270: 10 kS/s, 16-bit, 2 isolated channels, input ranges: 42 V.
    - 701271: 10 kS/s, 16-bit, 2 isolated channels, input ranges: 42 V.
  - **Frequency:**
    - 701280: 25 kS/s, 16-bit, 2 isolated channels, input ranges: 420 V/42 V.

### Notes

- *1:* See each product catalog for more detailed specifications
- *2:* Depends on input module
- *3:* Plug-in modules are not included
High performance and compact Mixed Signal Oscilloscope with 4 analog channels and 16/32-bit Logic input

**Basic Specifications**

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

**Logic Inputs**
- Number of inputs: 32 bits (8 bits × 4) (DL9710L, DL9705L), 16 bits (8 bits × 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. 10 kΩ/approx. 9 pF (701981)

**Common Specifications**
- Max. sampling rate: 5 GS/s
- Sweep sensitivity: 500 ps/div to 50 s/div
- Max. record length: 6.25 MW
- History memory: Max. data: 2000 (2.5 MW), when using History memory, 1600 (2.5 MW), when in N single mode
- Trigger modes: Auto, Auto Level, Normal, Single, and N Single
- Trigger types: Edge/State, Width, Event Interval, TV, Serial Bus (UART, FC, SPI, CAN, LIN), Serial Pattern
- Internal memory drive: Flash ROM, 90 MByte (Approx. 30 MByte is available for data storage)
- Interface: USB Peripheral support, PC Card Interfaces, USB-PC Connection, Ethernet (optional)
- Internal printer: Built-in printer, 4 Probe power connections on rear panel
- Built-in HDD: 4 Probe power connections on rear panel
- Built-in Ethernet: Built-in Ethernet + LXI compliant Ethernet interface
- LXI compliant Ethernet interface
- User-defined Math function
- Power Supply Analysis Function
- UART+I2C+SPI bus analyzer
- UART+I2C+CAN+LIN+SPI bus analyzer
- Power Cable

**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>-D</td>
<td>DL9505L 4ch 500 MHz + Logic 16 bits Max. 5 GS/s (2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701321</td>
<td>-F</td>
<td>DL9510L 4ch 1 GHz + Logic 16 bits Max. 5 GS/s (2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701330</td>
<td>-Q</td>
<td>DL9705L 4ch 500 MHz + Logic 32 bits Max. 5 GS/s (2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
<tr>
<td>701331</td>
<td>-R</td>
<td>DL9710L 4ch 1 GHz + Logic 32 bits Max. 5 GS/s (2.5 GS/s/ch), 6.25 MW/ch</td>
</tr>
</tbody>
</table>

**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 (optional): UART (New!), FC, SPI, CAN, LIN
- Power Supply Analysis (optional)

**Model Suffix Code Description**

- **-D**: Built-in printer
- **-F**: 4 Probe power connections on rear panel
- **-Q**: Built-in HDD + Ethernet interface
- **-R**: Ethernet interface
- **-S**: LXI compliant Ethernet interface
- **-T**: User-defined Math function
- **-U**: Power Supply Analysis Function
- **-V**: UART+I2C+SPI bus analyzer
- **-X**: UART+I2C+CAN+LIN+SPI bus analyzer

**Notes**

1. Not available for DL9500 series
2. Please order IP4 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, UART, FC, CAN, LIN and SPI triggers are standard.
High-Performance 500 MHz/1 GHz/1.5 GHz Bandwidth Digital Oscilloscopes

**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**

- **History Memory**
  Capture only the desired data for long periods of time.
  Make full use of the large-capacity memory to increase development efficiency without acquiring useless data.
  
  ![Waveform comparison using memory partitioned into up to 2,000 areas](image)

- **High Speed Response**
  Fast display updates, even when processing mega-words of data.

- **Dot Density Display**
  Displays waveforms like an analog oscilloscope.

- **UART (New!), I2C, CAN, LIN, SPI Bus Analysis (option)**

- **Auto Setup Function for Serial Bus Analysis (New!)**
  Fast and Automatic Serial Bus Detection & Analysis with just one button

---

**BasicSpecifications**

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

- **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**
  - 6.25 M word/channel (DL9040/DL9140/DL9240)

- **Internal media drive**
  - 90 MB (Flash Mem: Approx. 30 MB. System memory: Approx. 60 MB.)

- **Interface**
  - USB Peripheral Support/PC Card Interfaces
  - USB-PC Connections/Ethernet Communication

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

- **Other options**
  - UART Analysis Function, SPI Analysis Function, UART Analysis Function Internal Hard Disk Drive, User-defined math function, Power supply analysis function

- **Power cable**
  - UL/CSA standard

- **Help menu language**
  - English Help

- **Options**
  - Power supply analysis function
  - UART + CAN + LIN + SPI bus analyzer

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**Model Number and Suffix Codes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL9040L</td>
<td>DL9040L</td>
<td>500 MHz max. 5 GS/s (2.5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
<tr>
<td>DL9040</td>
<td>DL9040</td>
<td>500 MHz max. 5 GS/s (2.5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
<tr>
<td>DL9140L</td>
<td>DL9140L</td>
<td>1 GHz max. 5 GS/s (2.5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
<tr>
<td>DL9140</td>
<td>DL9140</td>
<td>1 GHz max. 5 GS/s (2.5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
<tr>
<td>DL9240L</td>
<td>DL9240L</td>
<td>1.5 GHz max. 10 GS/s (5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
<tr>
<td>DL9240</td>
<td>DL9240</td>
<td>1.5 GHz max. 10 GS/s (5 GS/s/ch), 6.25 Mword/ch</td>
</tr>
</tbody>
</table>

*1: Please specify this /P2 option if you use either current probes or differential probes such as 701920, 701922, 701929, 701930 or 701931.

*2: Choose either one.

*3: Choose either one.

*4: Choose either one. UART, I2C, CAN, LIN and SPI triggers are standard.
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 *)
- A/D conversion resolution:
  - 8 bits (24 LSB/div)

**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></td>
<td>DL7440 with 4 CH input and maximum 4 MW memory</td>
</tr>
<tr>
<td>701460</td>
<td></td>
<td>DL7440 with 4 CH input and maximum 16 MW memory</td>
</tr>
<tr>
<td>701470</td>
<td></td>
<td>DL7480 with 8 CH input and maximum 4 MW memory</td>
</tr>
<tr>
<td>701480</td>
<td></td>
<td>DL7480 with 8 CH input and maximum 16 MW memory</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>For 1 MΩ input: 2 mV/div to 10 V/div (steps of 1, 2, or 5)</td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td>For 50 Ω input: 2 mV/div to 1 V/div (steps of 1, 2, or 5)</td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>DC accuracy ±(1.5% of 8 div + offset voltage accuracy)</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>Time axis setting range: 1 ns/div to 50 s/div (for record length of 10 kW or greater)</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td>Display: 8.4-inch color TFT liquid crystal display</td>
</tr>
<tr>
<td></td>
<td>-E</td>
<td>Built-in printer (optional)</td>
</tr>
<tr>
<td></td>
<td>-J</td>
<td>Paper width: 112 mm</td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>Interfaces: GP-IB, USB-PC connector, USB peripheral connector, Ethernet (100BASE-TX, 10BASE-T; optional), SCSI (optional)</td>
</tr>
<tr>
<td></td>
<td>-C</td>
<td>Other options: PC bus analysis functions, CAN Bus Signal Analysis Function, SPI Bus Signal Analysis Function, Power Analysis Functions, FlexRay Signal Analyzer</td>
</tr>
<tr>
<td></td>
<td>-S</td>
<td>External dimensions: 373 (W) × 210.5 (H) × 355.3 (D) mm (when the printer cover is closed; does not include knobs and protrusions)</td>
</tr>
<tr>
<td></td>
<td>-I</td>
<td>Weight: Approx. 10 kg (24.2 lbs, including printer; does not include logic inputs)</td>
</tr>
</tbody>
</table>

*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: Option /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.
A compact personal mixed signal oscilloscope designed for easy viewing and ease of use.

Features

- Easy-to-Use & Easy-to-See
  We elevated the large (8.4-inch) LCD screen up into the line of sight. Also, the portrait format saves space on the desk or test bench.

- Flexible MSO Input
  Choose four analog channels or three analog channels + 8 bits of logic input for a maximum of eleven channels, at the touch of one button.

- Large capacity (125 Mpoint) memory enables long-duration measurements

- You can replay waveforms later on, so you’ll never miss an abnormal waveform
  - History Function -

Zooms into two different points

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 2ch, 200MHz</td>
</tr>
<tr>
<td>DLM201T</td>
<td></td>
<td>Mixed Signal Oscilloscope DLM201T 4ch, 200MHz</td>
</tr>
<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 2ch, 350MHz</td>
</tr>
<tr>
<td>DLM201T</td>
<td></td>
<td>Mixed Signal Oscilloscope DLM201T 4ch, 350MHz</td>
</tr>
<tr>
<td>DLM201S</td>
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<td>Digital Oscilloscope DLM201S 4ch, 350MHz</td>
</tr>
<tr>
<td>DLM201S</td>
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<td>Mixed Signal Oscilloscope DLM201S 2ch, 500MHz</td>
</tr>
<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 4ch, 500MHz</td>
</tr>
</tbody>
</table>

Dedicated Zoom keys

Model Specifications

Analog Signal Input
- Input channels: 2 (DLM20x2: CH1, CH2), 4 (DLM20x4: CH1 to CH4) (CH1 to CH3 when using logic input)
- Input coupling setting: AC, DC, DC50Ω, GND
- Input impedance: Analog input: 1 MΩ ±1%, approximately 20 pF
- Voltage axis sensitivity: 2 mV/div to 500 mV/div (steps of 1-2-5)
- Maximum record length: 2 ch model Repeat/Single/Single Interleave: 2 Mpoints (when interleave mode ON: 62.5 Mpoints)
- 2 ch model (Standard) 1.25 M/25 M/125 Mpoints
- 4 ch model (Standard) 1.25 M/25 M/125 Mpoints

Logic Signal Input (4 ch model only)

- Number of inputs: 8 bit (excl. 4 ch input and logic input)
- Maximum toggle frequency*: 100 MHz (when interlock mode ON: 62.5 Mpoints)
- Compatible probes: Model 701988: 100 MHz

- Display: 8.4-inch TFT color liquid crystal display 1024 x 768 (XGA)
- Rated supply voltage: 100 to 240 VAC
- Rated supply frequency: 50 Hz/60 Hz
- Maximum power consumption: 170 W
- External dimensions: 226 (W) x 293 (H) x 193 (D) mm (when printer cover is closed, excluding protrusions)
- Weight: Approx. 4.3 kg
- Operating temperature range: 5°C to 40°C

*1 Measured under standard operating conditions after a 30-minute warm-up followed by calibration.
*2 Value in the case of repetitive phenomenon.

Built-in printer

Option

- No switchable logic input (4 ch model only)
- MB: Built-in printer

Help languages

- English Help (Menu and Panel)
- Chinese Help (Menu and Panel)
- Korean Help (Menu and Panel)
- Italian Help (Menu and Panel)
- French Help (Menu and Panel)
- Spanish Help (Menu and Panel)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 2ch, 200MHz</td>
</tr>
<tr>
<td>DLM201T</td>
<td></td>
<td>Mixed Signal Oscilloscope DLM201T 4ch, 200MHz</td>
</tr>
<tr>
<td>DLM201S</td>
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<td>Digital Oscilloscope DLM201S 2ch, 350MHz</td>
</tr>
<tr>
<td>DLM201T</td>
<td></td>
<td>Mixed Signal Oscilloscope DLM201T 4ch, 350MHz</td>
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<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 4ch, 350MHz</td>
</tr>
<tr>
<td>DLM201S</td>
<td></td>
<td>Mixed Signal Oscilloscope DLM201S 2ch, 500MHz</td>
</tr>
<tr>
<td>DLM201S</td>
<td></td>
<td>Digital Oscilloscope DLM201S 4ch, 500MHz</td>
</tr>
</tbody>
</table>

- Memory expansion option (4 ch model only)
- During continuous measurement: 6.25 Mpoints; Single mode: 62.5 Mpoints (when interlock mode ON: 62.5 Mpoints)
- Memory expansion option (4 ch model only)
- During continuous measurement: 12.5 Mpoints; Single mode: 62.5 Mpoints (when interlock mode ON: 62.5 Mpoints)
- Memory expansion option (2 ch model only)
- During continuous measurement: 6.25 Mpoints; Single mode: 62.5 Mpoints (when interlock mode ON: 62.5 Mpoints)
- Probe power for 4 ch models
- Probe power for 4 ch models
- Probe power for 4 ch models
- GP-IB Interface
- Ethernet Interface
- SPI trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)
- UART trigger and analysis (4 ch model only)

Specifications:

- Input channels: 2 (DLM20x2: CH1, CH2), 4 (DLM20x4: CH1 to CH4) (CH1 to CH3 when using logic input)
- Input coupling setting: AC, DC, DC50Ω, GND
- Input impedance: Analog input: 1 MΩ ±1%, approximately 20 pF
- Voltage axis sensitivity: 2 mV/div to 500 mV/div (steps of 1-2-5)
- Maximum record length: 2 ch model Repeat/Single/Single Interleave: 2 Mpoints (when interleave mode ON: 62.5 Mpoints)
- 2 ch model (Standard) 1.25 M/25 M/125 Mpoints
- 4 ch model (Standard) 1.25 M/25 M/125 Mpoints

Logic Signal Input (4 ch model only)

- Number of inputs: 8 bit (excl. 4 ch input and logic input)
- Maximum toggle frequency*: 100 MHz (when interlock mode ON: 62.5 Mpoints)
- Compatible probes: Model 701988: 100 MHz

- Display: 8.4-inch TFT color liquid crystal display 1024 x 768 (XGA)
- Rated supply voltage: 100 to 240 VAC
- Rated supply frequency: 50 Hz/60 Hz
- Maximum power consumption: 170 W
- External dimensions: 226 (W) x 293 (H) x 193 (D) mm (when printer cover is closed, excluding protrusions)
- Weight: Approx. 4.3 kg
- Operating temperature range: 5°C to 40°C

*1 Measured under standard operating conditions after a 30-minute warm-up followed by calibration.
*2 Value in the case of repetitive phenomenon.
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>DL1720E</td>
<td>digital oscilloscope with 2 ch input, 500 MHz analog bandwidth and maximum 1 MW memory</td>
</tr>
<tr>
<td>701725</td>
<td>DL1735E</td>
<td>digital oscilloscope with 4 ch input, 350 MHz analog bandwidth and maximum 2 MW memory</td>
</tr>
<tr>
<td>701730</td>
<td>DL1740E</td>
<td>digital oscilloscope with 4 ch input, 500 MHz analog bandwidth and maximum 2 MW memory</td>
</tr>
<tr>
<td>701740</td>
<td>DL1740EL</td>
<td>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***
    - [C10]: Ethernet interface
    - [F5]: FC + SPI bus analysis function***
    - [E6]: Attach two 701941 probes**
- External dimensions:
  - 220 (W) × 265.8 (H) × 264.1 (D) mm
- Weight: Approx. 5.5 kg (with all options)

---

* 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.
3. Option for models 701715, 701730 and 701740 only.
4. 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 analyzer for 701610 and 701620
- 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)
- A4 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>DL1620</td>
<td>Digital oscilloscope</td>
</tr>
<tr>
<td>701610</td>
<td>DL1640</td>
<td>Digital oscilloscope</td>
</tr>
<tr>
<td>701620</td>
<td>DL1640L</td>
<td>Digital oscilloscope</td>
</tr>
<tr>
<td>AC</td>
<td>100 to 120 V &amp; 200 to 240 AC</td>
<td></td>
</tr>
<tr>
<td>DC*1</td>
<td>12 VDC</td>
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</tr>
<tr>
<td>-D</td>
<td>UL/CSA standard</td>
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</tr>
<tr>
<td>-F</td>
<td>VDE standard</td>
<td></td>
</tr>
<tr>
<td>-Q</td>
<td>BS standard</td>
<td></td>
</tr>
<tr>
<td>-R</td>
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</tr>
<tr>
<td>-H</td>
<td>GB standard</td>
<td></td>
</tr>
<tr>
<td>-Y</td>
<td>No power cable</td>
<td></td>
</tr>
<tr>
<td>-J1</td>
<td>Floppy disk drive*</td>
<td></td>
</tr>
<tr>
<td>-J2</td>
<td>Zip® drive*</td>
<td></td>
</tr>
<tr>
<td>-J3</td>
<td>PC card drive (Type II)*</td>
<td></td>
</tr>
<tr>
<td>/B5</td>
<td>Built-in printer</td>
<td></td>
</tr>
<tr>
<td>/P2</td>
<td>Probe power for 701605</td>
<td></td>
</tr>
<tr>
<td>/P4</td>
<td>Probe power for 701610 and 701620</td>
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</tr>
<tr>
<td>/C1</td>
<td>GP-IB = USB*</td>
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</tr>
<tr>
<td>/C10</td>
<td>Ethernet + USB*</td>
<td></td>
</tr>
<tr>
<td>/F5</td>
<td>PC bus analyzer for 701610 and 701620*</td>
<td></td>
</tr>
<tr>
<td>/F7</td>
<td>CAN bus signal analysis function*</td>
<td></td>
</tr>
</tbody>
</table>

The main unit comes standard with four passive probes (700960) for 701610/701620 and two passive probes for 701620.
*1 Select “-Y” for the DC power model.
*2 Choose one.
*3 Choose one.
*4 The PC bus analysis function includes the SPI analysis function.
*5 The CAN bus analysis function includes the SPI bus analysis function. It can only be specified for model 701610 and 701620.

- Battery box and charger
- Probe power
- GP-IB + USB
- Ethernet + USB
- Real-time digital filtering

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 IEEE802.3TX and 100BASE-T; optional)
- Internal media drive: Floppy disk drive, Zip® 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)
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.

### Overview

- 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

### Features

- **Basic Specifications**
  - Input:
    - Type: Isolated plug-in module
    - Slots: 8 (16 channels)
    - Logic inputs: 16 (8 bits × 2)
    - Sweep time: 500 ns to 3 days/div (10 div)
    - 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-TX 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
    - Approx. 6.6 kg (DL750), 8.0 kg (DL750P), (main unit with full options, including M3, C8, C10, and P4)
    - Approx. 9 kg (DL750), 10.3 kg (DL750P), (main unit and eight 701250 modules)
  - Weight
    - Approx. 6.6 kg (DL750), 8.0 kg (DL750P), (main unit with full options, including M3, C8, C10, and P4)
    - Approx. 9 kg (DL750), 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)’ + 112 mm width A6 thermal printer built-in</td>
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<tr>
<td>701230</td>
<td>F</td>
<td>‘DL750P 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></td>
<td>F</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>AS standard</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>BS standard</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>GB standard (Complied with CCC)</td>
</tr>
<tr>
<td>Internal media drive</td>
<td></td>
<td>J1 Floppy drive (DL750 only)</td>
</tr>
<tr>
<td></td>
<td>J2</td>
<td>Zip® drive (available for the DL750 only)</td>
</tr>
<tr>
<td></td>
<td>J3</td>
<td>PC card drive</td>
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<tr>
<td>Default Help language</td>
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<td>Italian</td>
</tr>
<tr>
<td></td>
<td>HK</td>
<td>Korean</td>
</tr>
</tbody>
</table>

- **Sample Rate**
  - 10 MS/s: 100 seconds, 1.67, 0.028, 0.001
  - 1 MS/s: 600 minutes, 10 minutes, 0.167, 0.007
  - 100 kS/s: 9000 minutes, 150 minutes, 2.5 hours, 0.10
  - 10 kS/s: 72000 seconds, 1200 minutes, 20 hours, 0.83 day
  - 1 kS/s: 864000 seconds, 14400 minutes, 240.0, 10 days
  - 200 S/s: 2592000 seconds, 43200 minutes, 720.0, 30 days

- **Maximum Recording Time**
  - Memory expansion options
    - M1: Memory expansion to 10 MW/CH
    - M2: Memory expansion to 25 MW/CH
    - M3: Memory expansion to 50 MW/CH
  - Other specifications
    - /10: Ethernet interface
    - /2: User-defined math function
    - /3: DSP channel function
    - /DC: DC 12V Power (10-18VDC)

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.
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/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

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL1400</td>
<td></td>
<td>SL1400 main unit</td>
</tr>
<tr>
<td>Power cable</td>
<td></td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td>Power cable</td>
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<td>UL/CSA standard</td>
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<tr>
<td>Power cable</td>
<td></td>
<td>UL/CSA standard</td>
</tr>
</tbody>
</table>

Internal media drive

- 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)

---

Module Selection

* Above plug-in modules can be used among all ScopeCorder series.

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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 1 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>701250</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/short-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>

---

1. Plug-in modules are not included.
2. Choose only one.
Advanced Functions for FlexRay Waveform & Protocol Analysis

Comprehensive In-Vehicle Serial Bus Analyzer

The SB5000 Vehicle Serial Bus Analyzer is an invaluable tool for engineers involved in the development and use of in-vehicle communication buses. It can analyze FlexRay, an emerging bus technology employed by advanced ECU’s and electronic vehicle control applications. Because it can measure logic signals of up to 32 bits simultaneously, a single SB5000 offers measurement and analysis of parallel bus signals from microprocessors and other sources.

Overview

Features

- Measure and Analyze 3 Vehicle Serial Buses + 3 General Purpose Serial Buses, and 32-Bit Max Parallel Buses —All on a Single Instrument
- Waveform(s), Analysis List and Decode Display
  - Easy and efficient observation of the physical layer and simultaneous protocol analysis enable you to evaluate the performance of your bus communication system.
- FlexRay Eye-Diagram Analysis
- CAN/FlexRay bus symbolic triggering, analysis, decoding, and trend display
  (Supports DBC database for CAN, FIBEX database for FlexRay)

Auto Setup Dedicated to Serial Busses

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB5310</td>
<td>701351</td>
<td>Max. 5GS/s(2.5GS/s/ch), 6.25 MW (Mpts)/ch</td>
</tr>
<tr>
<td>SB5310</td>
<td>701361</td>
<td>Max. 5GS/s(2.5GS/s/ch), 6.25 MW (Mpts)/ch</td>
</tr>
<tr>
<td>SB5710</td>
<td>701920, 701922, 701932 or 701933</td>
<td>Max. 5GS/s(2.5GS/s/ch), 6.25 MW (Mpts)/ch</td>
</tr>
</tbody>
</table>

Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP4**</td>
<td>Built-in printer</td>
</tr>
<tr>
<td>C9**</td>
<td>4 Probe power terminals on rear panel</td>
</tr>
<tr>
<td>C10**</td>
<td>Built-in HDD + Ethernet interface</td>
</tr>
<tr>
<td>C112**</td>
<td>Built-in HDD + LXI compliant Ethernet interface</td>
</tr>
<tr>
<td>G2**</td>
<td>Ethernet interface</td>
</tr>
<tr>
<td>G3**</td>
<td>LXI compliant Ethernet interface</td>
</tr>
<tr>
<td>G4**</td>
<td>User-defined math function</td>
</tr>
<tr>
<td>G5**</td>
<td>Power supply analysis function</td>
</tr>
</tbody>
</table>

- **: Please order this option if you use either current probes or differential probes such as 701920, 701922, 701932 or 701933.
- **: Choose either one.
- *: Choose either one.

SB5710

Major Specifications

<table>
<thead>
<tr>
<th>Models</th>
<th>Model name (No.)</th>
<th>Max. sampling rate</th>
<th>Freq. BW</th>
<th>Max. record length</th>
<th>Input channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB5310 (701351)</td>
<td>5 GSPs</td>
<td>1 GHz</td>
<td>6.25 MW (Mpts)</td>
<td>Analog 4 CH + Logic 8-bit</td>
<td></td>
</tr>
<tr>
<td>SB5710 (701361)</td>
<td>5 GSPs</td>
<td>1 GHz</td>
<td>6.25 MW (Mpts)</td>
<td>Analog 4 CH + Logic 32-bit</td>
<td></td>
</tr>
</tbody>
</table>

FlexRay bus

- FlexRay Protocol Version 2.1
- Bit rate: 10Mbps, 5 Mbps, 2.5 Mbps
- FlexRay Trigger Types
  - Frame start, ID/DATA, ID/DATA OR, Error, Message/Signal

CAN bus

- CAN Version 2.0B
- CAN Trigger Types
  - SOF, Error Frame, ID Std/Data, ID Ext/Data, ID Data OR, Message/Signal

LIN bus

- LIN1.3 or LIN2.0
- LIN Trigger Types
  - Break + Synch, ID/DATA, ID/DATA OR, Error

UART Trigger Types

- Every Data, Error

I2C bus

- Bus transfer rate: Up to 3.4 Mbits/s
- I2C Trigger Types
  - Address mode | 7 bits/10 bits
  - Start Byte/HS Mode

SPI Trigger Types

- Three-wire or Four wire
- Activate a trigger by comparing data from an arbitrary byte counts after the assertion of the CS. The length of data that is compared can be set to 1 to 4 bytes.

