YOKOGAWA

Meters & Portable Instruments
ALL PRODUCTS GUIDE

(M Ed:)
Vol.3

Yokogawa Meters & Instruments Corporation

Catalog YMI110-EN

Main Products Line up

Data Logger

XL120 Series

Clamp-on Power Meter

CW240

CW120 Series

Handy Calibrator

P10-13

CA150

CA71

CA11E/CA12E

Digital Multimeter

TY700 Series TY500 Series 732 Series 73101

Clamp-on Tester

CL100 Series CL200 Series CL300 Series 30031A 30032A

Insulation Tester

MY40 MY10 Series 2406E Series 3213A Series

Earth Tester

3235

Leakage Current Tester

3226

Illuminance Meter

510 Series

Thermometer

TM20 TX10 Series

Precision Measuring Instruments

279301

276910

Meters Products

201314

204102

205206

[Data Logger]

Datum-Y^{tm} (XL121/XL122/XL124)

4P~6P

[Clamp-on Power Meter]

CW240、CW120／CW121、97042、AP240、960Series

7P~11P

[Handy Calibrator]

CA150、CA71、CA11E/CA12E

12P~15P

[Digital Multimeter]

TY700Series、TY500Series、732Series、73101

16P~19P

[Clamp-on Tester]

30031A/32A、CL100Series、CL200Series、CL300Series

20P~21P

[Insulation Tester]

MY40、MY10Series、2406ESeries、
3213ASeries

22P~25P

[Earth Tester, Other Products]

3235

Illuminance Meter 510 series　Leakage Current Tester 3226

26P

[Thermomenter]

TM20、TX10Series

27P

[Precision Measuring Instruments]

2723、2768、2755、2752、2769、2792A、
2786、2793、2791、2707、2708

28P

[Meter Products]

2011~2042、2051~2053、2241~2243、2261、
2215~2217、2222~2223

29P

[Discontinuance models list. (Sales end models).]

30P~31P

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

CE

Datum-Y (XL120 Series)

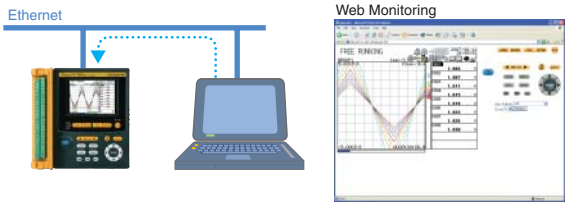
Portable Data Station (Data Logger)

Features

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

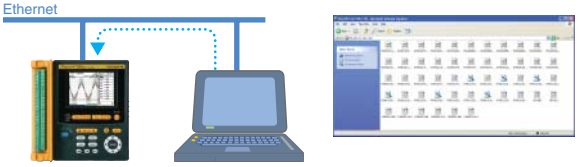
Web Server Function

You can easily monitor the Datum-Y screens with the Internet Explorer*1 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.
*1: Internet Explorer is a registered trademark of Microsoft Corporation.



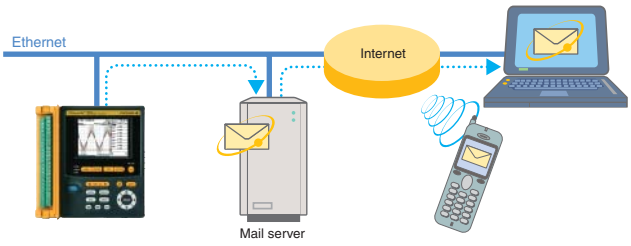
FTP Server Function

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



E-mail Delivery Function

You can deliver a text message to e-mail addresses specified in Datum-Y to notify of the occurrence and cancellation of alarms, the occurrence of errors in storage media and FTP client errors, power outage and recovery, and scheduled times.
You can attach the instantaneous data at that time to the email message.

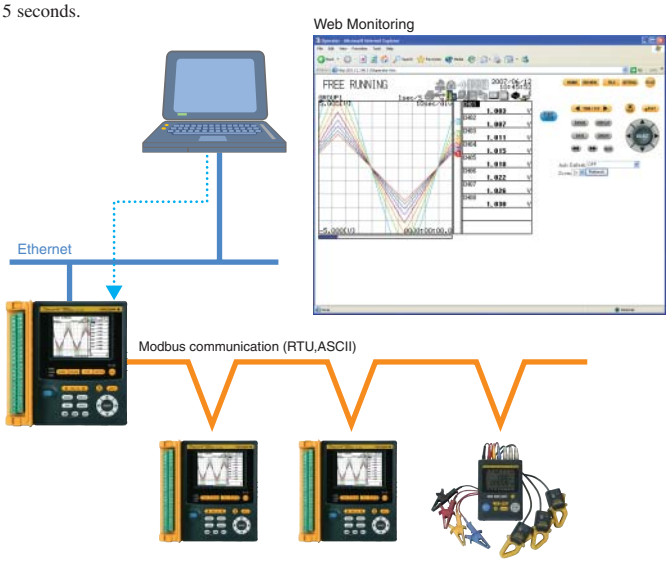


Specifications

Number of inputs : 8 channels (XL121), 16 channels (XL122, XL124)
Floating unbalanced input, insulated between channels
Measurement interval : 100 ms (only when the 8-channel terminal block is used), 200 ms, 500 ms, 1 sec, 2 sec, 5 sec, 10 sec, 20 sec, 30 sec, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, 1 hr
Input type : TC, RTD, DCV
* RTD for XL121 and XL122 only
Digital Pulse (1 ch), DI (2 ch)
Functions : Trigger Functions (Pre-trigger/trigger delay), Four arithmetic operation, Linear scaling, Statistical operation (MAX, MIN, AVE, P-P, RMS)
Communication Functions: Ethernet, USB, RS-232, RS-485
• Network Functions : Web server, FTP server, FTP client, E-mail delivery, Time synchronization
Serial communication Modbus protocol:
Transmission medium: RS-232 or RS-485
Transmission mode: RTU mode, ASCII mode
Data saving : Internal memory : 16 MB
External storage medium :
Compact flash memory card (Type II), SD card, USB memory
(Only the copy function is supported by USB memory. Only those USB memories that have been verified by Yokogawa are recommended.)
Display unit : 3.5-inch TFT color LCD (320 × 240 pixels)
External dimensions : Approx. 155 (W) × 155 (H) × 55 (D) mm
Weight : Approx. 800 g (Without battery and rubber boot)

LAN/RS-232,LAN/RS-485

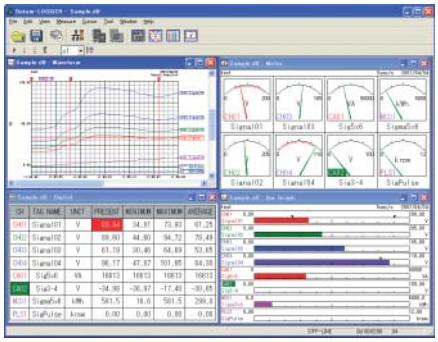
You can connect another Modbus protocol enabled device to Datum-Y to use all of the LAN functions while you are acquiring data.
* For the LAN/RS-232 or LAN/RS-485 communication protocol, the measurement interval is more than 10 seconds, and the Modbus communication interval is more than 5 seconds.



Model Number and Suffix Code

Model	Suffix code	Specification
XL121		8 ch, with Screw in type terminal block unit
XL122		16 ch, wth Screw in type terminal block unit
XL124		16 ch, with M3 screws type terminal block unit
	-D	Power cord (UL/CSA Standard)
	-F	Power cord (VDE Standard)
	-H	Power cord (GB Standard)
	-R	Power cord (AS Standard)
	-S	Power cord (BS Standard)

Application Software "Datum-LOGGER"



XL900

Application Software

Features

- 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)

Composite Operation on Four Dedicated Channels during Real-time Measurement

You can perform composite operations (e.g. log, Σ, and √, except for the four arithmetic operations) typical for a scientific electronic calculator on four dedicated arithmetic channels. You can create a calculation formula containing up to 16 terms comprising measured values and functions.

Measured Value Display at Two Points (A and B) with a Cursor

You can display each of the measured values at two points (A and B), the difference between the measured values (B-A), and the maximum, minimum, and average values between the two points. You can change the cursor position using the method of clicking on the waveform display and the method to specify the day and hour.

Analysis Screen Display for Measured Data

You can sort and display all the measurement data or the measured values between two points (A and B) in ascending or descending order, as well as sort and display the amounts of changes in ascending or descending order.