Display of Analysis Results

- Simple & detailed analysis result displays are available for all buses.

Basic Specifications

- Input channels: 4 (CH1 to CH4)
- Voltage axis sensitivity: For 1 MΩ input: 2 mV/div to 5 V/div (steps of 1-2-5)
- Maximum input voltage: For 1 MΩ input: 150 Vrms CAT I (when frequency is under 1 kHz)
- Rated supply voltage: For 5Ω input: 5 Vrms or less and 10 Vpeak or less
- Rated supply frequency: 50/60 Hz
- Maximum power consumption: 300 VA
- External dimensions: 350 (W) × 200 (H) × 285 (D) mm (with printer cover put away, excluding handle and other projections)
- Weight: Approx. 7.7 kg (without options)
- Operating Temperature: 5 to 40 °C
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.

USB2.0 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).

Xviewer/MATLAB tool kit

Xviewer is a PC software application designed to work with Yokogawa’s DL (M) Series and the DL750/750P/SL1400 Series ScopeCorders. Xviewer allows you to display DL-acquired waveform data (using the “Viewer” function), perform file transfers, and control DL (M) Series from a PC.

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).

In addition to the above, various kinds of accessory software, free software, LabVIEW drivers, and LabWindows/CVI drivers, can be downloaded from our web site.
<table>
<thead>
<tr>
<th>Product</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 MHz passive probe</td>
<td>701943</td>
<td></td>
</tr>
<tr>
<td>500 MHz BW, 10:1, 1.5 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 GHz active probe</td>
<td>701913</td>
<td></td>
</tr>
<tr>
<td>2.5 GHz BW, 10:1, 1.2 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5 GHz active probe</td>
<td>701914</td>
<td></td>
</tr>
<tr>
<td>1.5 GHz BW, 10:1, 1.2 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GHz active probe</td>
<td>701912</td>
<td></td>
</tr>
<tr>
<td>1 GHz BW, 10:1, 1.2 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 GHz BW, 10:1, Max. differential input voltage: ±5 V, 1.2 meters</td>
<td>701923</td>
<td></td>
</tr>
<tr>
<td>5 GHz BW, 10:1, 20:1, 0.95 m</td>
<td>701974</td>
<td></td>
</tr>
<tr>
<td>600 MHz passive probe</td>
<td>701938</td>
<td></td>
</tr>
<tr>
<td>200 MHz BW, 10:1, 1.5 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 MHz passive probe</td>
<td>701939</td>
<td></td>
</tr>
<tr>
<td>500 MHz BW, 10:1, 1.3 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 MHz active probe</td>
<td>700968</td>
<td></td>
</tr>
<tr>
<td>400 MHz BW (10:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allows the division ratio to be switched between 10:1 and 1:1. 1.3 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>350 MHz passive probe</td>
<td>700960</td>
<td></td>
</tr>
<tr>
<td>220 MHz BW (10:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allows the division ratio to be switched between 10:1 and 1:1. 1.3 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC to 500 MHz, 10:1, 1.2 meters</td>
<td>701941</td>
<td></td>
</tr>
<tr>
<td>DC to 350 MHz, 10:1, 3.0 meters</td>
<td>701942</td>
<td></td>
</tr>
<tr>
<td>DC to 50 MHz, 10:1, 1.2 meters</td>
<td>701944</td>
<td></td>
</tr>
<tr>
<td>DC to 2 MHz, 50:1, 3.0 meters</td>
<td>701945</td>
<td></td>
</tr>
<tr>
<td>350 MHz Passive Probe</td>
<td>701938</td>
<td></td>
</tr>
<tr>
<td>DC to 350 MHz, 10:1, 3.0 meters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logic Probe</td>
<td>701980</td>
<td></td>
</tr>
<tr>
<td>Input impedance: 1.0 MU, Max. toggle frequency: 100 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logic Probe</td>
<td>701981</td>
<td></td>
</tr>
<tr>
<td>Input impedance: 10 KΩ, Max. toggle frequency: 50 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL100 (100MHz Logic probe)</td>
<td>701968</td>
<td></td>
</tr>
<tr>
<td>Input impedance: 100 KΩ, Max. toggle frequency: 50 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBL250 (100MHz Logic probe)</td>
<td>701969</td>
<td></td>
</tr>
<tr>
<td>Input impedance: 100 KΩ, Max. toggle frequency: 25 MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 MHz differential probe</td>
<td>701921</td>
<td></td>
</tr>
<tr>
<td>DC~100 MHz, 10:1, 100:1, Max. differential input voltage: ±70 V (10:1), ±700 V (100:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 MHz differential probe</td>
<td>701922</td>
<td></td>
</tr>
<tr>
<td>DC~200 MHz, 10:1, 200:1, Max. differential input voltage: ±20 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5 MHz differential probe</td>
<td>700925</td>
<td></td>
</tr>
<tr>
<td>DC~15 MHz, 10:1, 100:1, Max. differential input voltage: ±50 V (10:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 MHz differential probe</td>
<td>700924</td>
<td></td>
</tr>
<tr>
<td>DC~100 MHz, 10:1, 1000:1, Max. differential input voltage: ±1400 V (1000:1), ±350 V (100:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 MHz differential probe</td>
<td>701920</td>
<td></td>
</tr>
<tr>
<td>DC~500 MHz, 10:1, Max. differential input voltage: ±12 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 MHz differential probe</td>
<td>701926</td>
<td></td>
</tr>
<tr>
<td>DC~50 MHz, 10:1, 1000:1, Max. differential input voltage: ±7000V/peak (1000:1), 7000V/peak (100:1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GHz differential probe</td>
<td>701924</td>
<td></td>
</tr>
<tr>
<td>DC~1 GHz, 50:1, Max. differential input voltage: ±25 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oscilloscope signal source</td>
<td>701935</td>
<td></td>
</tr>
<tr>
<td>Output voltage: Approx. 0-5 V, Output current: Approx. –100 to 0 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701933</td>
<td></td>
</tr>
<tr>
<td>DC to 50 MHz, 50 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701930</td>
<td></td>
</tr>
<tr>
<td>DC to 10 MHz, 100 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701931</td>
<td></td>
</tr>
<tr>
<td>DC to 2 MHz, 500 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701932</td>
<td></td>
</tr>
<tr>
<td>DC to 100 MHz, 30 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701929</td>
<td></td>
</tr>
<tr>
<td>DC to 500 MHz, 30 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current probe</td>
<td>701928</td>
<td></td>
</tr>
<tr>
<td>DC to 100 MHz, 30 Arms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe power supply</td>
<td>701934</td>
<td></td>
</tr>
<tr>
<td>Large current output, external probe power supply (4 outputs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Ω terminator</td>
<td>700976</td>
<td></td>
</tr>
<tr>
<td>Used to connect an oscilloscope having a 1 MΩ input to an instrument having a 50 Ω output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probe stand</td>
<td>701919</td>
<td></td>
</tr>
<tr>
<td>Diameter of attachable probe: 0.08 to 13 mm, Weight: Approx. 1.5 kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Waveform Measuring**

### Oscilloscopes Digital Power Module Frequency Isolation Module
- **701280 Module**
- **701260 Module**
- **701251 Module**
  - 1 MS/s 16-bit High-speed Module
  - 12-bit Isolation
  - 10 MS/s High-speed Module

---

**Textile**

- *Actual allowable voltage is the lower of the voltages specified for the main unit, prob and cable.
- **700901 Lead**
  - Safety Adaptor 1:1 BNC
- **700987 Lead**
  - Isolated Logic Probe 8-Bit, each channel isolated
- **701934 Probe Power Supply**
  - Supply (4 outputs), large current output, external probe power
- **709131 Current Probe**
  - 500 Arms, DC to 2 MHz, supports probe power
- **701933 Current Probe**
  - 30 Arms, DC to 50 MHz, supports probe power
- **366961 1:1 Banana-alligator Cable**
  - Non-isolated 42 V or less, 1.2m
- **366926 1:1 BNC-alligator Cable**
  - Non-isolated 42 V or less, 1m
- **701940 Passive Probe (10:1)**
  - Non-isolated 600 Vpk
- **366925 Passive Probe for 4-20mA**
- **366924 Bridge Head (NDIS, 120Ω/350Ω)**
- **366923 Bridge Head (DSUB, 120Ω/350Ω)**
- **758924 Safety BNC-banana Adapter**
  - 500 Vrms-CAT II
- **702911 Logic Probe**
  - 8-Bit, non-isolated, TTL level/Contact Input (for SL1400)
- **700986 High-speed Logic Probe**
  - 8-Bit, non-isolated, response speed: 1 µs
- **758917 Measurement Lead Set**
  - Measurement leads (2 per set)
- **701906 Safety Mini-Clips (Hook type)**
- **701954 Large Alligator-Clips (Dolphin type)**

---

**Accessories Combinations**

**Product** | **Model No.** | **Description**
--- | --- | ---
10:1 Probe (for isolated BNC Input) | 700929 | 1000 Vrms-CAT II
100:1 Probe (for isolated BNC Input) | 701947 | 1000 Vrms-CAT II (700929, 701947)
Plug on clip | 701948 | 1000 Vrms-CAT II
1:1 Safety BNC Adapter Lead | 701901 | 4-channel, 1000 Vrms-CAT II
Long Test Clips | 701906 | 1000 Vrms-CAT II, 1 set each of red and black
Safety Mini-Clips (Hook type) | 701959 | 1000 Vrms-CAT II, 1 set each of red and black
Large Alligator-Clips (Dolphin type) | 701954 | 1000 Vrms-CAT II, 1 set each of red and black
Alligator Clip Adapter Set | 758922 | 300 Vrms-CAT II, 1 set each of red and black
Fork Terminal Adapter Set | 758921 | 1000 Vrms-CAT II, 1 set each of red and black
Passive Probe (10:1)*2 | 701940 | Non-isolated 600 Vpk
1:1 BNC-Alligator Cable | 366926 | Non-isolated 42 V or less, 1m
1:1 Banana-Alligator Cable | 366961 | Non-isolated 42 V or less, 1.2m
Current Probe | 701933 | 30 Arms, DC to 50 MHz, supports probe power
Current Probe | 701930 | 150 Arms, DC to 10 MHz, supports probe power
Current Probe | 709131 | 500 Arms, DC to 2 MHz, supports probe power
Probe Power Supply | 701934 | Supply (4 outputs), large current output, external probe power
Shunt Resister | 438920/21/22 | 250 Ω/100 Ω/10 Ω ±0.1%
Bridge Head (NDIS, 120Ω/350Ω) | 701955/56 | With 5 m cable
Bridge Head (DSUB, 120Ω/350Ω) | 701957/58 | With 5 m cable, Shunt-CAL
Safety BNC-banana Adapter | 758924 | 500 Vrms-CAT II
Logic Probe (1m/3m) | 702911/12 | 8-Bit, non-isolated, TTL level/Contact Input (for SL1400)
High-speed Logic Probe | 700986 | 8-Bit, non-isolated, response speed: 1 µs
Isolated Logic Probe | 700987 | 8-Bit, each channel isolated
Measurement Lead Set | 758917 | Measurement leads (2 per set)
Safety BNC-BNC Cable | 701902/03 | 1000 Vrms-CAT II (BNC-BNC), 1m/3m

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*1 Actual allowable voltage is the lower of the voltages specified for the main unit, prob and cable.
*2 42 V is safe when using the 701940 with an isolated type BNC input.
# Digital Power Analyzer

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>WT1500</th>
<th>WT500</th>
<th>WT120/WT230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Top model of Digital Power Analyzer&lt;br&gt;With basic power accuracy of ±0.02% of reading, DC and ±0.1 Hz-1 MHz measurement bandwidth, and up to four input elements, this model provides higher-accuracy measurement of inverter I/O efficiency &lt;br&gt;</td>
<td>Middle Class model&lt;br&gt;Up to six input elements in one instrument (3 phase power input from two systems in one unit)&lt;br&gt;6.4&quot; Inch TFT Color LCD Wide voltage and current input range&lt;br&gt;</td>
<td>New Middle Class Power Analyzer&lt;br&gt;Compact half rack size and easy use&lt;br&gt;Max. 1000V and 40A input&lt;br&gt;Simultaneous measurement U, I, P and those harmonics components&lt;br&gt;External USB memory direct data saving&lt;br&gt;</td>
<td>Entry class model&lt;br&gt;Compact design (half-rack size) and superior cost performance&lt;br&gt;5 mA range for very low current measurement (model WT210 only) &lt;br&gt;</td>
</tr>
<tr>
<td><strong>Input elements</strong></td>
<td>1 to 4</td>
<td>1 to 6</td>
<td>1 to 3</td>
<td>1 (WT210), 2 or 3 (WT230)</td>
</tr>
<tr>
<td><strong>Basic power accuracy (50/60 Hz)</strong></td>
<td>0.02% of rdg ± 0.04% of mg</td>
<td>0.1% of rdg ± 0.25% 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><strong>Input voltage range</strong></td>
<td>DC, 0.1 Hz to 1 MHz</td>
<td>DC, 0.5 Hz to 1 MHz</td>
<td>DC, 0.5 Hz to 100 Hz</td>
<td>DC, 0.5 Hz to 100 KHz</td>
</tr>
<tr>
<td><strong>Input current range</strong></td>
<td>15/30/60/100/150/300/600/1000 V</td>
<td>1.5/3/6/10/15/30/60/100/150/300/600/1000 V</td>
<td>15/30/60/100/150/300/600/1000 V</td>
<td>15/30/60/150/300/600 V</td>
</tr>
<tr>
<td><strong>Input current range (for crest factor 3)</strong></td>
<td>Direct input: 0.5/1/2.5/5/10/20/30 A or 5 m/10/20/30/50 m/100 m/200 m/500 m/1/2 A&lt;br&gt;External input: 50 m/100/200/300/500 m/12/5/10 V</td>
<td>Direct input: 10 m/20/40 m/100 m/200 m/500 m/1/2 A or 1/2/5/10/20/30/50 A&lt;br&gt;External input: 50 m/100/200/300/500 m/12/5/10 V</td>
<td>Direct input: 500 m/1/2/5/10/20/40 A&lt;br&gt;External sensor input: 50/100/230/380/500/115/230/280 V</td>
<td>Direct input: 500 m/1/2/5/10/20 A&lt;br&gt;External input (option): 2.5/5/10 V or 50 m/500 m/10/200 mV</td>
</tr>
<tr>
<td><strong>Measurement parameters</strong></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, Corrected power, Crest factor, Efficiency, Harmonic analysis</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</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 and Current integration for both charge/discharge and sold/bought, crest factor, Efficiency, Harmonic analysis</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><strong>Display</strong></td>
<td>6.4-inch TFT color LCD</td>
<td>6.4-inch TFT color LCD</td>
<td>5.7-inch TFT color LCD</td>
<td>7-segment LED, 3 displays</td>
</tr>
<tr>
<td><strong>External dimensions (mm) (W × H × D)</strong></td>
<td>426 × 177 × 459</td>
<td>426 × 177 × 408</td>
<td>213 × 177 × 408.5</td>
<td>213 × 132 × 378 (WT210) &lt;br&gt;213 × 388 × 378 (WT230)</td>
</tr>
<tr>
<td><strong>Weight (kg)</strong></td>
<td>15</td>
<td>8.5</td>
<td>6.5</td>
<td>3 (WT210), 5 (WT230)</td>
</tr>
</tbody>
</table>

## WT Series & PZ4000 Power Analyzer

<table>
<thead>
<tr>
<th>Models</th>
<th>WT Series</th>
<th>PZ4000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>High Accuracy Power Meter&lt;br&gt;Total harmonic measurement and analysis function&lt;br&gt;Voltage fluctuation/flicker measurement&lt;br&gt;Higher power accuracy</td>
<td>A power analyzer that displays measured waveforms&lt;br&gt;Wide bandwidth, high-precision measurements&lt;br&gt;A power analyzer capable of dynamically capturing load fluctuations&lt;br&gt;Graphical power analysis</td>
</tr>
<tr>
<td><strong>Input elements</strong></td>
<td>1 to 3</td>
<td>1 to 4 or 1 to 3 + Sensor input</td>
</tr>
<tr>
<td><strong>Basic power accuracy (50/60 Hz)</strong></td>
<td>0.04% of rdg ± 0.04% of mg</td>
<td>0.1% of rdg ± 0.25% of rdg</td>
</tr>
<tr>
<td><strong>Input voltage range</strong></td>
<td>DC, 2 Hz to 300 kHz</td>
<td>DC, 0.1 Hz to 1 MHz</td>
</tr>
<tr>
<td><strong>Input current range</strong></td>
<td>Direct input: 1/2.5/5/10/20/30 A&lt;br&gt;External input: 50 m/100/200/300/500 m/12/5/10 V</td>
<td>Direct input: 0.5/1/2.5/5/10/20/40 A&lt;br&gt;External input: 500 m/1/2/5/10/20/40 A or 500 m/1/2/5/10/20 A&lt;br&gt;External input: 50/100/230/380/500/115/230/280 V</td>
</tr>
<tr>
<td><strong>Measurement parameters</strong></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, Corrected power, Crest factor, Form factor, Impedance, Resistance, Reactance, Corrected Power, Harmonic analysis</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 and Current integration for both charge/discharge and sold/bought, crest factor, Efficiency, Harmonic analysis</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>7-segment LED, 4 displays</td>
<td>6.4-inch TFT color LCD</td>
</tr>
<tr>
<td><strong>External dimensions (mm) (W × H × D)</strong></td>
<td>426 × 177 × 459</td>
<td>426 × 177 × 459</td>
</tr>
<tr>
<td><strong>Weight (kg)</strong></td>
<td>13</td>
<td>15</td>
</tr>
</tbody>
</table>

*About CW series Clamp-on Power Meters, please refer to the page 67.*
High-end Power Analyzer with Best-in-Class Precision ±0.02% of Reading and High Stability

WT3000

Overview

For three-phase power measuring, 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: (for crest factor 3)
  15/30/60/100/150/300/600/1000 V
- Measurement current range: (for crest factor 3)
  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
- Frequency range:
  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 (λ):
  When λ = 0
  Apparent power reading × 0.03% in the 45 to 66 Hz range
- External dimensions:
  Approx. 426 (W) × 177 (H) × 459 (D) mm
- Weight:
  Approx. 15 kg
  (including main unit, 4 input elements, and options)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760301</td>
<td></td>
<td>WT3000 1 input element model</td>
</tr>
<tr>
<td>760302</td>
<td></td>
<td>WT3000 2 input elements model</td>
</tr>
<tr>
<td>760303</td>
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<td>WT3000 3 input elements model</td>
</tr>
<tr>
<td>760304</td>
<td></td>
<td>WT3000 4 input elements model</td>
</tr>
</tbody>
</table>

Element number

- 01 30A input element
- 02 30A input element
- 03 2A input element
- 04 2A input element
- 05 2A input element
- 06 2A input element
- 07 2A input element
- 08 2A input element

Version

- SV Standard Version
- MV Motor Version

Power cord

- D UL/CSA standard
- F VDE standard
- R IEC standard
- G GS standard

Options

- C6 Advanced Computation (IEC standard testing, harmonic, FFT, Waveform calculation)
- RS Serial Printer
- T1 80mm (3.15") Single Roll
- TS Add-on Frequency Measurement
- K4 RS-232/422/485, 2-channel waveform output
- IV1 VGA Output
- IC1 RS-232 interface
- IC2 USB port (PCI)
- IC3 USB port (Peripheral)
- IC4 Ethernet function
- IC5 Cycle by Cycle
- IC6 Voltage fluctuation, Flicker

Model

- requires 761922 software

Note: Mixing of the 30 A and 2 A input elements is not supported, whether purchasing a new unit or reworking an existing one. Also, the unit cannot be modified to change the current range. Adding input modules after initial product delivery will require rework at the factory. Please choose your models and configurations carefully, and inquire with your sales representative if you have any questions.
A Precision, Wide Frequency Range, Digital Power Meter with up to Six Input Elements

WT1600

Overview

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.

Features

- 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)

Basic Specifications

- Measurement voltage range: (for crest factor 3) 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, for crest factor 3) 50 A input element 50/100/250/500 mA, 1/2/5 A (DC, 0.5 Hz to 10 kHz)
  5 A input element 1/2/5/10/20/50 A (DC, 0.5 Hz to 1 MHz)
  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)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
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<th>Description</th>
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<td>760101</td>
<td>-01</td>
<td>WT1600 digital power meter main unit 1 2 3 4 5 6 Element Number</td>
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<td></td>
<td>-60</td>
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<table>
<thead>
<tr>
<th>Communication functions</th>
<th>C1</th>
<th>GP-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power cord</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>SAA Standard</td>
</tr>
<tr>
<td></td>
<td>-G</td>
<td>BS Standard</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>GB Standard</td>
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<tr>
<td>Option specifications</td>
<td>IB5</td>
<td>Internal printer</td>
</tr>
<tr>
<td></td>
<td>IC7</td>
<td>SCSI interface</td>
</tr>
<tr>
<td></td>
<td>IC10</td>
<td>Ethernet, HDDL, SCSI</td>
</tr>
<tr>
<td></td>
<td>TDA</td>
<td>3-channel D/A output</td>
</tr>
<tr>
<td></td>
<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.
Compact and easy use: The Power Analyzer for the renewable energy generation

WT500 Series

Basic Specifications

- Measurement voltage range: (for crest factor 3)
  15/30/60/100/150/300/600/1000V (for crest factor 3)
- Measurement current range: (for crest factor 3)
  Direct input 500mA/1/2/5/10/20/40A
  External sensor input
  50mA/100mA/200mA/500mA/1/2/5/10V
- Frequency range:
  DC, 0.5Hz to 100kHz
- Measurement Accuracy:
  Basic Accuracy (45Hz ≤ f ≤ 66Hz) and DC
  Voltage/Current/Power
  ± (0.1% of rdg + 0.1% of rng)
- USB interface to PC is standard feature
- Ethernet communication function is available (optional)
- GP-IB communication function is available (optional)
- Effective of power factor (at \( \cos \phi = 0 \))
  ± 0.2% of rng added
- External dimensions:
  Approx. 213(W) × 177(H) × 408.5(D) mm
- Weight: Approx. 6.5kg (with 3-input element)

Overview

The WT500 is a new middle class power analyzer and it features a 5.7-inch color TFT and half width racking compact body that enables single-phase and three-phase power measurement, achieving ±0.1% of reading basic and DC accuracy, maximum input of 1000Vrms, 40Arms and a measurement bandwidth up to 100kHz.

Features

- Accurate efficiency measurement of DC and AC signals
- RMS, MEAN, DC, AC and RMEAN of voltages and currents simultaneously.
- Simultaneous measurement of normal U/I/P data and those harmonic data
- As fast as 100ms data capturing and store data with all channels
- Separate integration functions for charge/discharge and bought/sold power
- Integration of power, reactive power, apparent power, and current enables you to determine a device’s average power consumption
- Harmonics (DC-50th order) and Total harmonic distortion (THD) can be measured
- Saving measured data directly to external USB memory
- Measurement values can be saved as images or numerical data, and can be pasted into reports, analyzed in spreadsheet software, or used in a variety of other ways
- Easy setup with cursor keys
- GP-IB, USB and Ethernet communication are available

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760201</td>
<td></td>
<td>WT500 1 input element model</td>
</tr>
<tr>
<td>760202</td>
<td></td>
<td>WT500 2 input elements model</td>
</tr>
<tr>
<td>760203</td>
<td></td>
<td>WT500 3 input elements model</td>
</tr>
</tbody>
</table>

Power cord

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

Options

- C1  GP-IB interface
- C7  Ethernet interface
- EX1 External sensor input for 760201
- EX2 External sensor input for 760202
- EX3 External sensor input for 760203
- HSM Harmonic Measurement
- DT  Delta computation (760202/03 only)
- FQ  Add-on Frequency Measurement (760202/03 only)
- V1  VGA Output

Note: Adding input modules after initial product delivery will require rework at the factory. Please choose your models and configurations carefully, and inquire with your sales representative if you have any questions.
Digital Power Meters

WT210/WT230

Digital Sampling Power Meters with Superior Cost Performance

WT210
For standby low-power measurements and rated-power measurements.
A single-phase model

WT230
For measurement applications from low-frequency equipment to high frequency inverters.
A three-phase model

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: (for crest factor 3)
  Voltage: 15/30/60/150/300/600 V
• Measurement current range: (for crest factor 3)
  Direct input:
  5 m/10 m/20 m/50 m/100 m/200 mA/
  0.5/1.25/5/10/20 A (WT210),
  0.5/1.25/5/10/20 A (WT230)
  External Sensor input (optional):
  2.5/5/10 V or 50/100/200 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 Φ = 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)

Features
• Wiring Types and Model Numbers

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Model number</th>
<th>760401</th>
<th>760502</th>
<th>760503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase 2-wire</td>
<td>-</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Single-phase 3-wire</td>
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<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Three-phase 3 wire (2 voltages, 2 currents)</td>
<td>-</td>
<td>✓</td>
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</tr>
<tr>
<td>Three-phase 3 wire (3 voltages, 3 currents)</td>
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<td>-</td>
<td>✓</td>
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<tr>
<td>Three-phase 4-wire</td>
<td>-</td>
<td>-</td>
<td>✓</td>
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</tbody>
</table>

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model number</th>
<th>Suffix code</th>
<th>Description</th>
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<tbody>
<tr>
<td>760401</td>
<td>-D</td>
<td>WT210 single-input element model</td>
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<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>
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<tr>
<td></td>
<td>-C1</td>
<td>GP-IB communication interface</td>
</tr>
<tr>
<td></td>
<td>-C2</td>
<td>RS-232-C communication interface</td>
</tr>
<tr>
<td></td>
<td>-EX1</td>
<td>External input 2.5/5/10 V</td>
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<td></td>
<td>-EX2</td>
<td>External input 50/100/200 mV</td>
</tr>
<tr>
<td></td>
<td>-HRM</td>
<td>Harmonic measurement function</td>
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<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>

Options
• 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)

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

Model number

<table>
<thead>
<tr>
<th>Model number</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>760502</td>
<td>-C1</td>
<td>WT230 2-input element model</td>
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<tr>
<td>760503</td>
<td>-C2</td>
<td>WT230 3-input element model</td>
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<td>-C1</td>
<td>GP-IB communication interface</td>
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<tr>
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<td>-C2</td>
<td>RS-232-C communication interface</td>
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<tr>
<td></td>
<td>-D</td>
<td>UL/CSA standard</td>
</tr>
<tr>
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<td>-F</td>
<td>VDE standard</td>
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<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>
</tbody>
</table>

Options
• External input 2.5/5/10 V
• External input 50/100/200 mV
• Harmonic measurement function
• 12-channel DA output
• Comparator and D/A, 4 channels each

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

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. 20 Arms) for 253752
  External input:
  100/200/400/1000 mVpk
  (Max. 500mVrms)
• 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)

Overview

• 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

<table>
<thead>
<tr>
<th>Main unit</th>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>253710</td>
<td></td>
<td>PZ4000 Power Analyzer</td>
<td></td>
</tr>
<tr>
<td>Power cord</td>
<td>-D</td>
<td>UL/CSA Standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-F</td>
<td>VDE Standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-R</td>
<td>SAA Standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Q</td>
<td>BS Standard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>IEC Standard</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM1</td>
<td>Memory extension to 1 M word/CH</td>
</tr>
<tr>
<td>AM2</td>
<td>Memory extension to 4 M word/CH</td>
</tr>
<tr>
<td>BS5</td>
<td>Built-in printer</td>
</tr>
<tr>
<td>BC7</td>
<td>BCI interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plug-in modules</th>
<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>
<td></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>
<td></td>
</tr>
<tr>
<td>253771*</td>
<td></td>
<td>Sensor input module Torque / Revolution speed input</td>
<td></td>
</tr>
</tbody>
</table>

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

**Model and suffix codes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>253101</td>
<td>C1, C2</td>
<td>Single phase mode</td>
</tr>
<tr>
<td>253102</td>
<td>C1, C2</td>
<td>3-phase, 3-wire model</td>
</tr>
<tr>
<td>253103</td>
<td>C1, C2</td>
<td>3-phase, 4-wire model</td>
</tr>
</tbody>
</table>

**Supply voltage**

- 1: 100 V AC (50/60 Hz)
- 2: 115 V AC (50/60 Hz)
- 3: 200 V AC (50/60 Hz)
- 4: 230 V AC (50/60 Hz)

**Power cord**

- M: UL/CSA standard (3 or 2 pin)
- I: UL/CSA standard
- P: VDE standard
- R: IEC standard
- J: BS standard
- A: GB standard

**Additional specifications**

- H: Harmonic analysis function
- D/A: D/A output (14 channels)
- F: Fluctuation measurement function

**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-0-600 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-0-600 A
- AC –600 A peak
- Output current: 400 mA (the primary rated current of 600 A is flowing)

**Application Software**

**WTViewer Software**

WTViewer is an application software tool that reads numeric, waveform, and harmonic data measured with the WT3000, WT1600, WT500, WT210 and WT230.

**Software for Standards-Compliant Measurements**

The 761922 Harmonic/Flicker Measurement Software (WT3000/G6 and FL are required) enables users without specialized knowledge to perform a range of operations using the WT3000 including judging the latest standards compliance and outputting test reports. Supported standards are IEC61000-3-2, IEC61000-3-3, IEC61000-3-11, IEC61000-3-12 and JIS C61000-3-2.

**Accessory for Digital Power Meters and Power Analyzer**

**751521/751523**

- **751521** (for single-phase measurements)
- **751523** (for three-phase measurements)

**Current Sensor Units**

- **751521/751523**

  **Use model 751521 for single-phase measurements and model 751523 for three-phase measurements.**
  - **Wide dynamic range**: -600 A-0-600 A (DC), 600 A peak (AC)
  - **Wide bandwidth**: DC-100 kHz
  - **High accuracy**: ±0.05% of reading + 40 μA
  - **Achieves superior noise resistance and CMR characteristics from its optimized rectangular design**
  - **Accuracy assurance and calibration when combined with the WT digital power meters or the PZ power analyzer**
  - **Frequency range**: DC and 2 Hz to 300 kHz (for power, up to 300 kHz)
  - **Basic accuracy (45 Hz ≤ f ≤ 66 Hz)**:
    - **Voltage/current**: ±0.03% of rdg + 0.03% of rng
    - **Effect of power factor (at cos Φ = 0)**:
      - ±0.1% of rng added
    - **External Dimensions**: approx. 426 (W) × 132 (H) × 400 (D) mm
    - **Weight**: Approx. 13 kg (3-element model) Approx. 10 kg (1-element model)

**Wizard Meters**

**WT2010/WT2030**

**For Precision Harmonic Analysis and Voltage Fluctuation/Flicker Measurement**

**WT2010/WT2030 Specifications**

- **Rated values (range, for crest factor 3)**
  - 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**: ±0.03% of rdg + 0.03% of rng
    - **Effect of power factor (at cos Φ = 0)**:
      - ±0.1% of rng added
    - **External Dimensions**: approx. 426 (W) × 132 (H) × 400 (D) mm
    - **Weight**: Approx. 13 kg (3-element model) Approx. 10 kg (1-element model)

**Digital Power Meters**

http://tmi.yokogawa.com/products/digital-power-analyzers/
<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>B9284/4K</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) × 580 (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) × 893 (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 JS 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 JS 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 JS 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 JS connected installation</td>
</tr>
</tbody>
</table>
Basic Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plug &amp; Play</td>
<td>Auto-recognition of units and modules</td>
</tr>
<tr>
<td>Input type</td>
<td>Plug-in module</td>
</tr>
<tr>
<td></td>
<td>(A/D converters built in to each unit)</td>
</tr>
<tr>
<td>Maximum number of input channels:</td>
<td>16 (One unit operation)</td>
</tr>
<tr>
<td></td>
<td>128 (8 units synchronous operation)</td>
</tr>
<tr>
<td>Maximum sample rate</td>
<td>100 MS/s on all channels</td>
</tr>
<tr>
<td>Measuring mode</td>
<td>Free Run and Triggered</td>
</tr>
<tr>
<td>Clock source</td>
<td>Internal and external</td>
</tr>
<tr>
<td>Maximum record length (internal memory):</td>
<td>32 MW/ch for 1 module</td>
</tr>
<tr>
<td></td>
<td>16 MW/ch for 2 modules</td>
</tr>
<tr>
<td></td>
<td>8 MW/ch for 3 to 4 modules</td>
</tr>
<tr>
<td></td>
<td>4 MW/ch for 5 to 8 modules</td>
</tr>
<tr>
<td>Measuring groups</td>
<td>Up to 4 groups definable with independent sample rates</td>
</tr>
<tr>
<td>Trigger mode</td>
<td>Normal, Single, and Single(N)</td>
</tr>
<tr>
<td>Trigger source</td>
<td>Input channel, External, LINE, Time</td>
</tr>
<tr>
<td>Record conditions</td>
<td>For Free Run mode: Immediate, abs. time, time divided, alarm, and external trigger</td>
</tr>
<tr>
<td></td>
<td>For Trigger mode: Each trigger</td>
</tr>
<tr>
<td>Internal hard disk</td>
<td>40 GB (with the /HD1 option)</td>
</tr>
<tr>
<td>Maximum real-time hard disk recording speed:</td>
<td>1.6 MS/s</td>
</tr>
<tr>
<td></td>
<td>(= 200\text{ks/s} \times 8\text{ch} = 100 \text{ks/s} \times 16\text{ch})</td>
</tr>
</tbody>
</table>

Features

- **Fast Acquisition**
  - Up to 100 MS/s on all channels (10 ns sampling interval)
  - Supports parallel testing: Perform measurements with up to four simultaneously independent sample rates

- **Fast Transfer and Storage**
  - Stream data to PC via high speed USB 2.0 or 1000BASE-T Gigabit Ethernet
  - Stream data to a PC hard disk or the SL1000's internal hard disk in real time (at speeds of 1.6 MS/s = 100 kS/s \times 16\text{ch})
  - Maximum 8 synchronized units

  1: Speed depends on PC performance and measuring conditions.

- **Easy to use**
  - Easy to use Standard Acquisition Software

- **Can operate “Standalone”**
  - Store data directly on the SL1000 without PC

- **Wide Library of Plug-In Modules**
  - Eight module slots are available in each unit
  - Select now from twelve different plug-in modules

Signal and Data flow

You can synchronize the operation of up to eight SL1000s.
Real time HDD recording for the long term measuring and the triggered mode for the high-speed measuring

Continuously measured data can be saved in real time to the SL1000’s internal hard disk.

High-speed and long time measuring is available.

Maximum sampling rate at real time recording to the SL1000 Hard Disk

<table>
<thead>
<tr>
<th>Number of Channels</th>
<th>Maximum sampling rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 MS/s</td>
</tr>
<tr>
<td>2</td>
<td>500 kS/s</td>
</tr>
<tr>
<td>4</td>
<td>200 kS/s</td>
</tr>
<tr>
<td>8</td>
<td>200 kS/s</td>
</tr>
<tr>
<td>10</td>
<td>100 kS/s</td>
</tr>
<tr>
<td>16</td>
<td>100 kS/s</td>
</tr>
</tbody>
</table>

Maximum measuring time (unit: sec) at Single triggered measurement

<table>
<thead>
<tr>
<th>Number of Measuring Channels</th>
<th>2ch</th>
<th>4ch</th>
<th>8ch</th>
<th>16ch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 MS/s</td>
<td>0.5</td>
<td>0.25</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>50 MS/s</td>
<td>1</td>
<td>0.5</td>
<td>0.2</td>
<td>0.1</td>
</tr>
<tr>
<td>10 MS/s</td>
<td>2.5</td>
<td>1.25</td>
<td>0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>1 MS/s</td>
<td>25</td>
<td>12.5</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>500 kS/s</td>
<td>100</td>
<td>50</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>200 kS/s</td>
<td>250</td>
<td>125</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>1 kS/s</td>
<td>5000</td>
<td>2500</td>
<td>1000</td>
<td>5000</td>
</tr>
</tbody>
</table>

High-speed 100 MS/s 12-Bit Isolation Module (720210) Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>2ch</th>
<th>4ch</th>
<th>8ch</th>
<th>16ch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input channels</td>
<td>AC, DC, GND</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum sample rate</td>
<td>100 MS/s</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency range</td>
<td>12-bit (1.500 LSB/range)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC-20 MHz</td>
<td>1000 V (DC + AC peak)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input impedance</td>
<td>1 MΩ ±1% , approximately 35 pF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser safety standards</td>
<td>class 1 (IEC 60825-1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

File Utility
The file utility allows you to process waveform data files that have been recorded using the SL1000.
- Merging files
- Dividing files
- Converting waveform data files to CSV files

Xviewer Waveform viewer
Offline waveform display and computation
- Real time full-length display
- Setting Info. Or Numeric values
- Operating information: File information, Record state, Remaining Hard Disk indicator, etc.

Recording conditions
- Recording destination: PC HDD, HDD of the SL100 or both
- Start condition: Trigger, Immediate, Specified time, Alarm
- Stop condition: Manually, Specified time, Recording time, Alarm, External trigger

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model/Options</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>720210</td>
<td>-D</td>
<td>UL and 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>-G</td>
<td>GS standard</td>
</tr>
<tr>
<td></td>
<td>-H</td>
<td>GB standard (Complied with CCC)</td>
</tr>
<tr>
<td>701250</td>
<td>/HD1</td>
<td>Internal 4 GB HDD</td>
</tr>
<tr>
<td>701251</td>
<td>/TC10</td>
<td>Ethernet interface</td>
</tr>
<tr>
<td>701255</td>
<td>/P4</td>
<td>Probe power (4-output)</td>
</tr>
<tr>
<td>701260</td>
<td>/XV0</td>
<td>Without Xviewer</td>
</tr>
<tr>
<td>701271</td>
<td>/XV1</td>
<td>With the Xviewer Math Edition (1 license)</td>
</tr>
</tbody>
</table>

Module Selection

High-speed 100 MS/s 12-Bit Isolation Module

- Input channels: 2
- Input coupling: AC, DC, GND
- Maximum sample rate: 100 MS/s
- Frequency range (±3 dB): 12-bit (1.500 LSB/range)
- DC-20 MHz: 1000 V (DC + AC peak)
- Input impedance: 1 MΩ ±1%, approximately 35 pF
- Laser safety standards: Class 1 (IEC 60825-1)

- Input filter: Isolated type BNC connector
- Connector type: GFF/2 (N)-type
- DC accuracy: ±0.5% of range

* Above plug-in modules can be used among all ScopeCorder series.
Overview

- **Simple data acquisition without any software development**
  Each WE7000 system includes the standard control software and each module has its firmware resident within the module.
- **Isolation and noise immunity**
  Isolation and noise immunity are very important for mechanical electronics. WE7000 has great isolation from the base station to the input modules as well as channel to channel (depending on the module) isolation.
- **Various precision modules with traceability**
  WE7000 has various modules from 2 Hz to 20 MS/sec digitizing rates. There are also modules with signal output capability, including a precision D/A and a function generator.
- **Remote control and monitoring using Ethernet Communication**
  WE7000 control, monitoring, and real time saving of data are all available using Ethernet communication.

Specifications

- **Number of slots**: WE500: 5 measurement modules  
  WE900: 9 measurement modules
- **Interface for communicating with the PC**: USB (Complies with USB Rev. 2.0), Ethernet (10Base-T or 100Base-T)
- **External dimensions**: WE500:  
  Approx. 213 (W) × 266 (H) × 360 (D) mm (projections excluded)  
  WE900:  
  Approx. 350 (W) × 266 (H) × 360 (D) mm (projections excluded)

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 Instrument USB2.0
- Simply connect a USB cable and communication is ready
- 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
- 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

<table>
<thead>
<tr>
<th>Product</th>
<th>Model Number</th>
<th>Endblock 1</th>
<th>Endblock 2</th>
<th>Input Operation</th>
<th>Input Signal</th>
<th>Resolution</th>
<th>Memory</th>
<th>DS Connected</th>
<th>Memory Expansion</th>
<th>Current</th>
<th>Small Power</th>
<th>D/A Conversion</th>
<th>Other Features</th>
<th>Power Consumption</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE7000 Analyzer Module</td>
<td>WE500</td>
<td>2</td>
<td>No</td>
<td>DCCAN-16</td>
<td>no to 50 V (0-5 V)</td>
<td>12, 14 M</td>
<td>16, 24 M</td>
<td>Yes</td>
<td>20 Hz to 40 kHz (2-4-8 steps)</td>
<td>Yes</td>
<td>Approx. 15 VA</td>
<td>Approx. 0.8 kg</td>
<td>90 × 138 × 236 (H × W × D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WE7000 Analyzer Module</td>
<td>WE900</td>
<td>2</td>
<td>No</td>
<td>DCCAN-16</td>
<td>no to 50 V (0-5 V)</td>
<td>12, 14 M</td>
<td>16, 24 M</td>
<td>Yes</td>
<td>20 Hz to 40 kHz (2-4-8 steps)</td>
<td>Yes</td>
<td>Approx. 15 VA</td>
<td>Approx. 0.8 kg</td>
<td>90 × 138 × 236 (H × W × D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WE7000 Analyzer Module</td>
<td>WE7000</td>
<td>2</td>
<td>No</td>
<td>DCCAN-16</td>
<td>no to 50 V (0-5 V)</td>
<td>12, 14 M</td>
<td>16, 24 M</td>
<td>Yes</td>
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<td>90 × 138 × 236 (H × W × D)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PC-Based Measuring Instruments

Modular Type Measuring Instruments for Easy Operation

only on sale in the United States, the United Kingdom, Germany, France, the Netherlands, Spain, Italy, South Korea, Australia, and Japan.
7077 02/7077 03/7077 14/7077 51/7077 61

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 functions to the Control Software</td>
</tr>
<tr>
<td></td>
<td>Remote Monitor Add-On Software</td>
<td>707703</td>
<td>Adds remote monitor function to the Control Software</td>
</tr>
<tr>
<td>Package software</td>
<td>Computation Waveform Viewer</td>
<td>707714</td>
<td>Waveform Viewer for the WE7000, DL, etc.</td>
</tr>
<tr>
<td></td>
<td>Arbitrary Waveform Editor</td>
<td>707751</td>
<td>Arbitrary waveform data editor for the WE7121 and WE7281/82</td>
</tr>
<tr>
<td></td>
<td>Engine Combustion Pressure Analysis Package</td>
<td>707781</td>
<td>Offline combustion pressure analysis for the WE7275</td>
</tr>
</tbody>
</table>

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>
</tr>
<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>
</tr>
<tr>
<td>Add-On Tool for WE API Vol. 2</td>
<td>707743</td>
<td>ActiveX controls for Visual Basic (for display)</td>
</tr>
<tr>
<td>Control Tool Kit for LabVIEW</td>
<td>707746</td>
<td>Toolkit for LabVIEW</td>
</tr>
<tr>
<td>Control Tool Kit for MATLAB</td>
<td>707747</td>
<td>Toolkit for MATLAB</td>
</tr>
</tbody>
</table>
Redefining Optical Spectrum Measurement Excellence

**Features**

- **World Class Optical Performance & Flexibility**
  - High wavelength resolution: 0.02 nm
  - Close-in dynamic range: 70 dB at peak ±0.1 nm
- **Improved Measurement Throughput**
  - Fast measurement and fast data transfer
- **Enhanced User Friendliness**
  - USB for mouse, keyboard, and external storage devices
  - Bright 10.4” LCD
  - Various built-in analysis functions
- **Expedited Development of Automated Test Systems**
  - Supports GP-IB, RS-232C, and Ethernet interfaces
  - Compatible with SCPI and supports AQ6317 series remote commands
  - Built-in simple macro programming function
- **Includes Wavelength Calibration Source**
  - AQ6370 Viewer: Emulation/Remote control software (Optional)

**World-class optical performance**

*Close-in Dynamic Range*
70 dB at peak ±0.4 nm, resolution setting 0.02 nm (typical)

*DWDM signal measurement*
DWDM channels allocated at 50GHz spacing can be measured and analyzed.

**Improved Measurement Throughput**

- **Measurement speed**
  - 10x
- **Key & Command response**
  - 100x
- **Data transfer speed**
  - 100x

(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

**Basic Specifications**

- **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: 0.05 nm or wider, sensitivity: HIGH)
- **Maximum input power**: ±20 dBm (Per channel, full span)
- **Close-in dynamic range (at 1522 nm)**:
  - 37 dB (±0.1 nm from peak, resolution: 0.02 nm)
  - 55 dB (±0.2 nm from peak, resolution: 0.02 nm)
  - 45 dB (±0.2 nm from peak, resolution: 0.05 nm)
  - 62 dB (±0.4 nm from peak, resolution: 0.05 nm)
  - 40 dB (±0.2 nm from peak, resolution: 0.1 nm)
  - 57 dB (±0.4 nm from peak, resolution: 0.1 nm)
- **Wavelength accuracy**: ±0.02 nm (1520 to 1580 nm), ±0.05 nm (Full range)
- **Wavelength resolution setting**: 0.02 to 2.0 nm
- **Measurement data point**: 101 to 50001
- **Level sensitivity**: -90 dBm (1300 to 1620 nm, resolution: 0.05 nm or wider, sensitivity: HIGH)

**Model Number and Suffix Codes**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>735302</td>
<td>D</td>
<td>Power cord (UL3P)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Power cord (CEE-C7)</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>Power cord (SAA-3P)</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>Power cord (BS3P Round)</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td>Power cord (BS3P Rectangular)</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>Power cord (SAA-3P)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factory Installed Options</td>
</tr>
<tr>
<td>F</td>
<td>FC</td>
<td>AQ9447(FD) Connector adapter for optical input</td>
</tr>
<tr>
<td>S</td>
<td>SC</td>
<td>AQ9447(SC) Connector adapter for optical input</td>
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<tr>
<td>ST</td>
<td>ST</td>
<td>AQ9447(ST) Connector adapter for optical input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Options</td>
</tr>
<tr>
<td>R</td>
<td>FC</td>
<td>AQ9441(FC) Universal adapter for calibration input</td>
</tr>
<tr>
<td>S</td>
<td>SC</td>
<td>AQ9441(SC) Universal adapter for calibration input</td>
</tr>
<tr>
<td>ST</td>
<td>ST</td>
<td>AQ9441(ST) Universal adapter for calibration input</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Built-in thermal printer</td>
</tr>
</tbody>
</table>

**AQ6370 Viewer Emulation/Remote Control Software (Optional)**

Note: AQ6370 Viewer contains AQ6370 Viewer, AQ6370B Viewer, and AQ6375 Viewer.

The AQ6370B Viewer is a PC application software that has the same user interface and functions as the AQ6370B so that you can easily display and analyze waveform data acquired by the AQ6370B.

- **Viewer function**
  - Trace data files saved on the AQ6370B can be retrieved and analyzed on a PC.
- **Remote Control function**
  - The remote control allows you to set measurement conditions and to execute a measurement on AQ6370B Optical Spectrum Analyzer from anywhere on the Ethernet network.
- **File Transfer function**
  - Files can be exchanged between AQ6370B and PC.
Optical Measuring Instruments
http://tmi.yokogawa.com/products/optical-measuring-instruments/

Long Wavelength OSA 1200 - 2400nm

Features

- **Unparalleled Performance**
  - Long wavelength: 1200 - 2400nm
  - High sensitivity: +20 to -70dBm
  - High resolution & wide dynamic range

- **Greater Efficiency**
  - Fast command processing and data transfer
  - Support Multimode Fiber
  - Free-space optical input
  - Intuitive Easy Operation
  - Mouse & keyboard operation
  - Trace zoom function
  - Easy Calibration
  - Built-in calibrator
  - AQ6375 Viewer: Emulation/Remote control software (Optional)

Basic Specifications

- Measurement wavelength range: 1200 to 2400 nm
- Wavelength accuracy: ±0.05 nm (1520 to 1580 nm), ±0.1 nm (1580 to 1620 nm), ±0.5 nm (Full range)
- Measurement data point: 101 to 50001
- Wavelength resolution setting: 0.05 to 2.0 nm
- Level sensitivity:
  - -70 dBm (1800 to 2200 nm, resolution: 0.1nm or wider, sensitivity: HIGH)
  - Maximum input power: +20 dBm (Per channel, full span)
- Close-in dynamic range (at 1523nm):
  - 45 dB (±0.4 nm from peak, resolution: 0.05 nm)
  - 55 dB (±0.8 nm from peak, resolution: 0.05 nm)
- Applicable fiber: SM (9.5/125 µm), GI (50/125 µm, 62.5/125 µm)
- Data storage: Internal memory and external (USB storage)
- Printer: Built-in high-speed thermal printer (Factory option)
- Display: 10.4-inch color LCD (Resolution: 800x600)
- Power requirement: 100 to 240 V AC, 50/60Hz, approx. 150VA
- Dimensions and mass: Approx. 426 (W) x 1100 (H) x 459 (D) mm, Approx. 27kg (without printer option)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Suffix Codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>735306</td>
<td>U</td>
<td>Power cable</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Power cord (UL3P)</td>
</tr>
<tr>
<td></td>
<td>R</td>
<td>Power cord (CEE-CT)</td>
</tr>
<tr>
<td></td>
<td>Q</td>
<td>Power cord (BS3P Rectangular)</td>
</tr>
<tr>
<td></td>
<td>H</td>
<td>Power cord (BS3P Round)</td>
</tr>
</tbody>
</table>

Factory Installed Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>AQ9447(FC) Connector adapter for optical input</td>
</tr>
<tr>
<td>SC</td>
<td>AQ9447(SC) Connector adapter for optical input</td>
</tr>
<tr>
<td>ST</td>
<td>AQ9447(ST) Connector adapter for optical input</td>
</tr>
<tr>
<td>RFC</td>
<td>AQ9441(FC) Universal adapter for calibration output</td>
</tr>
<tr>
<td>RSC</td>
<td>AQ9441(SC) Universal adapter for calibration output</td>
</tr>
<tr>
<td>RST</td>
<td>AQ9441(ST) Universal adapter for calibration output</td>
</tr>
<tr>
<td>BS</td>
<td>Built-in thermal printer</td>
</tr>
</tbody>
</table>

Unparalleled Optical Performance

- **High sensitivity in long wavelength**
- **Measurement Example**

AQ6370 Viewer Emulation/Remote Control Software (Optional)

Note. AQ6370 Viewer contains AQ6370 Viewer, AQ6370B Viewer, and AQ6375 Viewer.