Specifications

■ Applicable models: Datum-Y firmware version 3.01 or later
■ Real-time measurement data acquisition functions
- Communication interface: Ethernet, USB, RS-232, RS-485
- Maximum number of units that can be connected:10 units
- Data acquisition channels (per unit): Analog channels (16 ch), Pulse channel (1 ch), Logic channels (2 ch), XL unit calculation channels (32 ch), Calculation channels dedicated to Datum-LOGGER (4 ch), Communication channels (32 ch)
- Measurement acquisition period: 1, 2, 5, 10, 20, 30 seconds, 1, 2, 5, 10, 20, 30 minutes, 1 hour

■ Display functions
- Display: Waveform, Digital, Bar graph, Meter display
- Cursor value display: Display of each measurement values, difference, maximum value, minimum value and average value of cursors A and B.
- Arbitrary cursor list display: Display a list of arbitrary cursors and comments inserted in a waveform graph.
- Alarm list display: Display a list of alarms for acquired data.
- Analysis view display: Display all specified channels, value differences between cursors A and B in descending or ascending order, and the rate of change in descending or ascending order.
- Horizontal Scroll: By scrolling a waveform display horizontally, it is possible to display data acquired in the past even during real-time acquisition.
- Resizing the Horizontal axis: Display all the acquired data or data between cursors A and B.
- Jump function: Re-display a waveform centering on a data selected in the cursor value display, arbitrary cursor list display, alarm list display or analysis view display.

■ Dedicated calculation functions (available for Real-time measurement)
■ Data load functions
Datum-Y main unit measurement files, Datum-LOGGER measurement files on PC.
■ File processing functions
- Partial storage: Save data between cursors A and B
- Divided storage: Save by specifying date/time intervals or store by dividing into specified number of files
- File division: Datum-Y measurement data files and Datum-LOGGER measurement data files stored on PC can be divided at the specified number of data interval or specified date/time interval.
- Combined storage: Combine and save divided sub files of Datum-LOGGER measurement data files.
- Skipped storage: Skip data using specified time intervals
- Storage format: Binary format (dedicated for Datum-LOGGER)

■ Report format storage: Save maximum, minimum and average of hourly reports, daily reports, weekly reports and monthly reports in CSV format. Measurement data can be added to CSV data to be stored.
■ Main unit setting functions: Send/receive setting details, load setting files and save setting files via communication.
■ Clipboard copy functions: Copy a displayed waveform image to the clipboard
■ Printing functions: Print a displayed waveform image

System requirements

OS	Windows 2000 (SP4 or later), XP (SP1 or later)
Display	XGA (1024 × 768) or higher, 65536color or higher
CPU performance	Pentium III 1.6 GHz or higher, Pentium 4 1.6 GHz or faster is recommended
Memory	512 MB or higher, 1 GB or more is recommended
Hard disk	At least 1 GB of free space

Optional Accessories

Model Number

	Name	Model No.	Description
Optional accessories	Type-K TC	90060	5 meter × 4 sets
	Carrying case	93037	To store the main unit and accessories
	Lithium ion battery	94009	2,400 mAh, 7.4 V
	Stand	93039	Supports tilted installation on the desktop, wall mounting, and DIN rail mounting
	Digital I/O cable	91029	For pulse/logic inputs and alarm outputs, 3 m
	Application Software (Datum-LOGGER)	XL900	For Datum-Y
	Communication cable	91011	RS-232 communication cable for PC (9 pin)
	Printer cable	91010	RS-232 cable for printer
	Printer	97010	Includes 1 roll thermal paper and 1 battery pack
	Printer thermal paper	97080	10 rolls/set
	AC adapter for printer	94006	Power supply 200-240 V
	Memory Card (256MB)	97034	256MB CF with PC Card Adapter
	Memory Card (512MB)	97035	512MB CF with PC Card Adapter
	Memory Card (2GB)	97037	2GB CF with PC Card Adapter

Printer (97010)

Carrying case (93037)

Lithium ion battery (94009)

Digital I/O cable (91029)

Stand (93039)

Check Temp Distribution of Water Cooler

Application

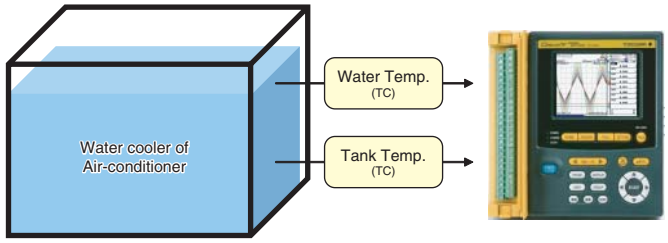
Maintenance for water cooler of air-conditioning equipment

Purpose

Temperature data acquisition for the maintenance of equipment.
Need to collect data without carrying PC and heavy data logger.

Decisive factor to purchase Datum-Y

- Compact and easy to carry
- Saved data can be checked at work site so no need to bring PC.



Evaluation Test Data for Electric Hot Water Supply Device

Application

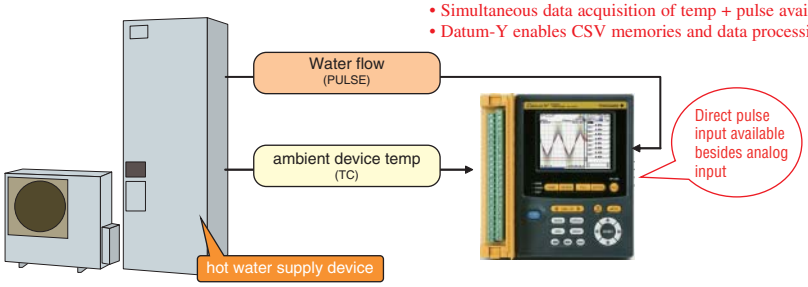
Device temp (TC) and water flow (pulse) evaluation test data in an electric hot water supply device.

Purpose

Quality inspection of device temp, water temp and water flow prior to equipment deliveries.
Comparison between water temp increase and water flow per number of sample data.

Decisive factor to purchase Datum-Y

- Simultaneous data acquisition of temp + pulse available with one unit.
- Datum-Y enables CSV memories and data processing by PC easily.



Measure concentration of CO and CO2 for environmental research

Application

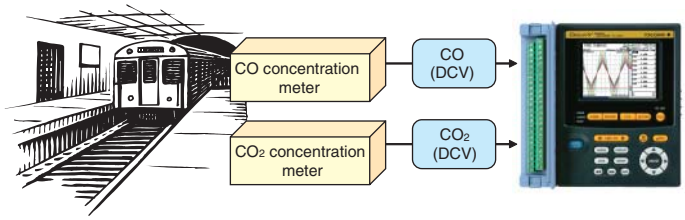
Measure concentration of CO and CO2 at Subway Stations

Purpose

Needed to measure & collect data for short term and check trend data.

Decisive factor to purchase Datum-Y

- Rubber boot (Not available for competitor models)
- Easy to carry around
- Easy to set scaling



Checking in Operating Conditions for Food Processing Device

Application

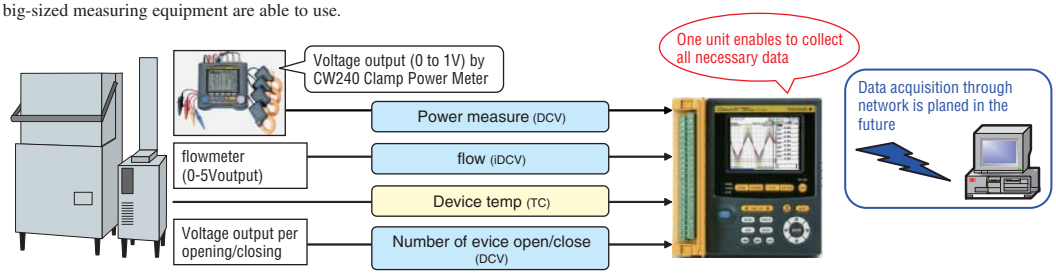
Checking of operating conditions at the customer's site (temp. water flow, power measurement)

Purpose

Realize the actual operating conditions of the device and data is commonly used. These data will be used for the maintenance service as well. Due to the limited space where the target device is located, no big-sized measuring equipment are able to use.

Decisive factor to purchase Datum-Y

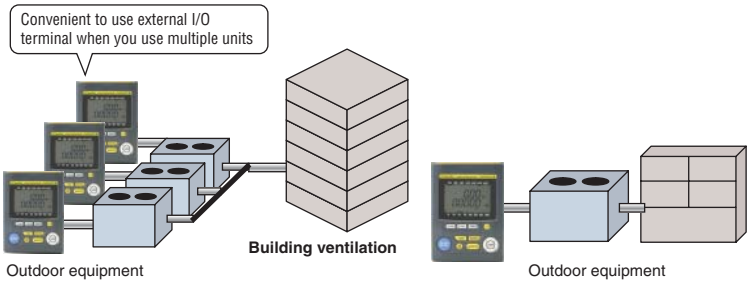
- Compact size and space saving design
- Set of communication functions that facilitate data acquisition.
  Periodical data acquisition will be possible without visiting customer's site.