The AQ6375 Viewer is a PC application software that has the same user interface and functions as the AQ6375 so that you can easily display and analyze waveform data acquired by the AQ6375.

- **Viewer function**
  - Trace data files saved on the AQ6375 can be retrieved and analyzed on a PC.
- **Remote Control function**
  - The remote control allows you to set measurement conditions and to execute a measurement on AQ6375 Optical Spectrum Analyzer from anywhere on the Ethernet network.
- **File Transfer function**
  - Files can be exchanged between AQ6375 and PC.
**Features**

**Best optical performance**
- High wavelength accuracy: ±0.1 nm
- 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**

<table>
<thead>
<tr>
<th>Applicable fiber</th>
<th>SM (9.5/125 µm), GI (50/125 µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement wavelength range</td>
<td>600 to 1700 nm</td>
</tr>
<tr>
<td>Span</td>
<td>0.1 nm to full range and zero span</td>
</tr>
<tr>
<td>Wavelength repeatability</td>
<td>±2.0 pm (1 nm, or less, 1450 to 1620 nm)</td>
</tr>
<tr>
<td>Number of samplings</td>
<td>101 to 50001</td>
</tr>
<tr>
<td>Resolution bandwidth</td>
<td>0.01, 0.02, 0.05, 0.1, 0.2, 0.5 and 1 nm</td>
</tr>
<tr>
<td>Resolution accuracy</td>
<td>±2% (RES.: 0.1 nm or wider, 1460 to 1620 nm) ±2.5% (RES.: 0.05 nm, 1450 to 1620 nm) ±5% (RES.: 0.02 nm, 1450 to 1535 nm)</td>
</tr>
<tr>
<td>Level linearity</td>
<td>±0.05 dB (±50 pm from peak at 1523 nm, RES.: 0.01 nm)</td>
</tr>
<tr>
<td>Close-in dynamic range</td>
<td>±60 dB (±200 pm from peak at 1523 nm, RES.: 0.01 nm)</td>
</tr>
<tr>
<td>Interface</td>
<td>D; IEEE488.2 full support</td>
</tr>
<tr>
<td>Remote control</td>
<td>AQ6317 Series compliant commands (IEEE488.1), IEEE488.2 full support</td>
</tr>
<tr>
<td>Others</td>
<td>GPIB × 2, RS232C, Printer port, External SVGA, PS/2 × 2, LAN</td>
</tr>
<tr>
<td>Power requirement</td>
<td>100 to 240 (±10%) V, 50/60 Hz, approx. 460 VA</td>
</tr>
<tr>
<td>Dimensions and mass</td>
<td>Approx. 435 (W) × 222 (H) × 500 (D) mm, 33 kg</td>
</tr>
</tbody>
</table>

**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 9/125µm SMF defined on EC30720-2 Mode field diameter: 9.5 um, NA: 0.104 to 0.107, polarized, attenuation off, vertical scale: absolute power display mode
7) Sensitivity setting is HIGH3 and chop mode on
8) Depending on measurement settings and input light condition.

**Ordering Information**

**Model**

| 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) |
| 5.315 A (AC 200 V to AC 240 V) |
| Parts No.: 955-9990000720 | model name: TF50KS – E2 |

**Accessories**

**Print paper (Roll type)**

Parts No.: 955-9990000720 (model name: TF50KS – E2)
Monitoring the strain distribution along buildings and constructions

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.

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.

High speed monitoring of temperature, strain, and pressure.

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.
Superior cost performance, easy to operate
Makes your work more efficient

Specifications

- Display: 8.4 inch color TFT (640 x 480 pixels)
- 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 sampling: 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
- External dimensions: 287 (W) x 197 (H) x 85 (D) mm (not including projections or options)
- Weight: Approx. 2.8 kg (not including options)

Features

Meets a broad range of measurement needs from FTTH to metro, core networks.
- Short dead zone (0.8 m)
- Quick Startup within 10 Seconds
- Wide range of models available supporting FTTH to core networks
- High performance & easy to use OTDR
- Built-in dummy fiber option for near-end measurement
- Bright & high contrast 8.4 inch LCD screen

Event Dead Zone 0.8 m
The AQ7275’s short event dead zone enables detection of closely spaced events in cables installed in offices and customer premises.

High Dynamic Range up to 45 dB
The high dynamic range model (735034) can achieve the dynamic range of 45 dB. This high dynamic range is effective in measuring a transmission line consisting of SM (ITU-T G.652)

Quick Startup within 10 Seconds
Now measurements can be started quickly upon arrival at the site. 10 seconds to power-up from completely OFF to fully ON!
With such a fast power-up time, battery life can be extended by turning the power off while not in use at the job site without any concern about the power-up time when the next job is ready. It’s ready when you’re ready!

Model 735031 735032 735033 735034 735035
Wavelength 1650 ±5nm, ±10nm 1310/1550 ±25nm 1310/1550 ±25nm 1310/1550 ±25nm 1310/1490/1550 ±25nm
Applicable fiber SM (ITU-T G.652) 500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km, 200km, 300km, 400km
Pulse width 3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1µs, 2 µs, 5µs, 10µs, 20µs
Dynamic range 30dB 34/32dB 40/38dB 43/41dB, 45/43 dB (typ.) 34/30/32dB
Event dead zone 0.8m 0.8m 0.8m 0.8m 0.8m
Attenuation dead zone 12m (typ.) 7/8m (typ.) 7/8m (typ.) 7/8m (typ.) 7/8m (typ.)

Model 735036 735037 735038 735041
Wavelength 1310/1550 ±25nm 1625 ±25nm 1310/1550 ±25nm 1310/1550 ±25nm 850±1300 ±30nm
Applicable fiber SM (ITU-T G.652) GI (62.5/125 µm, 50/125 µm) 500m, 1km, 2km, 5km, 10km, 20km, 50km, 100km
Pulse width 3ns, 10ns, 20ns, 50ns, 100ns, 200ns, 500ns, 1µs, 2µs, 5µs, 10µs, 20µs
Dynamic range 40/38/33dB 40/38/30dB 40/38/36dB 40/38dB 21.5/23/23dB (50/125 µm)
Event dead zone 0.8m 0.8m 0.8m 0.8m 1m
Attenuation dead zone 7/8/12m (typ.) 7/8/12m (typ.) 7/8/12m (typ.) 7/8m (typ.) 6/10m

Note. Specifications may be under specific conditions and are subject to change without notice. Please refer to AQ7275 product catalog for details.
Full Auto Measurement Mode
Multi Wavelength Measurement Mode
Batch measurement with Predefined Procedure – One Button Mode

Measurement Wizard – Assistance setting up measurements
Built-in Dummy Fiber
You can use the dummy fiber to effectively detect abnormal near-end connection loss.
* The dummy fiber option cannot be used for the 735041.
* The built-in dummy fiber is not attachable and removable.

USB Function
The AQ7275 has two USB 1.1 compliant connector ports as standard (Type A and Type B).
Type A port is for USB memory and USB hard disk drive for storage. Type B port is for connecting external PC. AQ7275 can be remotely controlled from external PC, and the internal memory of AQ7275 can be accessed from external PC directly.

Factory Installed Options

Stabilized Light Source Function (/SLS option)
Optical connector: Ported with the OTDR (at the same port)
Center wavelength: 1280 nm ~ 1320 nm
Light output level: -5 dBm at or more (at 23°C)
Output level stability: ±0.2 dBm (5 mm temperature)
Modulation frequency: 50 Hz
Laser safety standard: Class 3R
*Unavailable for the 735031 (MMF)

Visible Light Source (/VLS option)
Optical connector: Port is not shared with the OTDR
Center wavelength: 650 nm ±2 nm
Light output level: Peak value -3 dBm or more
Modulation frequency: 2.7 Hz
Laser safety standard: Class 3R
*Unavailable for the 735036, 735037 and 735041

Power Monitor Function (/PMM option)
Optical connector: Ported with the OTDR (at the same port)
Measurement wavelength: 1310, 1490, 1550, 1625, 1650 nm
Measurement range: *1 -5 to 5 dBm
Measurement accuracy: *2 ±0.5 dBm
*1 CW light, absolute maximum input level 0 dBm (1 mW)
*2 CW light, wavelength 1310 nm, -10 dBm for input, 23°C ±2°C
*Unavailable for the 735031 and 735041 (MMF)

Built-in Printer/LAN Function (/PL option)
Printing method: Thermal line-dot
Dot density: 576 dots/inch
Paper width: 80 mm
Operating environment: Temperature 0 to 40°C
Humidity 10 to 80% RH (no condensation)
Storage temperature: -20 to 60°C
LAN function: 10BASE-T/100BASE-TX (RJ-45) x 1

Dummy Fiber (/DF option)
Optical fiber: SM (ITU-T G.652)
Optical fiber length: Approx. 100 m
* Dynamic range declines by 0.5 dB

General Specifications
Operating environment: Temperature 0 to 45°C (0 to 35°C when charging the battery)
Humidity 85% RH or less (no condensation)
Storage temperature: -20 to 60°C
Battery: Operation time 6 hours (18 hours with external large capacity battery)
Recharge time 5 hours
Rated power voltage: 100 to 240 VAC
Rated supply frequency: 50 to 60 Hz
Power consumption: Max 70 W (when charging battery and printing with optional printer)
Dimensions: (W) 287 x (H) 197 x (D) 85 mm (excluding projections or options)
Weight: Approx. 2.8 kg (excluding options)
Safety standard: EN61010-1
Emission: EN61326-1 Class A
Immunity: EN61010-2 Table 2
* Measurement for 30 seconds in every 10 minutes without any options and in power save mode (Auto Power OFF 1 minute)
*2: Ambient temperature 23°C, power OFF

Models and suffix codes

AQ7275 OTDR
Option availability
Model: Optical power monitor /SLS Stabilized light source /Visible light source /Printer /LAN /Dummy fiber Shoulder belt
Remarks
735011 - - - - - 1-port, SM1310/1550 nm, filter
735012 - - - - - 1-port, SM1310/1550 nm, high DR
735031 - - - - - 1-port, SM1310/1550 nm, high DR
735032 - - - - - 1-port, SM1310/1550/1625 nm, filter
735033 - - - - - 1-port, SM1310/1550/1625 nm, high DR
735034 - - - - - 1-port, SM1310/1550/1625 nm, filter
735035 - - - - - 1-port, SM1310/1550/1625 nm, filter
735036 - - - - - 1-port, SM1310/1550/1625 nm, filter
735037 - - - - - 1-port, SM1310/1550/1625 nm, filter
735038 - - - - - 1-port, SM1310/1550/1625 nm, filter
735041 - - - - - 1-port, SM1310/1550 nm, filter

*1: MMF is not supported.
*2: Available.

SUFFIX CODES

Optical Connector

Description
-SC SC Type connector
-FC FC Type connector
-NUN No universal adapter
-USC Universal adapter (SC)
-UPC Universal adapter (PC)
-ROG Angled PC connector (ROG) *

Language

Description
-HE English
-HC Chinese/English
-HK Korean/English
-HR Hungarian/English

Power Cord

Description
- T UL/CSA standard
- V VDE standard
- R As standard
- G BS/Singapore standard
- U UL/CSA standard COMPATIBLE WITH CCC
- E Korean standard

Options

Description
-PM Optical power monitor
-SLS Stabilized light source
-VLS Visible light source
-PL Built-in printer/LAN
-DF Dummy fiber (SMF)

Application Software

Model
735070 AQS732 Emulation Software (Ver 3.0 or later)

SUFFIX CODES

Description
-EN English

Standard Accessories

Power cord, AC adapter, battery pack, hand belt, user's manual (CD-ROM), operation guide
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

**Features**

- **Passive component test applications**
  - TLS-OSA Sync Sweep
  - TLS-OPM Sync Sweep

- **10Gbit/s BERT applications**
  - Optical splitter measurement system for PON
  - Optical return loss and insertion loss measurement
  - Wide variety of plug-in modules
  - Hot-swappable modules

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**AQ2200 series modules**

**AQ2200 Frame Controller**

**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, 1310nm, 1490nm, 1-slot)
  - AQ2200-136 TLS module (1440-1640nm, SMF, 2-slot)
  - AQ2200-141 FP-LD module (1310nm, 1550nm, 1-slot)
  - AQ2200-142 DUAL FP-LD module (1310/1550nm, 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)
  - AQ2200-241 Optical sensor head (Large diameter, 800-1700nm)
  - AQ2200-241 Optical sensor head (Large diameter, 400-1100nm)
- **Optical Return Loss module**
  - AQ2200-271 ORL module (SMF)
- **Optical attenuator modules**
  - AQ2200-311A 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

**Applications**

- **Passive component test applications**
  - TLS-OSA Sync Sweep
  - TLS-OPM Sync Sweep

- **10Gbit/s BERT applications**
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  - 10 Gbit/s transceiver measurement system
  - DUT
  - AQ2202 Frame Controller

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**10 Gbit/s transceiver measurement system**

**Optical return loss and insertion loss measurement**

**Wide variety of plug-in modules**

**Hot-swappable modules**

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  - 10 Gbit/s transceiver measurement system
  - DUT
  - AQ2202 Frame Controller
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 back-lighting, and safe transport using the neck strap.

The AQ2160-02 is a full-featured handheld optical power meter 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.

The AQ2470-01 is a rugged double handheld LD light source that is operable in the temperature from 0°C to 50°C and conforms the waterproofing standard IP65. The AQ2470-01 can output two wavelengths (1510/1550 nm), and is easy to maintain due to a user cleanable input connector.

**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 (+3 dBm) to 100 mW (+20 dBm)
- Max. light receiving level: +20 dBm (100 mW)
- Max. power density: 5 mW/mm²

**3298F Specifications**

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

- Luminance measurement range: 0.01 to 40,000 cd/m²
- Luminance measurement range settings: -40 to 0/4000/40,000 cd/m²
- Luminance measurement precision: ±0.005% 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
- Correlated color temperatures (Tc, du, Lc)

**Multimedia Display Tester 3298F**

- External dimensions: Approx. 107 (W) × 40 (D) mm; tester dimensions: Approx. 107 (W) × 176 (H) × 55 (D) mm
- Weight: Approx. 1 kg
- Power supply: Four AA batteries or optional AC adapter

**Light Measurement Data Management Software 329831**

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 test 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.

**System Specifications**

- PC: PC with a Pentium 133 MHz or faster and at least 32 MB RAM, running Windows98/NT2000: The PC should have a serial port conforming to the RS-232 standard. Screen: 640 × 480 resolution, 256 or more colors (65,000 or more colors recommended).
- Multimedia display tester: 3298F (model: 329802) RGM Version 1.0.0 or later 3298 (model: 329811) RGM Version 1.0.5 or later

http://tmi.yokogawa.com/products/optical-measuring-instruments/
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)

### Source and Measurement Range

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.

### Functions

**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 3600 s)
- Source delay: 15 µs to 3600 s
- Response characteristics: Normal or stable

**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 3600 s)
- Measure delay: 0 µs to 3600 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], l [logic OR], & [logic AND], ! [negation], < <= > >= == != [comparison], = [substitution]
- Functions: ABS() [absolute value], SQRT() [square root], LN(), LOG() [logarithm], SIN(), COS(), TAN() [trigonometric functions], ASIN(), ACOS(), ATAN() [inverse 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]
- Conditional statement: IF-THEN-ELSE

### Communication Interface

**GPIB**
- Electrical and mechanical specifications: Conforms to IEEE Std 488-1987
- Functional specifications: SH1, AH1, T6, L4, RL1, PP0, DC1, DT1, CD
- Protocol: Conforms to IEEE Std 488.2-1987
- Address: 0 to 30
- RS232
- 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: 100BASE-TX/10BASE-T
- Data rate: 100 Mbps or 10 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>
</tr>
</thead>
<tbody>
<tr>
<td>765601</td>
<td>GS820</td>
<td>Multi Channel Source Measure Unit Standard Model</td>
</tr>
<tr>
<td>765602</td>
<td>GS820</td>
<td>Multi Channel Source Measure Unit Digital I/O Included Model</td>
</tr>
<tr>
<td>Q</td>
<td>UL/CSA standard</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>VDE standard</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>AS standard</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>BS standard</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>GB standard</td>
<td></td>
</tr>
</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)

### Voltage/Current Source 7651

#### Programmable DC Source with Sink and Source Function

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage:</td>
<td>10 mV to 30 V, 5 ranges</td>
</tr>
<tr>
<td>Output current:</td>
<td>1 mA to 100 mA, 3 ranges</td>
</tr>
<tr>
<td>Maximum output voltage:</td>
<td>±32 V</td>
</tr>
<tr>
<td>Response time:</td>
<td>10 ms or less</td>
</tr>
<tr>
<td>Communication function:</td>
<td>GPIB</td>
</tr>
<tr>
<td>Program function:</td>
<td>up to 50 steps</td>
</tr>
<tr>
<td>Seven patterns can be stored with an IC memory card</td>
<td></td>
</tr>
<tr>
<td>Setting of interval/sweep time</td>
<td></td>
</tr>
<tr>
<td>Compact and high accuracy</td>
<td></td>
</tr>
<tr>
<td>Power consumption:</td>
<td>about 30 VA</td>
</tr>
<tr>
<td>External dimensions:</td>
<td>213 (W) x 88 (H) x 350 (D) mm</td>
</tr>
<tr>
<td>Weight:</td>
<td>3.6 kg</td>
</tr>
<tr>
<td>Other features</td>
<td></td>
</tr>
<tr>
<td>External trigger function</td>
<td></td>
</tr>
<tr>
<td>Software calibration function</td>
<td></td>
</tr>
<tr>
<td>Programmable voltage/current limiter function</td>
<td></td>
</tr>
<tr>
<td>No glitch design at polarity reversal</td>
<td></td>
</tr>
</tbody>
</table>

#### 7651 Specifications

- High accuracy: ±0.01% of setting (voltage)
- ±0.02% of setting (current)
- High resolution: 100 nV, 10 mA
- 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 µVp-p (1 V range, DC to 10 Hz)
- Applicable to electronic loads owing to sink action

*About CA series Handy Calibrators, please refer to the page 68 to 69.
This product is a high-speed, high-accuracy real-time V-I curve tracer that consists of the GS series Source Measure Unit and the 765670 Curve Tracer Software. It is particularly well-suited to DC parametric tests of minute signals.

**Features**

- Simple system configuration, easy connection, compact, and light
- Real-time, High-Speed Drawing
- Field of Applications
  - Discrete semiconductors such as transistors and diodes
  - Analog ICs such as voltage regulators and op-amps
  - MOS logic and other digital ICs
  - LEDs and other optical devices
  - Solar battery cells

**Synthesized Function Generators**

**FG210, FG220, FG310, FG320**

- Generating frequencies: 1 µHz to 20 kHz (sine and square waves)
- Independent 2 channels (FG220/FG320)
- Multiple sweep functions and modulation functions
- Intuitive operation with large LCD panel and touch screen

**FG200/FG300 Specifications**

- Number of signal outputs: 1 (FG200) or 2 (FG300)
- Output waveforms: sine waves and square waves (50% duty ratio)
- Frequency resolution: 1 µHz
- Sweep range: 1 µHz to 10 MHz
- Triangular and pulse waves: 1 µHz to 200 kHz
- Sweep types: linear, log, triangle, ramp, gate, and arbitrary shapes
- Sweep parameters: frequency, amplitude, offset phase, duty ratio, and modulation type
- Measurement types: voltage, current, and power
- External dimensions: approx. 400 x 130 x 180 mm
- Weight: approx. 5 kg

**FG120/FG110**

- Completely independent 2-channel output
- Output waveforms: sine, square, triangular, ramp, and pulse
- Output frequency: DC and 1 µHz to 2 MHz
- Max. output voltage: ±10 V
- Compact (A4 size), lightweight (approx. 3.6 kg), and low cost

**FG120/FG110 Specifications**

- Number of signal outputs: 1 (FG120) or 2 (FG110)
- Output waveforms: sine, square, triangular, ramp, and pulse
- Frequency resolution: 1 µHz
- Sweep range: 1 µHz to 2 MHz
- Triangular, ramp, and pulse waves: 1 µHz to 100 kHz
- Frequency resolution: 1 µHz or 10 digits
- Max. output voltage: ±10 V
- Output impedance: 50 Ω ± 1%
- GPIB interface equipped as standard
- External dimensions: approx. 210 x 300 x 70 mm
- Weight: approx. 3.6 kg

**Examples of Measurements of Characteristics**

<table>
<thead>
<tr>
<th>Channel 1</th>
<th>Channel 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vgs</td>
<td>Ids</td>
</tr>
<tr>
<td>Vds</td>
<td>Iin</td>
</tr>
</tbody>
</table>

**Specifications**

- Graph drawing:
  - Voltage vs. current, voltage vs. voltage, gain vs. voltage, voltage vs. timestamp, current vs. voltage, current vs. current, gain vs. current, current vs. timestamp
  - Sweep axis: Voltage source or current source
  - Measurement axis: Voltage measurement or current measurement
  - Parameter: Voltage source or current source
  - Sweep shape: Ramp (linear or log), triangle (linear or log), rectangle
  - Sweep points: 1, 5, 10, 20, 50, 100, 200, 1000
  - Scaling: Auto scale or fixed scale
  - Averaging count: 2 to 100
  - Analysis feature: Cursor, zoom & scroll, reference curve designation
  - File operations: CSV data storage and loading, graphic image storage, panel image storage, setup storage and recall

**Product Overview**

This system is configured by connecting the GS series Source Measure Unit to a PC that contains the 765670 Curve Tracer Software via USB. You can perform high speed, high-accuracy curve tracing despite its compact size, light weight, and simple system configuration.

**Field of Applications**

- Discrete semiconductors such as transistors and diodes
- Analog ICs such as voltage regulators and op-amps
- MOS logic and other digital ICs
- LEDs and other optical devices
- Solar battery cells

**Features**

- Simple system configuration, easy connection, compact, and light
- Real-time, High-Speed Drawing
- Field of Applications
  - Discrete semiconductors such as transistors and diodes
  - Analog ICs such as voltage regulators and op-amps
  - MOS logic and other digital ICs
  - LEDs and other optical devices
  - Solar battery cells

**Specifications**

- Graph drawing:
  - Voltage vs. current, voltage vs. voltage, gain vs. voltage, voltage vs. timestamp, current vs. voltage, current vs. current, gain vs. current, current vs. timestamp
  - Sweep axis: Voltage source or current source
  - Measurement axis: Voltage measurement or current measurement
  - Parameter: Voltage source or current source
  - Sweep shape: Ramp (linear or log), triangle (linear or log), rectangle
  - Sweep points: 1, 5, 10, 20, 50, 100, 200, 1000
  - Scaling: Auto scale or fixed scale
  - Averaging count: 2 to 100
  - Analysis feature: Cursor, zoom & scroll, reference curve designation
  - File operations: CSV data storage and loading, graphic image storage, panel image storage, setup storage and recall
Features

Built for 40G Next Generation Networks, the NX4000 is designed to measure the transmission and reception of communication frames, alarm/error characteristics, and the transmission characteristics, such as the transmission delay time, of 40Gbit/s SONET/SDH/OTN networks.