Energy Saving for Air-conditioning & Freezing machine

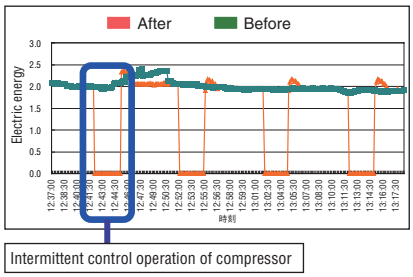
Introduction Example

Measure electric energy of Air-conditioning and compressor of Freezing machine to check energy-saving effect



Point: Min data saving interval is 1 second

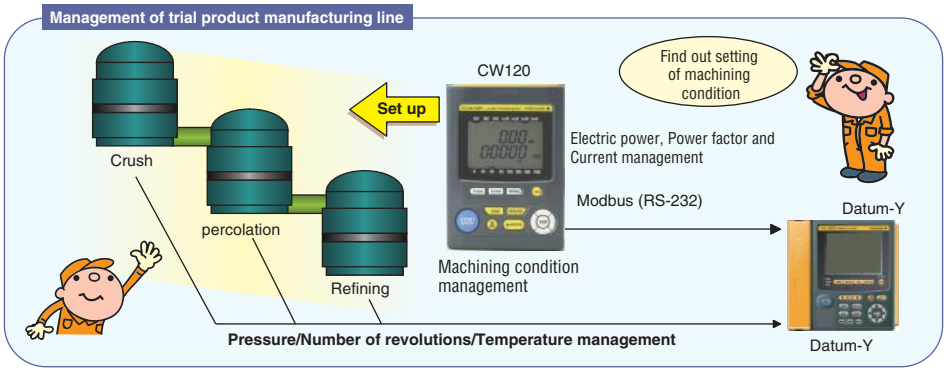
Can be measure electric energy for rise characteristics & Intermittent control operation



Intermittent control operation of compressor

Food company - Sesame oil production plant

Customer's Benefit : No need to use PC. Datum-Y to save all valuable data!



Harmonics measurement

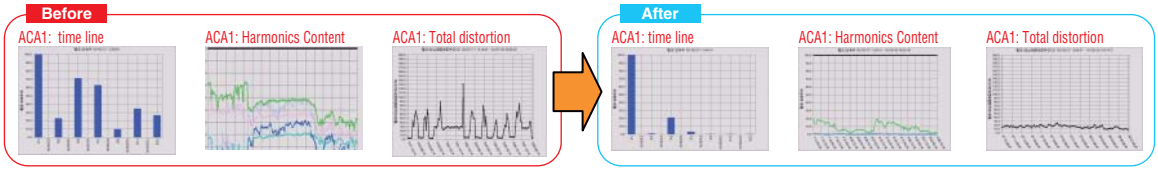
Case Example at Special Paper Printing Factory Facility : 500kV Transformer

- Problem: Periodically the printing machine is having trouble
  →Assume the problem caused by Harmonics on power supply line
  Odd order harmonics except 3rd order harmonics cause malfunction of electronics device or power equipments.
  Especially, 5th order harmonics cause burnout of D.C. reactor for power factor improvement condenser.

Use CW240's harmonics measurement function and found out harmonics on power supply line.
Harmonics e was generated by internal load.

Countermeasure: Set 5th and 7th transformer filter

Measured by CW240



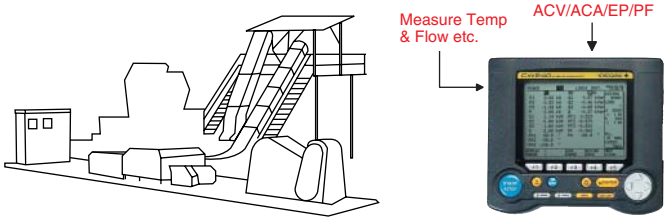
Result: Sharp decrease of relative harmonic content after 5thorder.Distortion rate is less than 30% maximum

Maintenance of Pumping Equipment

- Pump maintenance of water & sewerage system
- Measure voltage, current, flow, power factor, temperature and harmonics of pump motor

CW240 Solution

- CW240 is compact & handy type and easy to carry around the maintenance field
- Backup battery
- Can be measure voltage/current waveform for 1 cycle of commercial power supply
- Harmonics Noise measurement when pumps are running
- Can be monitor heat of pump motor by connection with analog output of thermometer
- Simultaneously measure consumption of electric energy and power factor, and use taken data to determine change timing of bearings.



Electric Power Analysis & Power Supply Quality Control

CW240

Clamp-on Power Meter

Features

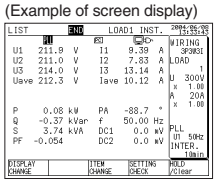
- Simultaneous measurement of power, harmonics, voltage fluctuation, and waveform
- Supports a range of connections
- Wide measurement range
- Leakage current measurement
- External memory
- Large LCD

Power Investigation Improves power Efficiency Through Detailed Data Collection

Measurement of Instantaneous Value:

The CW240 can be used to carry out investigation regarding renewal of electric equipment such as transformers in building, check load factors and demand factors, and to check current/voltage fluctuation at motor start-up.

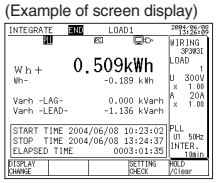
(Example of screen display)



Power Quantity Measurement:

The CW240 can measure and display the power quantity consumed up to the specified time (from the start of integration until the end).

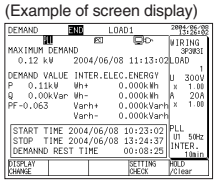
(Example of screen display)



Demand Measurement: For Review and Investigation on Contract Demand

•Demand
Demand time limit
: Length of time set to obtain the average power (normally 30 minutes)
Demand power
: Average power during the demand time limit

(Example of screen display)



Specifications

Inputs

Item	Voltage	Current
Input type	Resistive potential division	Clamp detection
Rated value (range)	150.0 V 300.0 V 600.0 V 1000 V	Varies with the clamp and range used. 96036 (2 A) 200.0/500.0 mA/1.000/2.000 A 96033 (50 A) 5.000/10.00/20.00/50.00 A 96030 (200 A) 20.00/50.00/100.0/200.0 A 96031 (500 A) 50.00/100.0/200.0/500.0 A 96032 (1000 A) 200.0/500.0 A/1.000 kA 96034 (3000 A range) 300.0/750.0 A/1.500/3.000 kA (2000 A range) 200.0/500.0 A/1.000/2.000 kA (1000 A range) 100.0/200.0/500.0 A/1.000 kA 96035 (3000 A range) 300.0/750.0 A/1.500/3.000 kA (300 A range) 30.00/75.00/150.0/300.0 A
Phase to be measured	Single-phase 2-wire, single-phase 3-wire, single-phase 3-wire 3-current (current in neutral line), three-phase 3-wire 2-current (2-power meter method), Three-phase 3-wire 3-current (3-power meter method), three-phase 4-wire, three-phase 4-wire 4-current (current in neutral line), Scott connection (three-phase 3-wire + single-phase 3-wire)	
Number of systems to be measured	With the same voltage Single-phase 2-wire: 4 systems, single-phase 3-wire: 2 systems, three-phase 3-wire 2-current: 2 systems	
Input resistance	Approx. 1.3 MΩ	Approx. 100 KΩ (CW240 main unit)
Maximum allowed input (continuous)	1000 Vrms	96036 (2 A) 20 Arms 96033 (50 A) 130 Arms 96030 (200 A) 250 Arms 96031 (500 A) 625 Arms 96032 (1000 A) 700 Arms 96034 (3000 A range) 2400 Arms (3600 Arms for 10 minutes) (2,000 A range) 2400 Arms (1000 A range) 1200 Arms 96035 (3000 A range) 3600 Arms (300 A range) 360 Arms
A/D converter	Voltage/current input simultaneous conversion, PLL synchronized 128 samples/period, 16-bit resolution	

Measurement Input functions

Item	Voltage	Current / Active power / Reactive power (reactive power meter method is used)
Method	Digital sampling	
Frequency range	45 to 65 Hz (Measurement element is selected from U1, U2 and U3)	
Crest factor	Rated input: 3 (however, 1.8 when 1000 V range is used)	
Accuracy	±0.2%rdg. ±0.1%rng.	96030, 96031, 96033, 96036 ±0.6%rdg.±0.4%rng. 96032, 96034, 96035 ±1.0%rdg.±0.8%rng.
Power factor influence	—	96030 ±1.0%rng (45 to 65 Hz, power factor =±0.5) Other than 96030 ±2.0%rng (45 to 65 Hz, power factor =±0.5)
Reactive factor influence	—	96030 ±1.0%rng. (45 to 65 Hz, reactive factor =±0.5) Other than 96030 ±2.0%rng (45 to 65 Hz, reactive factor =±0.5)
Active input range	5 to 110% of each range (Max. 100% in the case of 1000 V range)	
Display range	Voltage / current:0.4 to 130% of each range (Zero suppression when below 0.4% of the range) Power (active, reactive, apparent):0 to 130% of each range (Zero suppression when below 0.17% of the range rating). Harmonic level: 0 to 130% of each range Frequency: 40 to 70 Hz	
Temperature coefficient	±0.03%rng/°C	±0.05%rng/°C
Display updating interval	Approx. 0.5 seconds	