- SONET/SDH/OTN all in one set
- Flexible and cost-effective upgrade path
- Advanced optional modulation format compliant
- Main Measurement Functions
  - Various alarm and error measurements
  - Bit error (BER) measurement
  - Delay time measurement
  - Simultaneous measurement for mapped multiple channels
- Editing and Monitoring Function
- Ease of Operation
  - Large 10.4-inch display with Touch panel

Selection for Each Test

- SONET/SDH test system
  - System can be upgraded at minimum cost.
- OTN test system
  - NX4000 can be upgraded for OTN testing by adding a single module.
- Optical modulation formats
  - Only optical interface modules need to be replaced to use the unit for various optical modulation formats.
  - 40 Gbit/s NRZ optical interface, (NX4120, single rate)
  - 40/43 Gbit/s NRZ optical interface, (NX4120, dual rate)
  - 43 Gbit/s DPSK optical interface, C-band (planned)
  - 43/44 Gbit/s DQPSK optical interface (NX4121, C or L-band)
  - 43 Gbit/s QPSK optical interface, C-band (planned)

Main Measurement Functions

- Various alarm and error measurements
- Bit error (BER) measurement
- Delay time measurement
- Simultaneous measurement for mapped multiple channels
- Editing and Monitoring Function
- Ease of Operation
  - Large 10.4-inch display with Touch panel

Basic Specifications

**SONET/SDH Function**
- **Operation mode**: SONET/SDH
  - Non Frame: 39.81 Gbit/s
  - Frame: 44.57 Gbit/s
- **Interface rate**: 39.81 Gbit/s
- **Pattern**
  - PRBS
- **Delay time measurement**
  - Measure range: 0.1 µs to 10 µs, >TimeOut
  - Item: Current, Maximum, Minimum, Average

**OTN Function**
- **Operation mode**: OTN frame
  - 44 G OUT-3 (Four 10 G LAN PHY Mapping)
- **Interface rate**: 43.02 Gbit/s, 44.57 Gbit/s
- **Pattern**
- **Delay time measurement**
  - Measure range: 0.1 µs to 10 µs, >TimeOut
  - Item: Current, Maximum, Minimum, Average

**NX4120 OPT IF MODULE (NRZ)**
- **Interface rate**: 39.81 Gbit/s (suffix code: -R1)
- **Interface rate**: 39.81 Gbit/s, 43.02 Gbit/s (suffix code: -R2)

**NX4000 TRANSPORT ANALYZER (Main Frame)**
- **Display Size**: 10.4 inches, with touch screen
- **Module slots**
  - SLOT1: Dedicated to the Optical I/F module
  - SLOT2: Dedicated to the SONET/SDH BASE module
- **Dimensions and weight**
  - Dimensions: 559 (D) mm x 48 (H) mm x 48 (W) mm
  - Weight: Approx. 30 kg (when all module are installed)

Model Number and Suffix Codes

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix codes</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>731210</td>
<td>XN4000 TRANSPORT ANALYZER</td>
<td></td>
</tr>
<tr>
<td>Power cord</td>
<td>Q</td>
<td>UL, CSA standard</td>
</tr>
<tr>
<td></td>
<td>FR</td>
<td>VDE standard</td>
</tr>
<tr>
<td></td>
<td>NR</td>
<td>AS standard</td>
</tr>
<tr>
<td></td>
<td>GB</td>
<td>GB standard complied with CCC</td>
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<tr>
<td>731211</td>
<td>XN4100 SONET/SDH BASE MODULE</td>
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</tr>
<tr>
<td>731212</td>
<td>XN4110 OTN MODULE</td>
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<td>731213</td>
<td>XN4120 OPT IF MODULE (NRZ)</td>
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<tr>
<td>Signal speed</td>
<td>R1</td>
<td>40 G Single rate</td>
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<tr>
<td></td>
<td>R2</td>
<td>40/43 G Dual rate</td>
</tr>
<tr>
<td>Reference Clock</td>
<td>RC</td>
<td>Reference Clock Output</td>
</tr>
<tr>
<td>Reference Clock</td>
<td>R1</td>
<td>Reference Clock Output</td>
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<tr>
<td>Wavelength range</td>
<td>W1</td>
<td>Tunable laser for C-band</td>
</tr>
<tr>
<td></td>
<td>W2</td>
<td>Tunable laser for L-band</td>
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</tbody>
</table>

Model (Main Frame)

<table>
<thead>
<tr>
<th>Module</th>
<th>Slot 1: OPTICAL INTERFACE</th>
<th>Slot 2: SONET/SDH BASE MODULE</th>
<th>Slot 3: Additional slot (OTN MODULE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Module Suffix Codes

- Q: UL, CSA standard
- R: VDE standard
- NR: AS standard
- GB: GB standard complied with CCC
- RC: Reference Clock Output
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.

The Statistical monitor display on the TTproControlWindow

### 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

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>AE5520</th>
<th>AE5521</th>
<th>AE5522</th>
<th>AE5523</th>
<th>AE5524</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-wire rate traffic generation</td>
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<td>✔️</td>
<td>✔️</td>
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<td>Latency measurement</td>
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<tr>
<td>Frame BERT</td>
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<tr>
<td>Data capture</td>
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<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Multi-user sharing</td>
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<td>Link down generation</td>
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<td>IPv4 simulation</td>
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<td>✔️</td>
<td>✔️</td>
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<tr>
<td>IPv6 simulation</td>
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<td>Sequence check</td>
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<tr>
<td>Alarm logging</td>
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<td>✔️</td>
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<td>✔️</td>
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<tr>
<td>Non-trainable monitoring</td>
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<td>✔️</td>
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<td>Full measurement</td>
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<td>Bit clock adjustment</td>
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<tr>
<td>Voice</td>
<td>✔️</td>
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<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Ethernet-OAM</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

*1: Can share per unit *2: Only for single link down generation *3: Suppos the frame generation and the capture

### Model Number and Suffix Code

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Model Name</th>
<th>Suffix Code</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE5520 10/100BASE-T unit</td>
<td>417322900</td>
<td>-L</td>
<td>JAPAN standard</td>
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<tr>
<td>AE5521 1000BASE-X unit</td>
<td>417322901</td>
<td>-C</td>
<td>UL/CSA standard</td>
</tr>
<tr>
<td>AE5522 10GBASE-X unit</td>
<td>417322902</td>
<td>-E</td>
<td>VDE standard</td>
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<tr>
<td>AE5523 1000BASE-T unit</td>
<td>417322904</td>
<td>-V</td>
<td>SAA standard</td>
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<tr>
<td>AE5524 1000BASE-X unit</td>
<td>731011</td>
<td>-Q</td>
<td>BS standard</td>
</tr>
<tr>
<td>AE5511 TrafficTesterPro</td>
<td>17320900</td>
<td>-LN</td>
<td>GB standard</td>
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<td>RFC2544 Test application for AE5511</td>
<td>17320900</td>
<td>-NE</td>
<td>Japanese</td>
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<tr>
<td>AE5520 10/100BASE-T unit</td>
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<td>-LN</td>
<td>English</td>
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<tr>
<td>AE5521 1000BASE-X unit</td>
<td>417322902</td>
<td>-NE</td>
<td>English</td>
</tr>
<tr>
<td>AE5522 10GBASE-X unit</td>
<td>417322904</td>
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<td>English</td>
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<tr>
<td>AE5523 1000BASE-T unit</td>
<td>731011</td>
<td>-NE</td>
<td>English</td>
</tr>
<tr>
<td>AE5524 1000BASE-X unit</td>
<td>731011</td>
<td>-NE</td>
<td>English</td>
</tr>
</tbody>
</table>
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 up to 1000BASE-T, SX, LX) to flexibly adapt to multiple Ethernet networks, in a simple operation.

A single AE5501 can test Ethernet networks at 10 Mbit/s, 100 Mbit/s, and 1 Gbit/s.

Ping test/performance test using two units

Latency and jitter measurement by the other unit in the loop back mode

Wide-area Ethernet services

MC: Media Converter
SW: LAN Switch
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

Specification

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

- 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
**Digital Multimeters**

**7555/7561/7562**

*5.5 Digits Digital Multimeter*

**Specifications**
- DC voltage (DCV)
  - Range: 20 mV to 1000 V
  - Measurable range: 200 mV to 2000 V
  - Zero point: ±0.003% of full scale/°C

- DC current (DCA)
  - Range: 2 mA to 2000 mA
  - Resolution: 0.01 mA
  - Measurable range: ±0.05% of full scale (at 23°C ±3°C)

- Frequency (TRMS)
  - Input range: 200 mV to 1000 V
  - Frequency ratio: 1 Hz to 120 MHz (1/2-prescaler)

- Resistance
  - Range: 200 Ω to 20 MΩ
  - IC memory card usable

- Input signal
  - Measurable range: ±1999999

- Temperature measuring
  - Resolution: ±0.01°C

**Other features**
- Input compensation: ±0.05% of full scale (at 23°C ±3°C)
- Dividend 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

- Weight: approx. 3.5 kg

**Temperature Measuring Instrument**

**7563**

*Precision Digital Thermometer*

**Specifications**
- Maximum display: ±1999999
- Resolution: 100 mV
- Reference junction compensation accuracy: ±0.1°C
- Internal memory up to 1000 data items
- IC memory up to 8000 data items
- Software calibration function
- Convenient auto-trigger function
- Various computation functions
- Easy 1-action operation with 1 key

**Other features**
- Reference junction compensation: ±5 V (ATT = x1)
- Input range: 20 ns to 999.999999 ns
- Input frequency range: 1 mHz to 50 MHz
- Measuring range: A and B: 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
  - Resolution: ±0.0001% of full scale
  - Measurement range: 20 ns to 250 ns
  - Frequency ratio: ±0.0001% of full scale
  - Pulse width B
  - Measurement range: 20 ps to 250 ps

**Universal Counters**

**TC110/TC120**

*Wide Measuring Range from 1 mHz to 2 GHz (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
  - Measurement range: 20 ns to 999.999999 s
  - Time interval A+B
    - Measurement range: 60 ns to 999.999999 s
    - Pulse width B
    - Measurement range: 20 ns to 999.999999 s
  - Duty ratio B
    - Measurement range: 0.0000001 to 0.99999999
    - Input range: 20 ns to 999.999999 ns
  - Frequency ratio A/B
  - Input range: 1 mHz to 50 MHz
  - Counting capacity: 0 to 999999999
  - Revolution B (TC110 only)
    - Measurement 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) x 88 (H) x 330 (D) mm
  - Weight: Approx. 3.6 kg

**Pneumatic Pressure Standard**

**MC100**

*Pneumatic Pressure Standard*

**Specifications**
- Supply pressure
  - 0 to 200 kPa range model: ±0.2% of full scale
  - 0 to 25 kPa range model: ±0.1% of full scale
- Accuracy
  - ±0.05% of full scale (±0.1% of full scale)
- Load cell: ±0.02% of full scale
- Effect of mounting orientation
  - ±5 V (ATT = x1)
  - Frequency range: 50 Hz to 20 MHz
- External dimensions: approx. 213 (W) x 132 (H) x 400 (D) mm
- Weight: Approx. 9.5 kg

---

*7555 Digital Multimeter*
- Fast sampling at 125 times/s
- Communication function
- Adoption of command languages used in oscilloscopes
- Large current measurement up to 200 A
- Scanner function for multi-points
- Fast sampling at 333 times/s
- Large capacity buffer memory: up to 8000 data items
- IC memory card usable
- GP-IB interface (standard)
- Internal memory up to 1000 data items
- Various computation functions

*7562 Digital Multimeter*
- High accuracy (DC voltage-based accuracy)
- Fast sampling at 333 times/s
- Large capacity buffer memory: up to 8000 data items
- IC memory card usable
- GP-IB interface (standard)

---

*7563 Digital Thermometer, 6.5 Digits*
- Thermometer has a 6.5-digits display
- Twelve types of TC's and four types of RTD's
- Basic temperature accuracy measurement: 0.006% (TC)
- Basic accuracy in resistance measurement: 0.006% (2000 V range)
- Number of sampling times: up to 100 times/s (4.5 digits)

---

*7565 Digital Thermometer*
- DC voltage (DCV)
  - Range: 200 mV to 1000 V
- DC current (DCA)
  - Range: 2 mA to 2000 mA
- Accuracy
  - ±0.05% of full scale (at 23°C ±3°C)

---

*7566 Digital Thermometer*
- 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: ±0.05% of full scale

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*Temperature Measuring Instruments*

**7555 Digital Multimeter**

**7561 Digital Multimeter**

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*Universal Counters*

**TC110/TC120**

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*Other Test & Measurement Instruments*

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*Other Test & Measurement Instruments*

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*Other Test & Measurement Instruments*
**Handheld Digital Manometer**

**MT210**
- Digital Manometer
- Measurement range: (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa, and 3000 kPa
- Measurement range: (gauge pressure: negative) -80 to 0 kPa, -10 to 0 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: 0.0001 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: 0.1 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, kgc/cm², mmH₂O, mmHg
- External dimensions: 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 6.5 kg (0 to 130 kPa range model)

**MT210F**
- Digital Manometer
- Measurement range: (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa, and 3000 kPa
- Measurement range: (gauge pressure: negative) -80 to 0 kPa, -10 to 0 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: 0.001 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: 0.1 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, kgc/cm², mmH₂O, mmHg
- External dimensions: 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 6.5 kg (0 to 130 kPa range model)

**MT220**
- Digital Manometer
- The de facto standard of field calibrators for pressure and differential pressure transmitters
- High accuracy: ±0.01% of reading ±3 digits (130 kPa range model)
- DCV/DCA measurement function (DMM function)
- 24 VDC power supply for driving the transmitter
- % display, error display, and measured data memory
- D/A conversion output, comparator output, and external trigger input (optional)
- Both gases and liquids measurable
- External attachable battery pack (optional)

**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
- 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: 0.0001 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: 0.1 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, kgc/cm², mmH₂O, mmHg
- Measurement range of DCV/DCA measurement function
  - ±±2.5 V
  - ±±2.1 mA
- Accuracy of DCV/DCA measurement function (6 months after calibration) ±±0.05% of reading ±3 digits
- 24 VDC output
  - ±±1 VDC, 30 mA max.
- External dimensions: 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 7.0 kg (0 to 130 kPa range model)

**MT220F Series Specifications**
- Measuring range (gauge pressure: positive) 0 to 10 kPa, 130 kPa, 700 kPa, and 3000 kPa
- Measurement range (gauge pressure: negative) -80 to 0 kPa, -10 to 0 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: 0.001 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: 0.1 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, kgc/cm², mmH₂O, mmHg
- External dimensions: 213 (W) × 132 (H) × 350 (D) mm
- Weight: Approx. 6.5 kg (0 to 130 kPa range model)
**TA720**

**Time Interval Analyzer**
- Maximum Continuous Sampling Rate 80 MS/s
- Sampling rate: 80 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: This function enables two measurements to be done simultaneously.
- Inter-Symbol Interference Analysis Function
- Ethernet/PC Card Interface (optional)
- Built-in Printer (standard)
- GP-IB Interface (standard)
- 3.5-inch floppy drive (standard)
- TFT color LCD screen

**High Precision, TIA Jitter Measurement**

**TA120F**

**Digital Jitter Meter**
- 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)

**TA220**

**Digital Jitter Meter**
- Blu-ray Disc equalizer and PLL
- Limit equalizer (optional)
- Capable of measuring data-to-clock jitter and pulse width jitter
- Standard-equipped with function for analyzing data-to-clock jitter excluding 2T
- Inhibit function and block sampling function
- Standard-equipped with Ethernet and GP-IB interfaces
- A variety of display capabilities, with analog meter and two LED indicators
- Measurement Items:
  - Data-to-clock phase difference jitter and average value
  - Pulse width jitter and average value (arbitrarily set window range LEFT or RIGHT)

**TA720/TA220/TA120F**

**Time Interval Analyzers**

**Continuous Measurement**
Up to 80 MS/s

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

**TA720**
Time Interval Analyzer

- Sampling rate: 80 MS/s continuous (at Single 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
- Inter-Symbol Interference Analysis Function
- Ethernet/PC Card Interface (optional)
- Built-in Printer (standard)
- GP-IB Interface (standard)
- 3.5-inch floppy drive (standard)
- TFT color LCD screen

**TA220**
Digital Jitter Meter

- Blu-ray Disc equalizer and PLL
- Limit equalizer (optional)
- Capable of measuring data-to-clock jitter and pulse width jitter
- Standard-equipped with function for analyzing data-to-clock jitter excluding 2T
- Inhibit function and block sampling function
- Standard-equipped with Ethernet and GP-IB interfaces
- A variety of display capabilities, with analog meter and two LED indicators
- Measurement Items:
  - Data-to-clock phase difference jitter and average value
  - Pulse width jitter and average value (arbitrarily set window range LEFT or RIGHT)

**TA120F**
Digital Jitter Meter

- 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)

**Specification**

**TA120F**

- Sampling rate: 10 MSps (at data-to-clock phase difference jitter measurements)
- Internal jitter: 3T jiter: 300 ps rms
  - Data-to-clock phase difference jitter: 400 ps rms
- Measured parameters: 3T jitter, data-to-clock phase difference jitter, and moving average
  - 3T jitter: CDx1/arbitrary x1.0 to x10
  - Data-to-clock phase difference jitter: 0 ns to 40 ns
- Measurement update rate: maximum 50 ms (at 100,000 samples, DVDx1, measurement on both edges)
- Sample size: 100,000 samples/100 ms/500 ms/arbitrary (1.0 ms to 1 second, 0.1 ms steps)
- Input specifications:
  - RF input
    - Input signal: RF signal (before/after passing equalizer, equalizer ON/OFF switching), binary signal (minimum input pulse width: 15 ns)
  - Trigger level: MAN = -5 V to +5 V (1 mV steps), AUTO = Auto-slice, AUTO + MANUAL = AUTO + set value
- Clock input:
  - Maximum input frequency: 25 MHz to 60 MHz
  - Phase adjustment: 0 to 40 ns (0.1 ns steps)
- Preset function:
  - up to 7 settings can be saved
  - The desired setting can be loaded
- External dimensions:
  - Approx. 213 (W) x 132 (H) x 350 (D) mm
- Weight: Approx. 5 kg

**TA720/TA220/TA120F**

**Time Interval Analyzers**

**Continuous Measurement**
Up to 80 MS/s

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

**TA720**
Time Interval Analyzer

- Maximum Continuous Sampling Rate 80 MS/s
- Sampling rate: 80 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
- Inter-Symbol Interference Analysis Function
- Ethernet/PC Card Interface (optional)
- Built-in Printer (standard)
- GP-IB Interface (standard)
- 3.5-inch floppy drive (standard)
- TFT color LCD screen

**TA220**
Digital Jitter Meter

- Blu-ray Disc equalizer and PLL
- Limit equalizer (optional)
- Capable of measuring data-to-clock jitter and pulse width jitter
- Standard-equipped with function for analyzing data-to-clock jitter excluding 2T
- Inhibit function and block sampling function
- Standard-equipped with Ethernet and GP-IB interfaces
- A variety of display capabilities, with analog meter and two LED indicators
- Measurement Items:
  - Data-to-clock phase difference jitter and average value
  - Pulse width jitter and average value (arbitrarily set window range LEFT or RIGHT)

**TA120F**
Digital Jitter Meter

- 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)
### Recorders

#### Selection Guide

**Recorders Panel mount type**

<table>
<thead>
<tr>
<th>Model</th>
<th>DX1000</th>
<th>DX2000</th>
<th>DX1000N</th>
<th>DX100P</th>
<th>DX200P</th>
<th>CX1000</th>
<th>CX2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
<td>DAQSTATION</td>
</tr>
<tr>
<td>Models</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
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<tr>
<td>Recorder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of inputs</td>
<td>2/4/8/12ch</td>
<td>4/8/10/20/30/40/48ch</td>
<td>2/4/8/16ch</td>
<td>4/8/10/20/30/50ch</td>
<td>0/8ch</td>
<td>0/10/20/25ch</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</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>25 ms or 125 ms</td>
<td>125 ms or 1 s</td>
<td>1 s</td>
<td>1 s</td>
<td></td>
</tr>
<tr>
<td>Controlled points</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Types of measurement inputs</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
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<td>Chart speed</td>
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<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</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>
<td>4 levels/CH</td>
</tr>
<tr>
<td>Number of alarm relay outputs</td>
<td>Up to 6 (optional)</td>
<td>Up to 24 (optional)</td>
<td>Up to 6 (optional)</td>
<td>Up to 6 (optional)</td>
<td>Up to 24 (optional)</td>
<td>Up to 6 (optional)</td>
<td>Up to 6 (optional)</td>
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<tr>
<td>Internal memory</td>
<td>80 MB or 200 MB (Flash memory)</td>
<td>80 MB or 200 MB (Flash memory)</td>
<td>80 MB or 200 MB (Flash memory)</td>
<td>5 MB (Flash memory)</td>
<td>5 MB (Flash memory)</td>
<td>1.2 MB (Flash memory)</td>
<td>1.2 MB (Flash memory)</td>
</tr>
<tr>
<td>External media</td>
<td>CF card</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>Zip disk, CF card</td>
</tr>
<tr>
<td>Standard communication interface</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>Ethernet</td>
</tr>
<tr>
<td>Environmental worthiness</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</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>
<td>90 to 132 or 180 to 264 VAC</td>
</tr>
<tr>
<td>Dimensions W×H×D (mm)</td>
<td>144×144×228.5</td>
<td>288×288×226</td>
<td>144×144×258.5</td>
<td>144×144×218</td>
<td>288×288×220</td>
<td>144×144×223.6</td>
<td>288×288×225.5</td>
</tr>
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</table>

**Recorders Desktop type**

<table>
<thead>
<tr>
<th>Model</th>
<th>MV1000</th>
<th>MV2000</th>
<th>DR130</th>
<th>DR231</th>
<th>DR232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>MAVAdvanced</td>
<td>MAVAdvanced</td>
<td>DARWIN</td>
<td>DARWIN</td>
<td>DARWIN</td>
</tr>
<tr>
<td>Series</td>
<td>MAV1000, MAV100N, MAV101N, MAV110, MAV110N, MAV102N</td>
<td>MAV200A, MAV2010, MAV2020, MAV2030, MAV2040, MAV2048</td>
<td>DR130</td>
<td>DR231</td>
<td>DR232</td>
</tr>
<tr>
<td>Industrial</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
<td>Paperless</td>
</tr>
<tr>
<td>Recorder type</td>
<td></td>
<td></td>
<td></td>
<td></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>Max. 20 ch</td>
<td>Max. 30 ch</td>
<td>Max. 300 ch</td>
</tr>
<tr>
<td>Display</td>
<td>5.5 inch TFT color LCD</td>
<td>10.4 inch TFT color LCD</td>
<td>VFD</td>
<td>VFD</td>
<td>VFD</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>
</tr>
<tr>
<td>Controlled points</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Types of measurement inputs</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
<td>DCV, TC, RTO, DI</td>
</tr>
<tr>
<td>Chart speed</td>
<td>–</td>
<td>–</td>
<td>1 to 1500 mm/h (1 mm step)</td>
<td>1 to 1500 mm/h (1 mm step)</td>
<td>1 to 1500 mm/h (1 mm step)</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>
</tr>
<tr>
<td>Number of alarm relay outputs</td>
<td>Up to 6 (optional)</td>
<td>Up to 12 (optional)</td>
<td>Up to 10 (optional)</td>
<td>Alarm control output option (10 CH) required</td>
<td></td>
</tr>
<tr>
<td>Internal memory</td>
<td>80 MB (standard) 200 MB (large)</td>
<td>80 MB (standard) 200 MB (large)</td>
<td>512 KB (optional)</td>
<td>512 KB (optional)</td>
<td>512 KB (optional)</td>
</tr>
<tr>
<td>External media</td>
<td>CF card or USB memory</td>
<td>CF card or USB memory</td>
<td>3.5-inch floppy disk</td>
<td>3.5-inch floppy disk</td>
<td>3.5-inch floppy disk</td>
</tr>
<tr>
<td>Standard communication interface</td>
<td>Ethernet</td>
<td>Ethernet</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Environmental worthiness</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>IP65/NEMA4 0 to 50°C</td>
<td>0 to 50°C (5 to 40°C when floppy disk in operation)</td>
<td>0 to 50°C (5 to 40°C when floppy disk in operation)</td>
<td>0 to 50°C (5 to 40°C when floppy disk in operation)</td>
</tr>
<tr>
<td>Power supply</td>
<td>90 to 132 or 180 to 264 VAC, 10 to 28 VDC</td>
<td>90 to 132 or 180 to 264 VAC, 10 to 28 VDC</td>
<td>90 to 250 VAC, 10 to 32 VDC</td>
<td>90 to 250 VAC, 10 to 32 VDC</td>
<td>90 to 250 VAC, 10 to 32 VDC</td>
</tr>
<tr>
<td>Dimensions W×H×D (mm)</td>
<td>189×173×258</td>
<td>281×273×260</td>
<td>338×221×336</td>
<td>438×201×336</td>
<td>438×291×301</td>
</tr>
</tbody>
</table>
**Get Your System Set Up Quickly, from Desktop Measurement to Large-scale Data Logging**

**Overview**
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.

**Features**
- **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.

**Combined Web Browser Monitoring and Data Logging of Plant and Equipment Data**

**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°C1,2,3,4
  - Reinforced insulation: Between input terminal and case5, 3700 Vrms (one minute) or 600 Vrms/VDC (continuous)
  - 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) cards6 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 that 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 X04A08B01).
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, 9-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, 9-wire RTD, DI (non-voltage contact), Level (5 V logic). Mixed input allowed.</td>
</tr>
<tr>
<td>4-Wire RTD and Resistance Input Module</td>
<td>MX110-V4R-M06</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>10 ms 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>10 ms Non-voltage contact, open collector, and Level (5 V logic). Mixed input allowed. 10 input/output unit.</td>
</tr>
<tr>
<td>24 V Digital Input Module</td>
<td>MX115-D24-H10</td>
<td>10</td>
<td>10 ms 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>100 ms 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>100 ms Pulse width modulation output module</td>
</tr>
<tr>
<td>Digital Output Module</td>
<td>MX125-MKC-M10</td>
<td>10</td>
<td>100 ms “A” 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
- 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 772002. Applies to MX110-UNV-M10 and MX115-D10/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-D10/H10</td>
</tr>
<tr>
<td>772063</td>
<td>Plate with clamp terminals (RUC) applies to MX110-UNV-M10 and MX115-D10/H10</td>
</tr>
<tr>
<td>772064</td>
<td>Clamp terminal, applies to MX110-UNV-H04</td>
</tr>
<tr>
<td>772065</td>
<td>Clamp terminal, applies to MX110-VAO-M08, MX110-PWM-M08, and MX115-MKC-M10</td>
</tr>
<tr>
<td>772066</td>
<td>Plate with clamp terminals, applies to MX110-UNV-M10 and MX115-D10/H10</td>
</tr>
<tr>
<td>772067</td>
<td>Plate with clamp terminals with 120 Ω built in bridge resistance, applies to MX112-B12-M04</td>
</tr>
<tr>
<td>772068</td>
<td>Plate with clamp terminals with 500 ms built in bridge resistance, applies to MX112-B35-M04</td>
</tr>
<tr>
<td>772069</td>
<td>Plate with clamp terminal with 30 ms built in bridge resistance, applies to MX112-NDI-M04</td>
</tr>
<tr>
<td>772070</td>
<td>Plate with clamp terminal with 100 ms built in bridge resistance, applies to MX110-UNV-M10</td>
</tr>
<tr>
<td>772071</td>
<td>Plate with clamp terminal with 250 ms built in bridge resistance, applies to MX110-UNV-M10</td>
</tr>
</tbody>
</table>
Double save function

MATH functions *6, 7

30 ch Quick Start Package

Equipment

Analyzer

Datacomm Measuring Instruments

Data Acquisition

Oscilloscopes Digital Power

Next Generation, Generators, Communication Test Instruments

Measurement Instruments Wireless

Email messaging and file transfer via FTP
to high capacity Compact Flash media

Fast set up- attach sensors, connect to your network, configure with your web browser, and Simple! Compact Size! Ready to Run!