rdg: Reading rng: Range

General specifications

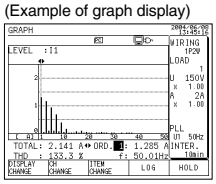
Location for use:	Indoor, at an altitude of 2000 meters or less
Storage temperature and humidity ranges	-20 to 60°C, 90%RH (no condensation)
Operating temperature and humidity ranges	5 to 40°C, 5 to 80%RH (no condensation)
Insulating resistance	500 VDC, 50 MΩ or greater Between voltage input terminals and case Between voltage input terminals and current input terminals / DC power terminals / external interface terminals
Insulating withstand voltage (50/60 Hz, for one minute)	5.55 kVAC rms for one minute (Sensed current: 1 mA) Between voltage input terminals and case 3.32 kVAC rms for one minute (Sensed current: 1 mA) Between voltage input terminals and current input terminals / DC power terminals / external interface terminals
Power supply	AC adapter (standard accessory), 100 to 240 VAC, 50/60 Hz
Backup battery (for power failure)	Six AA size alkaline batteries (standard accessory) One NiMH battery pack (optional)
Maximum rated power consumption	Main unit: Approx. 10 W (normal operation), approx. 20 W (during charging of NiMH battery pack) AC adaptor: Approx. 30 VA (normal operation), approx. 60 VA (during charging of NiMH battery pack)
External dimensions	Approx. 206 (W) u 184 (H) u 65 (D) mm (excluding projecting parts)
Weight	Approx. 1.2 kg (without batteries)

Discovers Failures in Power Supply Lines

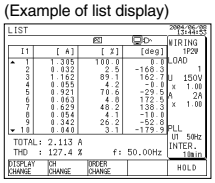
Harmonic Measurement

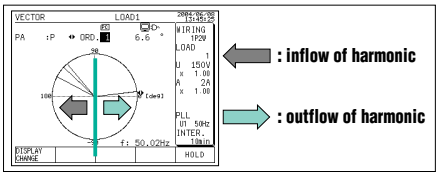
In many cases, inverter power supplies are used to drive air-conditioners and compressors. These power supplies cause distortions in voltages and currents, leading to malfunctions and power loss. Therefore, investigation and control of influences on the main power supplies by harmonics is necessary.

(Example of graph display)



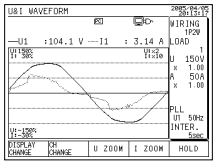
(Example of list display)





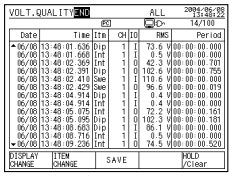
Waveform Measurement

•Measurement elements:
Voltage of each phase, current of each phase
Voltage and current of each phase



Voltage Fluctuation Measurement

The CW240 detects dates/times of when fluctuations occur, fluctuation type, channels where they occur, rms values, and periods between start and end. The voltage threshold is set, and fluctuations exceeding the threshold are detected.



Low-cost Tools to Support Your Energy Conservation

CE

CW120 Series

Clamp-on Power Meter

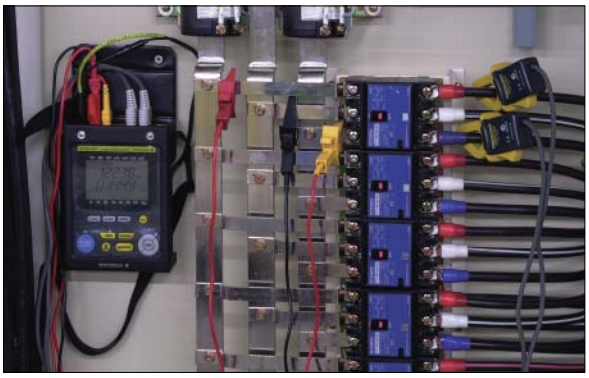
Features

Useful features for energy conservation and power measurement

- Periodically save data as often as once a second
- Check equipment operating conditions
- Wiring error check function
- Simultaneous measurement of multiple facilities
- Works even with small electric energy values

Compact design

- The CW120 Series is compact in size (117 × 161 × 51mm (W × H × D)), making it ideal for installation in cubicles and inside distribution panels. Installation is even easier with the magnetic case (93023).
- Although the CW120 Series is small, it has a large backlit LCD.



Magnetic case (93023)

Measurements

- The CW120 Series can be used for voltage measurements up to 495 V.
- A variety of connection types are supported, from single-phase 2-wire to three-phase 4-wire (CW120: three-phase 3-wire model; CW121: three-phase 4-wire model).
- Continuous measurement integration (accurate measurements can be obtained even if there are large load fluctuations)
- Plus/minus signs are shown for reactive power and power factor.
- The data saving interval can be set in the range of one second to one hour.