Quick Start Package

MW100

100 ms scan speed

Multi-interval measurement and logging to high capacity Compact Flash media

Simple! Compact Size! Ready to Run!

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 Compact Flash media

Email messaging and file transfer via FTP

MW100

Quick Start Package

Model | Suffix Code | Description
--- | --- | ---
MX100 | -2 | 12 to 28 VDC, with AC adapter *3
| -3 | 12 to 28 VDC, without AC adapter *4

Power supply code

/M1 | /C3 | RS-232 communication interface *5, 6

/M1 must be selected when using the Modbus/TCP client function.

Also, “/M1” must be selected for use of the Modbus/RTU master function.

Options /DS

Supply cord

/L50542

Power supply inlet and power supply cord

Supply voltage -1 100 VAC-240 VAC

Software language -E English (comes with MW100 Viewer Software)

/L50542

Model Suffix Code Description
--- | --- | ---
CW | /L50542 | 100 ms scan speed
| /SL1 | 10 ch Quick Start Package
| /SL2 | 20 ch Quick Start Package
| /SL3 | 30 ch Quick Start Package

For MX100

Multi Unit Data Logging

Max. 1200 ch/system (connect 60 x2/20 units)

Web-enabled Data Acquisition and Data Logging System

On-Demand, Remote Measuring System

Multi-User & Multi-Access

Use measuring and networking technology to share a broad range of data from the field and access multiple facilities simultaneously with a Web browser to check on the status of equipment.

Comes with DHCP (automatic IP address assignment) and SNTP (time correction function) for connections with Modbus-compatible instruments (requires the /M1 MATH option on the client side)

Multi Interval Data Logging

Data acquisition intervals set independently by measurement group

Web browser monitoring & setting changes

Supports web browsers 3.0 or later, and JAVA VM/JAVA Script & setting changes

Supports Internet Explorer 5.0 or later

Multi Unit Data Logging

Single Unit Data Logging

High speed

High withstand voltage

1GB Flash memory (continuous)

CompactFlash memory (continuous)

100 ms scanning (continuous)

1200 ch/1 s: approximately 3 months

CF 2 GB (60 ch/100 ms: approximately 10 days,
| 24 ch/10 ms: approximately 1 week)

Max. 1200 ch/system

CompactFlash: CF 2 GB (60 ch/100 ms: approximately 10 days, 60 ch/1 s: approximately 2 months)

Point a Web browser to URL of the MW100, access the MW100 at the site, and browse any data, any time.

From changing settings to Starting/Stopping data acquisition, the MW100 is easy to operate with a familiar, Web browser interface.

Long Duration Memory & File Transmission

CompactFlash: CF 2 GB (60 ch/100 ms: approximately 10 days, 60 ch/1 s: approximately 2 months)

Drag & drop

Files can be sent automatically as they are created, or manually transferred with the CF card in the main unit

Network online (FTP; file transmission)

Point a Web browser to URL of the MW100 to send MW100 data files with drag-and-drop ease.

Files can be sent automatically as they are created, or manually transferred with the CF card in the main unit.
Powerful & Portable Data Acquisition Stations

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.

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.

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.

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.

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.

MV1000/MV2000 Specifications

Models and Input Capacity

<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></td>
<td>MV1012 (12 channels), MV1024 (24 channels)</td>
<td>1 x (125 ms)</td>
</tr>
<tr>
<td>MV2000</td>
<td>MV2008 (8 channels)</td>
<td>125 ms (25 ms)</td>
</tr>
<tr>
<td></td>
<td>MV2010 (10 channels), MV2020 (20 channels), MV2030 (30 channels), MV2040 (40 channels), MV2048 (48 channels)</td>
<td>1 x (125 ms)</td>
</tr>
</tbody>
</table>

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

Memory

- Internal memory
  - standard: 80 MB
  - large: 200 MB

Example of saving data to internal memory:

Condition
Sampling interval: 1 sec
Measurement channel: 12 ch
Binary save mode

Approx. 30 days for standard memory
Approx. 75 days for large memory

* Numbers in parentheses are when in high-speed mode.
<table>
<thead>
<tr>
<th>Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR12000E</td>
<td><strong>Multiple Laboratory Recorder</strong>&lt;br&gt;- Ten- or twelve-pen models&lt;br&gt;- Universal input of voltages, thermocouples, or RTDs&lt;br&gt;- Crisp, color recording and a wealth of printing functions&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>LR8100E</td>
<td><strong>Laboratory Recorder</strong>&lt;br&gt;- Four-, six-, or eight-pen model&lt;br&gt;- Universal input of voltages, thermocouples, or RTDs&lt;br&gt;- Crisp, color recording and a wealth of printing functions&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>LR4100E</td>
<td><strong>Laboratory Recorder</strong>&lt;br&gt;- One-, two-, three-, or four-pen model&lt;br&gt;- Universal input of voltages, thermocouples, or RTDs&lt;br&gt;- Crisp, color recording and a wealth of printing functions&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>LR4200E</td>
<td><strong>Flat-Bed Laboratory Recorder</strong>&lt;br&gt;- One-, two-, three-, or four-pen model&lt;br&gt;- Universal input of voltages, thermocouples, or RTDs&lt;br&gt;- Crisp, color recording and a wealth of printing functions&lt;br&gt;- High reliability owing to non-contact technologies&lt;br&gt;- IC memory card (standard)</td>
</tr>
</tbody>
</table>

**LR12000E Specifications**<br>- Operating method: digital servo<br>- Number of channels: 10 or 12<br>- Input mode: guarded floating input<br>- Measurement accuracy: 0.05% of reading + 0.03% of range + 1.0 µV (for 1 mV or more)<br>- Measuring range: 0.1 mV to 200 V FS (high sensitivity model), 12 types of thermocouples, and RTDs<br>- Measurement cycle: 135 Hz at fastest<br>- Chart speed: 10 to 600 mm/h or mm/min<br>- Chart paper: effective recording width of 250 mm; fan-folded, 30 m long<br>- Recording pen: disposable felt-pen<br>- Pen gap: about 3.5 mm, provided with phase synchronization function as standard<br>- Printing: wire dot, ink-ribbon (monochromatic)<br>- Display: fluorescent display tube (5 by 7 dots); 6 lines with 20 characters each<br>- Display contents: digital values, bar graph and range<br>- Memory: IC card slot (standard), floppy disk drive (optional)<br>- Power supply: AC or DC (optional)<br>- Option: remote control, 4 alarm point output, communication (via GP-IB or RS-232C), floppy disk drive, computation, 10 to 32 V DC drive<br>- Dimension: Approx. 448 (W) × 455 (D) × 185 (H) mm<br>- Weight: Approx. 14.0 kg (for 4 pens)
The DC100 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 DC100 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 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.

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

- **High-speed, high-precision measurements**
  The DC100 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, and mA (DC current).

- **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.

### DC100 Specifications (some specifications are for separately sold options)

**Input:**
- 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.

**Communication standards:**

**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

**Weight:**
- Approx. 4 kg (with module attached)

### DC100 Data Collector

The DC100 is a data collector that lets you monitor various I/O signals using many different display functions on a large monitor, while saving the data to internal memory. With its large memory capacity, a single DC100 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.

- **Support for efficient data processing**
  With its large memory capacity (specify 1 MB, 2 MB, or 4 MB of internal memory when placing your order), the DC100 enables efficient data acquisition. You can even transfer data to a PC while simultaneously backing up to internal memory. The DC100 comes standard with a 3.5-inch floppy drive, and an optional SCSI interface is available.

- **Superior mobility**
  With a lightweight (approximately 5 kg)*, compact (approximately 20 cm depth) design, the DC100 is ideal for vehicle installations or use as a portable data collector.

- **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.

**Input channels:**
- Standalone model: 10 to 40 channels
- Expandable model: 10 to 300 channels

**Measurement interval:**
- 0.5–60 seconds

**AD 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

**Communication standards:**

**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) × 157 (D) mm
- Subunit: Approx. 422 (W) × 176 (H) × 100 (D) mm

**Weight:**
- Approx. 4.3 kg (with module attached)
## Measuring Instruments

### Equipment

**Analyzer**

**Sources**

- Optical

**Data Acquisition**

- Oscilloscopes
- Digital Power
- Next Generation, Generators,
- Communication

**Test Instruments**

- Measurement
- Instruments
- Wireless
- Recorders
- 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.

**Recorders**

**Portable Hybrid Recorder**

**DR130**

- **Portable Hybrid Recorder**
  - The DR130 portable hybrid recorder has superior mobility and functionality with advanced functions and high reliability packed into a compact body weighing less than 10 kg. The included floppy drive makes it easy to exchange data with a PC.
  - **Small, lightweight, and portable**
  - The DR130’s overall size and weight have been reduced compared to older models. It can be used in building a simple network or connected to a LAN to support remote data acquisition and centralized data management.
  - **Networking capability**
  - The DR130 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.
  - **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.
  - **PC-friendly**
  - Powerful PC software makes it easy to create a PC-based data acquisition environment.
  - **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).

**DR130 Specifications (some specifications are for separately sold options)**

- **Inputs:** 10 or 20 channels (specify when ordering)
- **Input types:** DC voltage, thermocouple, RTD, DI
- **Communication standards:** GP-IB, RS-232, Ethernet
- **Measurement interval:** 2-60 seconds
- **Recording interval:** Minimum 2 seconds
- **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:** Calculation function, alarm output, remote function, power monitor, report computation function
- **PC software:** DAQ 32Plus, DAQLOGGER

**Dimensions:** Approx. 338 (W) × 221 (H) × 335 (D) mm

**Weight:** Approx. 9.3 kg

**Portable Test & Measurement Instruments**

**Hybrid Recorder**

**DR230**

- **Hybrid Recorder**
  - The DR230 hybrid recorder provides excellent function expandability and design freedom as an R&D tool for all industries, for applications ranging from small-scale data logging up to multi-point data collection.
  - **Superior 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.
  - **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.

**DR230 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, distortion, DI
- **Communication standards:** GP-IB, RS-232-C, RS422A/485, Ethernet
- **Other:** Alarm output, remote function, power monitor, report computation function
- **PC software:** DAQ 32Plus, DAQLOGGER

**Dimensions:**

- **Standalone:** Approx. 438 (W) × 291 (H) × 336 (D) mm
  - 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
- **Expandable:** Approx. 438 (W) × 291 (H) × 301 (D) mm
  - Subunit: Approx. 422 (W) × 176 (H) × 100 (D) mm
  - Weight: Approx. 13 kg (with module attached)
Introducing the New DX Series
(Data Acquisition Station)

**DX1000/DX2000**

**DAQSTATION** reaches a new dimension

**Basic Functions**
- Up to 48 channels of input
  - User can start/stop recording by batch, and create data files
  - Expandable to up to 348 channels with the MW100 automatic connection function

**Display & Operation**
- Arrange the display to suit your way with a custom display function
- Review historical data with date and time calendar search functions

**Networking**
- Standard Ethernet interface
  - Supports the PROFINET and EtherCAT protocols
  - Expanded Web and networking functions!
  - Dust- and splash-proof front panel (IP65, NEMA4 compliant)
  - Highly reliable internal memory with error-correction function
  - Front panel door lock and login function

**Reliability and Security**
- Software for a variety of tasks including analysis, settings, and acquisition
  - **DAQSTANDARD**: Supports settings and data file analysis
  - **DAQStudio**: Builder software for custom displays
  - **DAQWORX**: Integrated Data Acquisition Software Suite

**Large Memory**
- Max 200 MB of flash memory can be installed as internal memory
- Max 2 GB of CF card can be installed as removable memory

**USB Interface**
- Front and Rear 1 port each
  - Keyboard: 104 or 89 US Key board, USB Class Ver 1.1
  - Memory: USB Flash Drive

**Display & Operation**
- Arrange the display your way with a custom display function!
- Review historical data with date and time calendar search functions

**Networking**
- Standard Ethernet interface
- Supports the PROFINET and EtherCAT protocols!
- Expanded Web and networking functions!

**Reliability and Security**
- Dust- and splash-proof front panel (IP65, NEMA4 compliant)
- Highly reliable internal memory with error-correction function
- Front panel door lock and login function

**Application Software**
- Software for a variety of tasks including analysis, settings, and acquisition
  - **DAQSTANDARD**: Supports settings and data file analysis
  - **DAQStudio**: Builder software for custom displays
  - **DAQWORX**: Integrated Data Acquisition Software Suite

**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
  - DCC (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:
  - 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**
- Protocols: TCP, UDP, IP, ICMP, ARP, DHCP, HTTP, FTP, SMTP, SNMP, 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.

**Customizable Display Screens**

**Large Memory**
- Max 200 MB of flash memory can be installed as internal memory
- Max 2 GB of CF card can be installed as removable memory

**USB Interface**
- Front and Rear 1 port each
  - Keyboard: 104 or 89 US Key board, USB Class Ver 1.1
  - Memory: USB Flash Drive

**Display Update (min/div)**
- 30 min/div

**Save interval (sec)**
- 60 sec

**Total sample time**
- Approx. 1085 days

**DX2000 (200MB)**
- Large Memory
- USB Interface
- Customizable Display Screens
All-In-One Controller That Integrates Monitoring and Recording Functions

CX1000/CX2000

Control and Measurement Station

DAQSTATION CX1000/CX2000 have up to 6 embedded loops. CX is a control and measurement station to collect/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.

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
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)
Mathematical function: 12 channels (CX1000)
30 channels (CX2000)
Dimensions: CX1000: 144 (W) × 223 (D) mm
CX2000: 288 (W) × 288 (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: Floppy disks, Zip disks, CompactFlash memory card
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) × 144 (H) × 218 (D) mm
DX200: 288 (W) × 288 (H) × 220 (D) mm
Weight: Weight: DX100: Approx. 3.0 kg
DX200: Approx. 6.6 to 7.3 kg

DX100/DX200

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/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**

**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.

**Application software**
- Sign-in through DX100P/DX200P and through PC software.
- 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 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 are supported.
- 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, and 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 reliability**
- Internal memory is flash memory, which does not require a battery backup. You can also back up data to multiple destinations through your network.

**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:**
  - Display: 5.5-inch TFT color liquid crystal display (DX100P), 10.4-inch TFT color liquid crystal display (DX200P)
- **External storage media:** Specify any of the following when placing your order:
  - CompactFlash memory card
  - Zip disk
- **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) × 220 (D) × 100 (H) mm
  - DX200P: 288 (W) × 343 (D) × 176 (H) mm
- **Recording capacity:**
  - DX100P: Approx. 6.6 kg
  - DX200P: Approx. 7.3 kg

**DR240**

**Hybrid Recorder**

The DR240 hybrid recorder is a panel-mounted industrial recorder equipped with a highly reliable, high-breakdown solid-state relay developed by Yokogawa. This recorder has excellent environmental durability and is ideal for process monitor applications.

- **Environmental durability you can rely on**
- The DR240 provides the environmental durability and reliability you need for applications in harsh field environments. The input scanner unit contains a surface-mounted high breakdown solid-state relay developed by Yokogawa. This feature helps significantly reduce the unit’s size while improving reliability.
- **Superior design freedom**
- The DR240 is available as a simple 30-channel (maximum) standalone model and an expandable model that can be expanded from 10 to 300 channels in the field.
- **Networking capability**
- The DR240 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 saves you space.
- **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.

**DR240 Specifications**

- **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:** GPIB, RS-232C, RS422A/485, Ethernet
- **Other:**
  - Alarm output, remote function
  - Remote measurement (expandable model):
    - Maximum total distance using special cables: 500 meters
    - Maximum number of connected subunits: 6
  - **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:** 5.5-inch floppy drive with 512 KB SRAM
- **Options:** Computation function, report computation function
- **PC software:** DAQ 32Plus, DAQLOGGER
- **Dimension:**
  - Standalone: Approx. 444 (W) × 288 (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 x 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 x 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

Intelligent Industrial Recorder (180 mm recording chart)

µR20000 has carried over µR series high reliability and basic functions. The 181 x 16 fulldot 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)

- 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 x 16 full dot matrix display
  Versatile operation display

  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
  TC (R, S, B, K, E, J, T, N, W, L, U, WRc)
  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, pen, plotter pen
  Dot model: 6 color wire dot
- Recording period
  Pen model: Consecutive recording
  Dot model: max. 6 channel/10 sec
- Display:
  VFD 101 x 16 full dot matrix display
- Display types
  Multiple displays
digital, bar, flag, Dl/D0 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) x 144 (H) x 220 (D) mm
- Weight: 2.1 to 2.5 kg

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
  TC (R, S, B, K, E, J, T, N, W, L, U, WRc)
  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 x 16 full dot matrix display
- Display types
  Multiple displays
digital, bar, flag, Dl/D0 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) x 288 (H) x 220 (D) mm
- Weight: Pen model: 7.5 to 7.6 kg
  Dot model: 8.4 to 9.0 kg
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, DCV, RTD
- **Universal output:** Voltage pulse, 4 to 20 mA, and relay
- **Alarm output:** 3 points
- **Heater burnout alarm specifiable**
- **Communication function via RS485 interface compatibility:** simple communication with graphic panel/PLC/PC (via link/ladder communication/Modbus protocol)
- **Coordinated operation available**
- **High reliability:** conforms to UL, CSA, and CE-mark certification

UT351/UT321

- **Easy to operate general-purpose controllers**
- **Large clear PV display (with Active Color PV Display)**
- **A/M mode switching key (standard)**
- **Heating/cooling control included**
- **Retransmission output (standard)** (also usable as the power supply for the sensor)
- **Number of combination of setpoints and PID parameters:** 4
- **24 VDC loop power source (optional)**
Multi-function, High-performance Type

**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)
- 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)

Excellent Control, Multifunction Type

**UT750** Digital Indicating Controller

- Advanced highly functional indicating controller
- Large clear LCD 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

- 30-segment LED LV 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.)

Programmable Controller with Bar Graph Displays

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

UT450/UT420 Specifications

- Input accuracy: ±0.1%, control cycle 200 ms
- Dimensions: UT450: 96 (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
  - Modbus protocol
  - Communication function via RS485 (PC link/ladder communication)

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
- Overshoot suppression “super” function, hunting suppression “super2” function, and auto-tuning (standard)
- Extended DIO (UT550: alarm output up to 8 points available)
- Communication function via RS485 interface compatibility:
  - simple communication with graphic panel/PLC/PC
  - Modbus protocol

UT750 Specifications

- Input accuracy: ±0.1%, control cycle 50 ms (fastest)
- Dimensions: 96 (W) × 96 (H) × 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output: voltage pulse, 4 to 20 mA, and relay
- DIO increase available (using I/O extension modules): up to 23 points
- Communication function via RS485 interface compatibility (2 points):
  - simple communication with graphic panel/PLC/PC
  - Modbus protocol

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

*Note: Dimensions and weights may vary depending on specific model and options.*
**Simple, General Purpose-program Type**

**UP351 Specifications**
- Input accuracy: ±0.1%, control cycle 250 ms
- Dimension: 96 (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)
- Communication function via RS485
  - 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

**UP550 Specifications**
- Input accuracy: ±0.1%, control cycle 100 ms (fastest)
- Dimension: 96 (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)
- 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)
  - DI/O extendable (up to 8 points for both DI and DO)
  - Interface compatibility:
  - DI and DO
  - DI/O extendable (I/O extension modules used)
  - DI/O increase and coordinated operation available
  - Over/under output (standard)
  - Event setting: settable for up to 16 time events and 8 PV events (output up to 8 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 with the LL100 parameters setting tool
  - Weight: Approx. 1 kg or less

**UP750 Specifications**
- Input accuracy: ±0.1%, control cycle 100 ms (fastest)
- Dimension: 96 (W) × 96 (H) × 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal output:
  - voltage pulse, 4 to 20 mA, and relay
  - DI/O extendable (I/O extension modules used)
- Communication function via RS485
  - interface compatibility (2 ports): simple communication with graphic panel/PLC/PC
  - (PC link/ladder communication/Modbus protocol)
- DI/O increase and coordinated operation available
- Over/under output (standard)
- DI and DO
- DI/O increase and coordinated operation available
- DI/O extendable (up to 8 points for both DI and DO)
- Over/under output (standard)
- Event setting: settable for up to 16 time events and 8 PV events (output up to 8 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 with the LL100 parameters setting tool
  - Weight: Approx. 1 kg or less

**UM531/UM331 Specifications**
- Input accuracy: ±0.1%, sampling cycle of 250 ms
- Dimensions: UM351: 96 (W) × 96 (H) × 100 (D) mm
  - UM331: 96 (W) × 48 (H) × 100 (D) mm
- Universal input: TC, DCV, RTD
- Universal 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)
- 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
  - Weight: Approx. 0.7 kg (for both the UM351 and UM331)
UT351- *A/UT551- *A to *D

Simple, High-performance Type

UT351- *A Specifications

- Easy-to-operate general-purpose controllers
- Large clear PV display (with Active Color PV Display)
- Heating/cooling control included
- Remote setpoint input available
- Number of combination of setpoints and PID parameters: 4

UT351- *A
Digital Indicating Controller with Industrial Ethernet 1, 2

1: Ethernet is the trademark of XEROX Corporation.
2: Please prepare Ethernet cable individually.

UT351- *A
Digital Indicating Controller with Industrial Ethernet

1: Ethernet is the trademark of XEROX Corporation.
2: Please prepare Ethernet cable individually.

UT351 to *D

Broad-ranging, High-performance Type

UT551- *A to *D Specifications

- High performance controllers with lots of functions
- Large clear PV display (with Active Color PV Display)
- Remote setpoint input available
- Number of setpoint and PID parameter combinations: up to 8

UT551- *A to *D
Digital Indicating Controller with Industrial Ethernet

1: Ethernet is the trademark of XEROX Corporation.
2: Please prepare Ethernet cable individually.

UT551 to *D

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 LL100 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.
Features
- Compact design for space saving
  The dimension is 76 (H) × 29.5 (W) × 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
- Isolator VJH7
- Distributor VJA7
- Universal Temperature Converter VJ77
- Potentiometer Converter VJP7
- Pulse to Analog Converter VJP8
- Pulse Rate Converter VJP5
- Universal Computing Unit VJX7

PC-based Parameters Setting Tool: VJ77
Field configuration tools to set, change and monitor the range, zero/span, burnout, parameters, computation program, etc. of the microprocessor based JUXTA signal conditioners and computing units.

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 screwdriver.
- Input range of the Potentiometer Converter can be set easily by using a screwdriver

Lineup
- Distributor (Free Range Type) MA5
- Distributor (2-output, Free Range Type) MA5D
- Isolator (Free Range Type) MB5
- Isolator (2-output, Free Range Type) MB5D
- Universal Temperature Converter (Free Range Type) MU5
- Universal Temperature Converter (2-output, Free Range Type) MUSD
- Potentiometer Converter (Free Range Type) MS5
- Potentiometer Converter (2-output, Free Range Type) MS5D
- Universal Temperature Converter MUSD, MUSD

Universal Temperature Converter 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: ±1°C (0 to 50°C)
  - Type R and S: ±2°C (0 to 50°C)
- External dimensions: 86.5 (H) × 51 (W) × 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 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**

<table>
<thead>
<tr>
<th>Interface</th>
<th>Conforms to IEEE802.3 (10BASE-T/100BASE-TX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Modbus/TCP</td>
</tr>
<tr>
<td>Access control</td>
<td>CSMA/CD</td>
</tr>
<tr>
<td>Transfer rate</td>
<td>10/100 Mbps</td>
</tr>
<tr>
<td>Maximum segment length</td>
<td>100 m (the length between Hub and converter)</td>
</tr>
<tr>
<td>Maximum connecting configuration</td>
<td>Up to 4 cascade connection per hub (10BASE-T)</td>
</tr>
<tr>
<td>Power supply</td>
<td>Conforms to EIA RS-485</td>
</tr>
<tr>
<td>Power supply rated voltage</td>
<td>24 VDC ±10% or 100-240 VAC/DC</td>
</tr>
<tr>
<td>Power consumption</td>
<td>1.8 W at 24 VDC, 1.5 W at 110 VDC, 2.6 VA at 100 VAC, 4.0 VA at 200 VAC</td>
</tr>
</tbody>
</table>

**Support for a Variety of Applications**

- Enables connection with RS-485 communication devices when connected to the RS-485 communications terminal of the main unit.

**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.
DAQWORX

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

By combining YOKOGAWA recorders and data acquisition<br>stations and instruments, you can create data acquisition<br>systems without the need for special programming. You can<br>easily increase the measurement bandwidth and range of<br>applications by including our high-value-added software.

Features

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

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

• Product Specific Packages<br>These are data acquisition software programs designed to<br>maximize hardware performance; DAQ32Plus for DARWIN,<br>MXLOGGER for MX100/MW100, DAQEXPLORE for<br>DAQSTATION DX/CX and MVAdvanced/MobileCorder,<br>MV. High-value-added software can be combined, and<br>acquired data can be integrated with DAQLOGGER.

List of Software

• Integrated Package<br>DAQLOGGER: General purpose data acquisition on a maximum of 32 units/1600<br>ch, shortest measurement interval of 1 second.<br>• <Supported Instruments> Daplation DX/CX, MVAdvanced/MobileCorder<br>MV, DA/DC/DL, VR, and the<br>rµ100/1800.
GateDX-P: Interface for DX100P/DX200P<br>GateµR: Interface for µR1000/µR2000
GateMX/MW: Interface for MX100/MW100<br>GateCONTROL: Interface for small-scale<br>measurement instruments<br>(controllers, signal conditioners, etc.)
GateWT: Interface for WT series power<br>measuring instruments
GateOPC: Interface for OPC DA server<br>GateMODBUS: Interface for MODBUS<br>(TCP/RTU)
GateEye: Real time image transfer from<br>Web cameras to AddObserver<br>monitoring panels.

Examples:
1 MX LOGGER analog pattern output and data acquisition using<br>MDXLOGGER.
2 Integrated data acquisition on WT1600 and MX100 using<br>MXLOGGER (via MXLOGGER).
3 Data recording and monitoring on a group-by-group basis using<br>GateWT.
4 Display and compare data files across groups<br>and lots using DataBrowser.

• Product Specific Package<br>DAQLOGGER Client: Remote monitor for<br>DAQLOGGER.
AddObserver: Real time monitoring on<br>user-created screens (with<br>“Builder” screen editor).
AddObserver Runtime: Real time monitoring on<br>user-created screens (runtime<br>version).
AddMulti: Acquisition on a group-by-group<br>basis (50 ch × 50 groups).
AddTrigger: Acquisition using a wide array of<br>trigger conditions.

• Product Specific Package<br>DAQ32Plus: For DARWIN, shortest<br>acquisition interval of 0.5 seconds.
MXLOGGER: For the MX100, shortest<br>acquisition interval of 10 ms.
DAQEXPLORE: For DXAdvanced/DX/CX/MV,<br>automatic data file transfer<br>Remote monitor for DAQ32Plus.<br>Monitor (Common to All).<br>DataBrowser: File searching and<br>multi-waveform display.

OPC Interface Package

OPC (OLE for Process Control) is a comprehensive<br>interface standard for communication between applications.<br>Established by the OPC Foundation in the US, OPC is<br>recognized as an international standard. DAQOPC allows<br>DARWIN, DARWIN Series (DP410), DX/DC/PC/CM Series<br>(DXA410) units to connect with a wide variety of client<br>applications (SCADA software and user application<br>software).

DAQOPC Features

• DAQOPC is an OPC server which supports OPC Data<br>Access Version 2.0.
• DAQOPC provides OPC clients with custom interfaces and<br>automation interfaces.
• DAQOPC supports the browser function, enabling OPC<br>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<br>identifiers, and writes process data through communication<br>input channels (C01 through C60).

System configuration

• Server/client configuration<br>DAQOPC users (OPC clients) can be configured in the<br>following two ways:
  • OPC client coexisting on the same PC as DAQOPC<br>  • OPC client present on host computer (Windows 2000/XP)
• Multiple-client configurations
  Multiple OPC clients can access a single DAQOPC.

• Multiple-server configurations
A single OPC client can access multiple DAQOPC<br>servers.

Compatible Equipment

• DXA410: 100/200/300/400/500/600/610/620/630/640/650/660/670/680/690/6900/6910/6920/6930/6940<br>• DP410: 100/200/300/400/500/600/610/620/630/640/650/660/670/680/690/6900/6910/6920/6930/6940<br>• Communication standards:
  Ethernet: All models listed above<br  RS-232/RS-422/RS-485: All models listed above except<br  DX410/DP410/DAQ32Plus/DAQEXPLORER.<br>• Operating systems: Windows 2000 and XP Professional

Application capacity

A number of connected clients: Up to 100<br>• A number of group objects: Up to 1000<br>• A number of registered item IDs: Up to 10,000<br>• A number of cache updated item IDs: Up to 100,000<br>• Cache updating interval: 1 to 3600 sec<br>• A number of connected units: Up to 24
• A number of connected units (DP410): Up to 16
Datum-Y, Datum-LOGGER

Compact Data Logger Offering Best-in-class Noise Resistance and Communication Function

**Datum-Y (XL120 Series)**

Portable Data Station (Data Logger)

- All channels adopt universal insulated inputs
- 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
- 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.

**External storage medium:**
- Compact flash memory card (Type II), SD card, USB memory
- External storage media: USB memory that have been verified by Yokogawa are recommended.
- Only the copy function is supported by USB memory. Only those USB memories that have been verified by Yokogawa are recommended.

**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, w/ Screw in type terminal block unit</td>
<td></td>
</tr>
<tr>
<td>XL122</td>
<td>16ch, w/ Screw in type terminal block unit</td>
<td></td>
</tr>
<tr>
<td>XL124</td>
<td>16ch, w/ 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(IEC Standard)</td>
<td></td>
</tr>
<tr>
<td>-H</td>
<td>Power cord(BS Standard)</td>
<td></td>
</tr>
<tr>
<td>-R</td>
<td>Power cord(AU Standard)</td>
<td></td>
</tr>
<tr>
<td>-S</td>
<td>Power cord(IS 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, 74.4 V</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>Communication cable</td>
<td>91011</td>
<td>RS-232 communication cable for PC (9 pin)</td>
</tr>
<tr>
<td>Printer</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>AC adapter</td>
<td>94006</td>
<td>Power supply 200-240 V</td>
</tr>
<tr>
<td>AC adapter</td>
<td>94007</td>
<td>Power supply 100-120 V</td>
</tr>
</tbody>
</table>
Portable Test Instruments

**Electric Power Analysis & Power Supply Quality Control**

**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, 3P3W, 3P4W, 3P4W4i
  - Multipul system Load Measurement:
    - 1P2W × 2, 1P3W × 2, SCOTT Wiring (1P3W + 3P3W)
- **Range:**
  - Voltage: 150/300/600/1000 V
  - Current: 200.0 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

**Low-cost Tools to Support Your Energy Conservation**

**CW120 Series Specifications**

- **Measurement Item:**
  - Voltage rms (V), Current rms (A), Active Power (W) and Frequency (Hz)
- **Wiring:**
  - CW120: 1P2W, 1P3W, 3P3W and 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

**Effective power supply quality and power saving management for PCs**

**AP240E**

Data Analytic Program for CW series

- **Data Management**
- **Data Display Selection**
- **Graph Display**
- **Daily Report Display, Weekly / Monthly Report Display**
- **Harmonic Graph Display**
- **Harmonics Instant Value Display**
- **Waveform Data Display**
- **Voltage Change Display**

**Clamp Probes for CW240/CW120 series**

<table>
<thead>
<tr>
<th>Model</th>
<th>96036</th>
<th>96033</th>
<th>96030</th>
<th>96031</th>
<th>96032</th>
<th>96034</th>
<th>96035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter of measurable conductor</td>
<td>ø 40 mm</td>
<td>ø 18 mm</td>
<td>ø 30 mm</td>
<td>ø 30 mm</td>
<td>ø 65 mm</td>
<td>65 x 100 mm</td>
<td>ø 170 mm</td>
</tr>
<tr>
<td>Measuring Range</td>
<td>AC 2 A</td>
<td>AC 2 A</td>
<td>AC 200 A</td>
<td>AC 500 A</td>
<td>AC 700 A (1000 A 5 min)</td>
<td>AC 1200/2000/3000 A</td>
<td>AC 300/3000 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 50 mV</td>
<td>AC 250 mV</td>
<td>AC 500 mV</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>20 Hz to 5 kHz</td>
<td>20 Hz to 5 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 dimension</td>
<td>ø 150 x 25 mm</td>
<td>52 x 106 x 25 mm</td>
<td>73 x 130 x 30 mm</td>
<td>73 x 150 x 30 mm</td>
<td>100 x 172.5 x 32 mm</td>
<td>120 x 310 x 48 mm</td>
<td>140 x 64 x 28 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. 500 g</td>
<td>Approx. 1,390 g</td>
<td>Approx. 470 g</td>
</tr>
</tbody>
</table>

* Need to purchase AC adapter separately
### Portable Test Instruments

#### CA150

**Handy Calibrator**

### 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
  - Frequency/pulse

### Applications

#### Two-wire Type Transmitter Applications

- **Two-wire type transmitter (measurement function) application**
  
  - **Loop check function**
    
    Measures mA DC 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 DC 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>1000 mV</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>1 V</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>10 V</td>
<td>1 mV</td>
</tr>
<tr>
<td>100 V</td>
<td>10 mV</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>9 V</td>
<td>0.1 mV</td>
</tr>
<tr>
<td>15 V</td>
<td>0.5 mV</td>
</tr>
</tbody>
</table>

#### DC current

<table>
<thead>
<tr>
<th>mA/SINK</th>
<th>20mA</th>
<th>10A</th>
</tr>
</thead>
</table>

#### Ohm

| 5 kΩ   | 0.1 Ω |
| 25 kΩ  | 0.5 Ω |

#### RTD

| PT100  | ±0.1°C |
| JPT100 | ±0.1°C |

#### Thermocouple

| K       | 0.1°C |
| J       | 0.1°C |
| N       | 0.1°C |
| R       | 0.1°C |
| S       | 0.1°C |
| B       | 1°C   |

#### Frequency/pulse

| 1CPH   | 0.001 kHz |
| 1CPM   | 0.01 kHz  |
| 10kHz  | 0.1 kHz   |
| 100kHz | 1 kHz     |

### General Specifications

- **Communication functions**: Serial interface
- **Memory functions**: Data can be stored and loaded in setting memory
- **Common source specifications**
  - Power supply: 6 AA size alkaline batteries
  - Battery life Conditions:
    - When NiMH battery is used: Approx. 10 hours
    - When 6 batteries are used: Approx. 8 hours
  - Auto power-off: Approx. 10 minutes
  - Insulation resistance: Between input terminal and output terminal:
    - 500 VDC, 50 MΩ
  - Withstand voltage: Between measurement terminal and generation terminal:
    - 500 VDC, 50 MΩ
  - Insulation resistance: Between input terminal and output terminal:
    - 500 VDC, 50 MΩ
  - **Operating temperature/humidity range**: 0 to 40°C, 20 to 80% RH (no condensation)
  - **Storage temperature range**: -20 to 60°C (90% RH or less (no condensation)
  - **Weight**: Approx. 1000 g (with Batteries)
  - **Dimensions**: Approx. 251 x 124 x 70 mm
  - **Accessories**:
    - Lead cable for measurement: 1 set
    - Lead cable for generation: 1 set
    - Terminal adapter: 1
    - Size AA battery: 6
    - Fuse for measurement: 1 (spare)
  - **Conforming Standards**:
    - Safety: EN 61010-1
    - EMC: EN 61326 Class B, EN 55011 Class B Group 1
    - UL/CSA: EN 61000-3-2, EN 61000-3-3, EN 60601-1

### 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>94015</td>
<td>93027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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>1 V</td>
<td>0.05% + 0.01 mV</td>
<td>0.01 mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 V</td>
<td>±0.2% + 1 mV</td>
<td>1 mV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 V</td>
<td>±0.02% + 10 mV</td>
<td>10 mV</td>
<td></td>
</tr>
<tr>
<td>DC current</td>
<td>20 mA</td>
<td>0.02% ± 3 µA</td>
<td>1 µA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4–20 mA</td>
<td>4-8/12/16/20 mA</td>
<td>4 mA</td>
<td></td>
</tr>
<tr>
<td>IA SINK</td>
<td>20 mA</td>
<td>0.05% ± 5 µA</td>
<td>5 µA</td>
<td></td>
</tr>
</tbody>
</table>

### Measurement Unit

- Both CA51 and CA71
- CA71 only

### Source and Measuring of Voltage and Current

#### CA51/CA71, CA11E, CA12E

**Handy Calibrators**

**Features**

- Source and measure operations can be performed at the same time.
- (Select from the following source signal and measurement signal options: voltage, current, resistance, thermocouple (TC), resistance temperature detector (RTD), frequency, pulse).
- AC voltages, including supply voltage, can be measured.
- Easy operation.
- Compact size and Lightweight
- Includes a wide array of additional functions.
- Memory function
- Sweep function
- Source
- Includes a wide array of additional functions.
- RS-232C-compliant optically isolated interface
- Changes the output value in step form based on the setting from the divided output values set in steps of 4-20 mA
- Simultaneous Signal Source and Measurement Capability
- Four AA batteries, or four AA batteries or AC adapter
- Memory check function
- Auto-power-off function
- Battery life
- Approximately 10 minutes (auto-power-off can be disabled through a DIP switch setting)
- Power supply
- Four AA (R6) dry cells or AC adapter
- Weight
- Approximately 1.95 kg (including batteries)

### General Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Four AA alkaline batteries, or optional AC adapter (sold separately)</td>
</tr>
<tr>
<td>Battery life</td>
<td>Measurement off, output: 9 V DC/10 kΩ or greater: Approximately 40 hours</td>
</tr>
<tr>
<td></td>
<td>Stray source signal measurement: Output: 0.1 V DC/100 kΩ or greater: Approximately 20 hours</td>
</tr>
<tr>
<td></td>
<td>Stray source signal measurement: Output: 20 mA/5 V (approximately 12 hours using alkaline batteries, with backlight off)</td>
</tr>
<tr>
<td>Auto-power-off function</td>
<td>Approximately 10 minutes (auto-power-off can be disabled through a DIP switch setting)</td>
</tr>
<tr>
<td>Applicable standards</td>
<td>EN61326-1, EN61010-1, EN61010-2-31, EN50011, IEC 61010-1, Class II, Group I</td>
</tr>
<tr>
<td>Operating temperature and humidity ranges</td>
<td>0–50°C, 20–80% RH (no condensation)</td>
</tr>
<tr>
<td>External dimensions (W×D×H)</td>
<td>Approximately 190×130×95 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>Approximately 730 g (excluding batteries)</td>
</tr>
</tbody>
</table>

### Source and Measuring of Voltage and Current

#### CA51/CA71

**Handy Calibrators**

**Features**

- Source
- Values set in steps of 4-20 mA
- Stray source signal measurement
- Output settings are divided, eliminating the need for bothersome calculations for percentage output.
- Auto-test function
- Changes the output value in step form based on the setting from the divided output files.
- Online calibration (CA71 only)
- RS-232C-compliant optically isolated interface
- Measurement
- Linearly increases or decreases the output.
- The increasing/decreasing time can be set to either 16 or 32 seconds.
- Memory function
- Source values and measurements forming individual value sets can be saved to or read from the Handy Calibrator’s internal memory (maximum 50 value sets).
- Temperature monitor function

### Simulator of Common Thermocouples and RTD Sensors

#### CA11E

**Voltage/Current Calibrator**

**Specifications**

- Source: DCV: 30/10/3 V/100 mV
- DCA: 20/4–20 mA SINK
- Measurement: DCV: 30/10/3 V/100 mV
- DCA: 20 mA
- Genetal Specifications
  - External dimensions: 192 (W) x 90 (H) x 42 (D) mm
  - Weight: approx. 440 g
- Power Supply: Four AA (R6) dry cells or AC adapter

#### CA12E

**Temperature Calibrator**

**Specifications**

- Source
- TC: RTD PT100, 100 mA, 400Ω
- Measurement
- TC: RTD PT100, 100 mA, 400Ω
- Genetal Specifications
  - External dimensions: 192 (W) x 90 (H) x 42 (D) mm
  - Weight: approx. 440 g
  - Power Supply: Four AA (R6) dry cells or AC adapter
**Selection Guide, TY700 series**

**Portable Test Instruments**

**Digital Multimeters**

**TY700 Series**

**Digital Multimeters Specifications**

- **Model**: TY710, TY720, TY520, TY530, 73201, 73202, 73203, 73204, 73101

**TY700 Series**

<table>
<thead>
<tr>
<th>Model</th>
<th>Handheld</th>
<th>Pocket-sized</th>
</tr>
</thead>
<tbody>
<tr>
<td>TY710</td>
<td>50000</td>
<td></td>
</tr>
<tr>
<td>TY720</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>TY520</td>
<td>4300</td>
<td></td>
</tr>
<tr>
<td>TY530</td>
<td>4300</td>
<td></td>
</tr>
<tr>
<td>73201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73203</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73204</td>
<td></td>
<td></td>
</tr>
<tr>
<td>73101</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**General Specifications**

- **Display Measurement Items Additional Functions**
  - RMS
  - Peak Hold
  - Auto Hold
  - Max./Min. Value Memory
  - Zero Setting
  - Low-Power Consumption
  - Frequency
  - Capacitance
  - Continuity Check
  - Data Memory
  - Auto Power Off
  - Comparator
  - Alarm Output

- **Additional Functions**
  - USB communication (optional adapter & software)
  - data management, relative/percentage value computation, logarithm computation, data auto hold, peak hold (TY720), overvoltage warning, backlight

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

- **Battery Life**
  - Approx. 120 hours

- **Dimensions**
  - 90 (W) x 192 (H) x 49 (D) mm

- **Weight**
  - Approximately 560 g (including batteries)

- **Safety Standards**
  - 1000 V CAT. III, 600 V CAT. IV

- **Components**
  - Shockproof elastomer casing
  - Safe Design: Shutters prevent erroneous insertion of test leads into current measurement terminals (terminal shutters)
  - Full support of data management: Measured data stored in internal memory
  - Highly Reliable: Closed case calibration
  - Highly Reliable: Closed case calibration
  - Maximum Measurement Accuracy: 0.020% rdg + 2 dgt
  - Shockproof elastomer casing

- **Temperature**
  - 0°C to 50°C

- **Relative Value Computation Current**
  - 0.5 A

- **Switching selection (RMS or MEAN)**

- **Type**
  - DCV
  - ACV
  - DC/A (RMS)
  - AC/A (RMS)
  - Resistance
  - Low-power Resistance
  - Frequency
  - Capacitance
  - Continuity check
  - Scale factor
  - Temperature

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

- **Dimensions**
  - TY710:
    - 90 (W) x 192 (H) x 49 (D) mm
  - TY720:
    - 90 (W) x 192 (H) x 49 (D) mm

- **Battery Life**: Approx. 120 hours

- **Weight**: Approximately 560 g (including batteries)

- **Safety Standards**: 1000 V CAT. III, 600 V CAT. IV
Portable Test Instruments

**TY500 series, 732 series, 73101**

Provides Safety Levels Demanded in Field Work

### TY500 Series Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
<th>Mean Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
</tr>
</tbody>
</table>

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

### 732 Series Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>73201</th>
<th>73202</th>
<th>73203</th>
<th>73204</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
<td>0.5% + 1</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
<td>0.5% + 1</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>0.5% + 1</td>
<td>0.5% + 1</td>
</tr>
</tbody>
</table>

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

### Pocket DMM with Superb Portability

#### 73101 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
<th>Input Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>&gt;100 MΩ</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td>10 MΩ</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
<td></td>
</tr>
<tr>
<td>Continuity check</td>
<td>400 Ω</td>
<td>1.5% ± 1</td>
<td></td>
</tr>
<tr>
<td>Diode test</td>
<td>2.0 V</td>
<td>1.5% ± 1</td>
<td></td>
</tr>
</tbody>
</table>

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

---

**TY500 Series**

Digital Multimeters

- 3.5 digits (6,000-count, 31-segment bar graph display), RMS type
- Measurement Functions: Voltage, Current, Resistance, Continuity Check, Diode Test, Frequency, Capacitance, Temperature
- Features: Closed case calibration, Hi-impact overmold case, USB communication (optional adapter & software) (TY530 only), data memory (1,600 data for TY530 only)
- Safety Standards: 1000 V CAT. II, 600 V CAT. IV

**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

**73101**

Pocket Digital Multimeter

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

---

**TY500 Series Specials**

- **Accuracy:** ±(% rdg + dgt)
- **Display:** 4000 count
- **Continuity Check and Diode Test**
- **Auto Hold**
- **Auto Power Off**

**TY500 Series Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
</tbody>
</table>

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

---

**732 Series Specials**

- **Accuracy:** ±(% rdg + dgt)
- **Display:** 4000 count
- **Continuity Check and Diode Test**
- **Auto Hold**
- **Auto Power Off**

**732 Series Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
</tbody>
</table>

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

---

**Pocket DMM with Superb Portability**

- **Accuracy:** ±(% rdg + dgt)
- **Display:** 4000 count
- **Continuity Check and Diode Test**
- **Auto Hold**
- **Auto Power Off**

**73101 Specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACV</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>ACA</td>
<td>0.05 mV / 0.1 V</td>
<td>0.2% + 1</td>
</tr>
<tr>
<td>Continuity check</td>
<td>400 Ω</td>
<td>1.5% ± 1</td>
</tr>
<tr>
<td>Diode test</td>
<td>2.0 V</td>
<td>1.5% ± 1</td>
</tr>
</tbody>
</table>

**Accuracy:** (23°C ±5°C, Less than 80% RH), ±(% rdg + dgt)
CL120 Clamp-on Tester
- ACA
- ø 24
- AC/20 to 200A

CL120 Specifications

<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</td>
</tr>
<tr>
<td></td>
<td>20A</td>
<td>2.0+7</td>
</tr>
</tbody>
</table>

Accuracy: (23°C ±5°C, Less than 75% RH), ±(% rdg + dgt)

CL130/CL135 Clamp-on Testers
- ACA
- ø 33
- AC/200 to 2000A

CL130/CL135 Specifications

<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</td>
</tr>
<tr>
<td></td>
<td>400A</td>
<td>1.0+3</td>
</tr>
<tr>
<td>ACV</td>
<td>200V/600V</td>
<td>1.0+4</td>
</tr>
<tr>
<td>Resistance</td>
<td>200Ω</td>
<td>1.0+2</td>
</tr>
</tbody>
</table>

Accuracy: (23°C ±5°C, Less than 85% RH), ±(% rdg + dgt)

CL150/CL155 Clamp-on Testers
- ACA
- ø 54
- AC/400 to 2000A

CL150/CL155 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>200A</td>
<td>1.0+4</td>
</tr>
<tr>
<td></td>
<td>400A</td>
<td>1.0+5</td>
</tr>
<tr>
<td>ACV</td>
<td>200V/600V</td>
<td>1.0+4</td>
</tr>
<tr>
<td>Resistance</td>
<td>200Ω</td>
<td>1.0+2</td>
</tr>
</tbody>
</table>

Accuracy: (23°C ±5°C, Less than 75% RH), ±(% rdg + dgt)

CL220 Clamp-on Tester
- ACA/DCA
- ø 33
- AC/40 to 300A

CL220 Specifications

<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>40 A</td>
<td>2.5+4</td>
</tr>
<tr>
<td></td>
<td>300 A</td>
<td>3.5+4</td>
</tr>
</tbody>
</table>

Accuracy: (23°C ±5°C, Less than 85% RH), ±(% rdg + dgt)
### Oscilloscopes

**Digital Power**

#### CL320 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy: 23°C (±5°C, Less than 75% RH), ±(% rdg + dgt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>400/600 A</td>
<td>1.5 ±5 (50/60 Hz)</td>
</tr>
<tr>
<td>DCA</td>
<td>400/1000 A</td>
<td>1.0 ±6</td>
</tr>
<tr>
<td>ACV</td>
<td>40/400/600 V</td>
<td>1.5 ±5 (50/60 Hz)</td>
</tr>
<tr>
<td>DCV</td>
<td>40/400/600 V</td>
<td>1.0 ±6</td>
</tr>
<tr>
<td>Resistance</td>
<td>400/4000Ωt</td>
<td>1.0 ±5, Beeps at below 20Ω (continuity check)</td>
</tr>
<tr>
<td>Frequency</td>
<td>10 to 3000 Hz</td>
<td>1.5 ±5</td>
</tr>
</tbody>
</table>

#### CL250 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy: 23°C (±5°C, Less than 75% RH), ±(% rdg + dgt)</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 (0 to 1000 A)</td>
<td>3.0 ±4 (50 to 500 Hz)</td>
</tr>
<tr>
<td></td>
<td>2000A (1001 to 2000 A)</td>
<td>3.0 ±4 (500 to 1 kHz)</td>
</tr>
</tbody>
</table>

#### CL255 Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy: 23°C (±5°C, Less than 75% RH), ±(% rdg + dgt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>400A/2000A (0 to 1000 A)</td>
<td>1.5 ±3 (50/60 Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>400A/2000A (1001 to 2000 A)</td>
<td>3.0 ±4 (30 to 1 kHz)</td>
</tr>
<tr>
<td></td>
<td>2000A (1001 to 2000 A)</td>
<td>3.0 ±3 (50/60 Hz)</td>
</tr>
</tbody>
</table>

### Resistance

- **RMS ACA/DCA measurement**
- **Wide Range of ACA/DCA measurement**

#### CL325

**Clamp-on Tester**
- ACA/DCA
- ± 3
- AC/400 to 600A, DC/400 to 1000A
- AC V/DC V/2kHz
- RMS

#### CL250

**Clamp-on Tester**
- ACA/DCA
- ± 5
- AC/400 to 2000A, DC/400 to 2000A
- AC V/DC V/2
- DC Output
- Hz/RMS for CL255

#### CL255

**Clamp-on Tester**
- ACA/DCA
- ± 5
- AC/400 to 2000A, DC/400 to 2000A
- AC V/DC V/2
- DC Output
- Hz/RMS for CL255

### Leakage Currents of 1 mA measurement

#### CL320

**Leakage Clamp-on Tester**
- ACA
- ± 3
- AC 20mA to 200A

#### CL340

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 40mA to 400mA
- RMS for CL345

#### CL345

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 40mA to 400mA
- RMS for CL345

### Compact design of Leakage current measurement

#### CL320

**Leakage Clamp-on Tester**
- ACA
- ± 3
- AC 20mA to 200A

#### CL340

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 40mA to 400mA
- RMS for CL345

#### CL345

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 40mA to 400mA
- RMS for CL345

### Portable Instruments

- **Portable Test Instruments**
- **Wireless Communication**
- **Test Instruments**
- **Generators, Optical Data Acquisition Equipment, Analyzer**

#### CL360

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 200mA to 1000A
- DC/AC Output

#### 30031A/30032A

**Leakage Clamp-on Tester**
- ACA
- ± 0.4
- AC 200mA to 60 A

#### 30031A/30032A Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Range</th>
<th>Accuracy: 23°C (±5°C, Less than 85% RH), ±(% rdg + dgt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCA</td>
<td>0 to 30 mA</td>
<td>1.5 ±5 (50/60 Hz)</td>
</tr>
<tr>
<td>ACA</td>
<td>0 to 30 mA</td>
<td>1.5 ±5 (50/60 Hz)</td>
</tr>
<tr>
<td>30031A</td>
<td>50 to 60 A</td>
<td>2.5 ±5 (1kHz)</td>
</tr>
<tr>
<td>30032A Filter ON</td>
<td>50 to 60 A</td>
<td>5.5 ±5 (50/60 Hz)</td>
</tr>
<tr>
<td>30032A Filter OFF</td>
<td>50 to 60 A</td>
<td>5.5 ±5 (50/60 Hz)</td>
</tr>
</tbody>
</table>
## Measuring Instruments

### Analyzer Sources

- Optical Oscilloscopes, Digital Power Generators, Communication Test Instruments

### Measurement Instruments

- Wireless Portable Test Instruments

### Other Test & Insulation Testers

- Meters Products

### Recorders Control Products
- Data Acquisition

### Digital insulation testers

**Type**

- **Digital insulation testers**
  - 4 ranges
  - 2 & 3 ranges
  - Single range

### Model: MY40

**Display**: 3 1/2-digit LCD

**Additional Function**
- Automatic discharge
- Comparator function
- Memory function

### Testing Performance Specifications

#### 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) × 103 (H) × 53 (D) (mm), excluding protrusions
- Weight: 420 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>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>Instability Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY40-01</td>
<td>125V/200MΩ</td>
<td>1kΩ</td>
<td>4000</td>
<td>4.000</td>
<td>0–119.9MΩ</td>
<td>±(5% of rdg + 6dgt)</td>
<td>0.125MΩ</td>
<td>1mA</td>
<td>5MΩ</td>
</tr>
<tr>
<td></td>
<td>250V/500MΩ</td>
<td>1kΩ</td>
<td>4000</td>
<td>4.000</td>
<td>0–499.9MΩ</td>
<td>±(5% of rdg + 6dgt)</td>
<td>0.25MΩ</td>
<td>1mA</td>
<td>5MΩ</td>
</tr>
<tr>
<td></td>
<td>500V/1000MΩ</td>
<td>1kΩ</td>
<td>4000</td>
<td>4.000</td>
<td>0–999.9MΩ</td>
<td>±(5% of rdg + 6dgt)</td>
<td>0.5MΩ</td>
<td>1mA</td>
<td>5MΩ</td>
</tr>
<tr>
<td></td>
<td>1000V/2000MΩ</td>
<td>1kΩ</td>
<td>4000</td>
<td>4.000</td>
<td>0–1199.9MΩ</td>
<td>±(5% of rdg + 6dgt)</td>
<td>2MΩ</td>
<td>0.5mA</td>
<td>50MΩ</td>
</tr>
</tbody>
</table>

* First effective measuring range; ** The minimum value at which the rated voltage can be maintained

### 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>
<th>Open-circuit Voltage</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>
<td>≤4Ω</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>0.1Ω</td>
<td>±2% of rdg + 6dgt</td>
<td>≤4Ω</td>
</tr>
</tbody>
</table>

### Notes

- Standard test conditions
  - Ambient temperature/humidity ranges: 23 ±5°C/45-75% RH
  - Tolerances under the above-mentioned conditions:
  - Deviation from zero scale value: 6 digits maximum
  - Indication of – mark on bar graph: Approx. 400 MΩ min. (1000 V/1000 V)
  - Approx. 400 MΩ min. (125 V/250 V)
- Open circuit voltage: 100% max. of rated voltage
- Rated measuring current: 1 mA (0 to 20%) when in first effective measuring range
- Short-circuit Current: 2 mA max.
Analog models with two and three ratings

### Features
- AC voltage measurement
- Automatic discharge
- Sky blue EL backlight

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

### Testing Performance Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix code</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 Value</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>240631</td>
<td>-E</td>
<td>25V/50MΩ</td>
<td>0.01–1MΩ</td>
<td>0.1MΩ</td>
<td>0–100V</td>
<td>0.1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240641</td>
<td>-E</td>
<td>50V/100MΩ</td>
<td>0.01–10MΩ</td>
<td>10MΩ</td>
<td>0–200V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240632</td>
<td>-E</td>
<td>125V/200MΩ</td>
<td>0.1–100MΩ</td>
<td>100MΩ</td>
<td>0–500V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240642</td>
<td>-E</td>
<td>250V/500MΩ</td>
<td>0.1–50MΩ</td>
<td>50MΩ</td>
<td>0–1000V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240643</td>
<td>-E</td>
<td>500V/1000MΩ</td>
<td>0.01–50MΩ</td>
<td>50MΩ</td>
<td>0–2000V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240634</td>
<td>-E</td>
<td>250V/1000MΩ</td>
<td>0.1–50MΩ</td>
<td>50MΩ</td>
<td>0–2000V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240644</td>
<td>-E</td>
<td>500V/1000MΩ</td>
<td>0.01–50MΩ</td>
<td>50MΩ</td>
<td>0–2000V</td>
<td>1mA</td>
<td>1mA</td>
</tr>
<tr>
<td>240645</td>
<td>-E</td>
<td>1000V/2000MΩ</td>
<td>0.01–50MΩ</td>
<td>50MΩ</td>
<td>0–2000V</td>
<td>1mA</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

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) × 103 (H) × 53 (D) (mm), excluding projections
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 Value (Ω)</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>MY10-01</td>
<td>125V/200MΩ</td>
<td>0.01–20MΩ</td>
<td>20MΩ</td>
<td>0–250V</td>
<td>0.25MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-02</td>
<td>250V/500MΩ</td>
<td>0.01–50MΩ</td>
<td>50MΩ</td>
<td>0–500V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-03</td>
<td>500V/1000MΩ</td>
<td>0.06–100MΩ</td>
<td>100MΩ</td>
<td>0–1000V</td>
<td>1MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-04</td>
<td>500V/1000MΩ</td>
<td>0.5–1000MΩ</td>
<td>1000MΩ</td>
<td>0–2000V</td>
<td>1MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>MY10-05</td>
<td>1000V/2000MΩ</td>
<td>1–2000MΩ</td>
<td>2000MΩ</td>
<td>0–5000V</td>
<td>2MΩ</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

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
- Automatic discharge
- AC voltage measurement
- Sky blue EL backlight

### General Specifications
Dimensions: Approx. 110 (W) × 180 (H) × 60 (D) (mm)
Weight: Approx. 700 g including batteries, or approx. 1.2 kg 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 Value (Ω)</th>
<th>Rated Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>321341</td>
<td>100V/200MΩ</td>
<td>0.05–20MΩ</td>
<td>20MΩ</td>
<td>0–150V</td>
<td>0.15MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>321342</td>
<td>250V/500MΩ</td>
<td>0.05–50MΩ</td>
<td>50MΩ</td>
<td>0–250V</td>
<td>0.25MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>321343</td>
<td>500V/1000MΩ</td>
<td>0.1–100MΩ</td>
<td>100MΩ</td>
<td>0–300V</td>
<td>0.3MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>321344</td>
<td>500V/1000MΩ</td>
<td>1–1000MΩ</td>
<td>1000MΩ</td>
<td>0–300V</td>
<td>0.5MΩ</td>
<td>1mA</td>
</tr>
<tr>
<td>321345</td>
<td>1000V/2000MΩ</td>
<td>2–2000MΩ</td>
<td>2000MΩ</td>
<td>0–3000V</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

---

**Portable Test Instruments**

**Insulation Testers**

**2406E series, MY10 series, 3213A series**

**Analog Insulation Testers**

**2406E Series**

**Analog Insulation Testers**

**MY10 Series**

**Analog Insulation Testers**

**3213A Series**

**Analog Insulation Testers**
**Measuring Instruments**

- **Equipment**
  - Analyzer
  - Datacomm

- **Sources**
  - Optical

- **Data Acquisition**
  - Oscilloscopes
  - Digital Power
  - Generators
  - Test Instruments

- **Next Generation**
  - Measurement Instruments
  - Shields 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
  - Three input resistance ranges – 1, 1.5 and 2 kΩ

- **Leakage Current Tester**
  - 322610
  - Batteries: One 9 V 6F22(S-006P)
  - Weight: Approx. 260 g
  - Dimensions: Approx. 122 × 74 × 38 (mm)

- **Portable Test Instruments**
  - Earth Tester
  - 323511
  - Handy and rugged and shockproof
  - A-C potentiometer bridge, synchronous detector
  - 3-terminal measurement of earth resistance
  - Accurate, wide-range logarithmic scale
  - AC potentiometer bridge, synchronous detector
  - Built-in overload protection circuit
  - Shockproof indicator using taut band movement
  - 100 µA full scale value
  - ±2.5% full scale accuracy
  - Three input resistance ranges – 1, 1.5 and 2 kΩ

- **Digital Illuminance Meters**
  - 510 series
  - Intensity of illumination can be adjusted at noon
  - Digital Thermometers

- **TX10 Series**
  - 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 T: -200 to 700 deg.C
  - Resolution
    - 0.1 deg.C (when resolution is set at 1 deg.C)
    - 0.01 deg.C (when resolution is set at 0.1 deg.C)
  - Accuracy
    - ±2.0% of full scale value on current and voltage ranges
    - ±0.5% of full scale value on resistance ranges
    - ±2.5% of full scale value on temperature ranges
  - 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 × 33 (mm)
  - Weight: Approx. 1.5 kg for Instrument only

- **510 Series Specifications**
  - Photoelectric Element: Silicon Photodiode
  - Response Time: 5 sec. (Auto Range) 2 sec. (Manual Range)
  - Accuracy: ±2% rdg. ±1 dgt.
  - Dimensions: Approx. 190 × 90 mm (excluding handle)
  - Weight: Approx. 1.0 kg

- **510 Series**
  - Measuring range: 9.99 (51002)/99.9999/9999.99/999999/999999/0000X
  - Response Time: 5 sec. (Auto Range) 2 sec. (Manual Range)
  - Accuracy: ±2% rdg. ±1 dgt.

- **510 Series Specifications**
  - General Specifications
  - External dimensions (main unit): Approx. 67 (W) × 117 (H) × 38 (D) (mm)
  - Weight: Approx. 260 g
  - Batteries: One 9 V 6F22(S-006P)

- **510 Series Digital Illuminance Meters**
  - Measuring range: 9.99 (51002)/99.9999/9999.99/999999/999999/0000X
  - Response Time: 5 sec. (Auto Range) 2 sec. (Manual Range)
  - Accuracy: ±2% rdg. ±1 dgt.
  - External dimensions: 190 × 90 mm (excluding handle)
  - Weight: Approx. 1.0 kg

- **510 Series Digital Thermometers**
  - Measuring range: 20 Hz to 5 kHz
  - Power Source: Two 9 V dry cells
  - Continuous Operating Time: Approx. 290 hours
  - Dimensions: Approx. 190 × 124 × 33 (mm)
  - Weight: Approx. 1.5 kg for Instrument only

- **Earth Tester**
  - 323511
  - Single Dial Measurement Without Range Change
  - Measuring Range:
    - Earth Resistance: 0 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 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.
TM10/TM20

Thermo-collectors

- 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.

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 (9-pin)</td>
<td>91021</td>
</tr>
<tr>
<td>Printer</td>
<td>87910</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

- 90010 Standard Needle Probe (90013 Rounded end probe for liquid)
  - Measuring range: -30°C to 200°C
  - Temperature range (T) Accuracy: -30°C ≤ T < -20°C ±1.0°C, 0°C ≤ T ≤ 100°C ±0.5°C, 100°C ≤ T < 150°C ±1.0°C, 150°C ≤ T ≤ 200°C ±2.0°C
  - Response: Approx. 6 seconds for 90% of final value

- 90011 High-speed Needle Probe
  - Measuring range: -30°C to 200°C
  - Temperature range (T) Accuracy: -30°C ≤ T < -20°C ±2.0°C, 0°C ≤ T ≤ 100°C ±1.5°C, 100°C ≤ T < 150°C ±1.5°C, 150°C ≤ T ≤ 200°C ±2.5°C
  - Response: Approx. 2 seconds for 90% of final value (90011)

Probes for TM20

- 90020 Material: SUS316
- 90021 Material: SUS316
- 90022 Material: SUS316
- 90023 Material: SUS316
- 90024 Material: SUS316
- 245907

External Dimensions

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

TM10/TM20 Specifications

<table>
<thead>
<tr>
<th>Product name (Model)</th>
<th>TM10 Thermocollector Thermometer model (54051)</th>
<th>TM20 Thermocollector Thermocouple model (54061)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of measuring channels</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Measuring range (only the main unit)</td>
<td>External thermometer: -30°C to 200°C</td>
<td>Built-in thermometer: -20°C to 50°C</td>
</tr>
<tr>
<td>Accuracy (only the main unit)</td>
<td>±0.3°C to ±1.0°C</td>
<td>±0.2°C to ±1.0°C</td>
</tr>
<tr>
<td>Collector mode: 1 second or longer Logging mode: 1 second to 24 hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data capacity</td>
<td>5000 data items when used in collector mode only. 20000 data item when used in logging mode only.</td>
<td></td>
</tr>
</tbody>
</table>

TM10/TM20

Temperature measurement and management of temperature data records

Probes for TM20/TX10

<table>
<thead>
<tr>
<th>Model</th>
<th>Probe type</th>
<th>Measuring range</th>
<th>Accuracy</th>
<th>Response time (second)</th>
<th>Sensor Diameter / Length (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90020</td>
<td>rounded end</td>
<td>-50 to 600°C</td>
<td>±0.4% or ±1.5°C</td>
<td>1.4</td>
<td>±0.3 to 200°C</td>
</tr>
<tr>
<td>90021</td>
<td>rounded end</td>
<td>-50 to 600°C</td>
<td>±0.4% or ±1.5°C</td>
<td>0.4</td>
<td>±0.3 to 150°C</td>
</tr>
<tr>
<td>90022</td>
<td>rounded end</td>
<td>-50 to 600°C</td>
<td>±0.4% or ±1.5°C</td>
<td>1.4</td>
<td>±0.3 to 200°C</td>
</tr>
<tr>
<td>90023</td>
<td>needle</td>
<td>-50 to 500°C</td>
<td>±2.5% or ±3.5°C</td>
<td>4.4</td>
<td>±0.3 to 150°C</td>
</tr>
<tr>
<td>90024</td>
<td>needle</td>
<td>-50 to 500°C</td>
<td>±4.5% or ±5.5°C</td>
<td>4.4</td>
<td>±0.3 to 150°C</td>
</tr>
<tr>
<td>90030</td>
<td>Surface straight</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90031</td>
<td>Surface angled</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90032</td>
<td>Surface straight</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90033</td>
<td>Surface angled</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90034</td>
<td>Surface straight</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90035</td>
<td>Surface angled</td>
<td>-20 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
<tr>
<td>90036</td>
<td>Bead TC</td>
<td>-40 to 250°C</td>
<td>±0.75% or ±2.5°C</td>
<td>2</td>
<td>±15 temp. sensing portion</td>
</tr>
</tbody>
</table>

Other Test & Measurement Instruments

Optical Measuring Instruments

Equipment

NOTE: 90020 is using polypropylene from objects to be measured. The accuracy numbers above were obtained with a measurement of liquids being agitated.

External Dimensions

- TM20 TX10
- Material: SUS316
- Material: SUS316
- Material: SUS316
- Material: SUS316
- Material: SUS316
- Material: SUS316
- 245907
- Material: SUS316
- Material: SUS316
- Material: SUS316
- Material: SUS316
- Material: SUS316
Decade Resistance Boxes 278610/278620

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.

278610/278620 Specifications
Available Models:
- 278610: 0.1 to 11,111 Ω (one decade dials)
- 278620: 1 to 1,111,110 Ω (six decade dials)

Residual Resistance: Less than 23 mΩ
Power Rating: 0.3W/step, within 3W for overall instrument.
Maximum Allowable Input: 0.5W/step, 5W for overall instrument.
Maximum Circuit Voltage: 250 V.
Operating Temperature Range: 0 to 40°C
Storage Temperature Range: -20°C to 50°C
Operating Humidity Range: 25 to 85%, relative humidity
Insulation Resistance: More than 500 MΩ at 500 V DC
Dielectric Strength: 1,500 V AC for one minute.

Used in testing laboratory and industrial test

2791 Series

2791 Series Specifications
Available Models:
- 279101: 4.8 kΩ, ±0.1%
- 279102: 1,200 Ω, ±0.5%
- 279105: 100 Ω, ±1%
- 279106: 20 Ω, ±2%
- 279110: 4.7 Ω, ±5%
- 279115: 2.2 Ω, ±10%

Allowable Deviation: ±3% of nominal value.
Insulation Resistance: More than 5 MΩ at 500 V DC between terminal and case.
Dielectric Strength: 1,000 V AC for one minute between terminal and case.

Portable Wheatstone Bridge 2755

1 Ω to 10 MΩ by operation of dials and switches

2755 Specifications
- Measuring Range: 1,000 Ω to 10.00 MΩ
- Ratio Arms (Multiplexer): 0.001, 0.01, 0.1, 1, 10, 100, 1000 (M10, M100, M1000...Murray & Varley loop testing)
- Accuracy: ±0.05% of reading on 100 Ω, ±0.1% of reading on 1 Ω, ±0.2% of reading on 10 Ω
- Temperature Coefficient of Resistance Elements: ±0.5%/°C
- Galvanometer: Sensitivity: 0.005 μA/div, 0.01 μA/div, 0.05 μA/div, 0.1 μA/div, 0.5 μA/div, 1 μA/div
- Power Source: Three 1.5 V batteries

Portable Double Bridge 2769

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

2769 Specifications
- Measuring Range: 0.1 mΩ to 110 Ω
- Galvanometer: Built-in electronic DC galvanometer, voltage sensitivity...approx. 20 μV/div

Note: Standard Resistor (Model 2771) is recommended for measurement on 0.1 mΩ to 110 Ω range, ±0.3% of reading on 10 MΩ range, ±0.1% on 100 MΩ range.

G1...approx. 1/10 of G0 sensitivity.
G2...approx. 1/110 of G0 sensitivity.
G3...approx. 1/1,000 of G0 sensitivity.
G4...approx. 1/10,000 of G0 sensitivity.
2011 to 2053

Portable Instruments

- 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.

Panel Meters

- Compliance with JIS C1102-2007
- Clearline Series
  Two types of movement suspension systems, Taut-band and Pivot & Jewel, are available to fit to various applications.
- FS,FL Series
  High visibility by adopting clear front cover.

Clearline Series and FS,FL Series

2100A Series

Switchboard Instruments

- Compliance with JIS C1102-2007
- DC Ammeters and Voltmeters
- AC Ammeters and Voltmeters
- High-frequency AC Ammeters and Voltmeters
- Audio-frequency AC Voltmeters
- Frequency Meters
- Power Factor Meters
- Wattmeters
- Miniature DC Ammeters and Voltmeters
- Miniature AC Ammeters and Voltmeters

0.5 Class Transducer for Power Applications

- Available for DIN rail and panel mountings
- Dimensions (mm)
  2371A, 2372A, 2373A, 2374A, 2375A, 2376A: 127(H) x 40(W) x 130(D)
  2377A, 2378A: 127(H) x 55(W) x 130(D)
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Portable Test Instruments