Specifications

Inputs

Parameter		Voltage (V)	Current (A)
Input type		Resistive potential division	Clamp detection
Rated value (range)		150/300/450 V	Clamp 96033: 5/10/20/50 A Clamp 96030: 20/50/100/200 A Clamp 96031: 50/100/200/500 A Clamp 96032: 200/500/1000 A
Wiring	CW120	Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire	
	CW121	Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire, three-phase 4-wire	
Input resistance	CW120	Approximately 1.5 MW	Approximately 100 kW
	CW121	Approximately 1.3 MW	
Maximum allowed input		495 Vrms	Clamp 96033: 130 Arms Clamp 96030: 250 Arms Clamp 96031: 625 Arms Clamp 96032: 1000 Arms
A/D converter		Voltage/current input simultaneous conversion, 12-bit resolution	

Measurement Input functions

Parameter		Voltage		Current/active power
Method		Digital sampling		
Frequency range		45–65 Hz (reciprocal system), detected from V1		
Crest factor		150/300 V range	Rated input: 2	Rated input: 3
		450 V range	Rated input: 1.56	
Active input range		10–110% of each range		
Display range	Lower limit	All ranges 1.5 V		0.4% of each range
	Upper limit	130% of each range, except 110% for 450 V range		130% of each range
Temperature coefficient		±0.05% rng/°C		±0.07% rng/°C (including clamp)
Display updating interval		Approximately one second		

Instantaneous Value Measurement

- Measurement parameters: Voltage rms (V), current rms (A), active power (W), frequency (Hz)
- Measurement accuracy (at power factor 1, including clamp)
  - 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
  - Frequency: ±(0.1% rdg + 1% dgt)
- Computation parameters: Reactive power (Var), power factor
- Computation accuracy: (value calculated from measurement) ±1 dgt
- Power factor influence: ±1.0% rng cosø = ±0.5 (relative to power factor 1) when using clamp 96030
  ±2.0% rng cosø = ±0.5 (relative to power factor 1) when using clamps 96031, 96032, and 96033
- Reactive factor influence: ±1.0% rng sinø = ±0.5 (relative to reactive factor 1) when using clamp 96030
  ±2.0% rng sinø = ±0.5 (relative to reactive factor 1) when using clamps 96031, 96032, and 9603

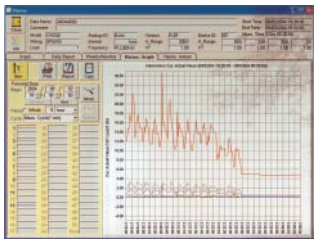
General Specifications

- Environmental requirements: Indoor usage at an altitude of 2000 meters or less.
- Usage temperature and humidity ranges:
  0–50°C, 5–85% RH (no condensation)
  0–40°C, 5–85% RH (no condensation) for UL, C-UL
- Storage temperature and humidity ranges:
  -20–60°C, 90% RH (no condensation)
- Power supply: 100–240 V AC ±10%, 50/60 Hz
- Consumed power: 8 VA maximum
- External magnetic field effects: Within accuracy levels at 400 A/m
- External dimensions: Approximately 117 × 161 × 51 mm (W × H × D)
- Weight: Approximately 0.6 kg
- Terminals:

Voltage input	CW120: 3 terminals	Banana terminals (safety terminals)
	CW121: 4 terminals	Banana terminals (safety terminals)
Current terminals	CW120: 2 pairs	Banana terminals (safety terminals)
(H/L)	CW121: 3 pairs	Banana terminals (safety terminals)
External control I/O	3 terminals (H/L/H)	Screwless terminals
terminals RS-485	4 terminals (+/-/SG/TM)	M3 screw terminals

- Connectors:
  RS-232: Mini DIN 8-pin
  AC power supply: 2-pin
- Accessories:
  Voltage input probes: 3 for CW120, 4 for CW121
  Power cord, user's manual, operation guide, Toolbox (setting software)
- Safety standards:
  Compliant with EN61010-1, EN61010-2-031, UL3111-1 First Edition, CAN C22.2 No. 1010.1-92
  –Voltage input line
  Measurement (Overvoltage) category III (Max. input voltage : 600 Vrms)
  –Power line
  Installation category II (Max. input voltage : 264 Vrms)
  Pollution degree 2
- EMC (emission):
  Compliant with EN55011, Group1, ClassA; EN61326; EN61000-3-2; EN61000-3-3
- EMC (immunity):
  Compliant with EN61326

Effective power supply quality and power saving management for PCs



AP240E

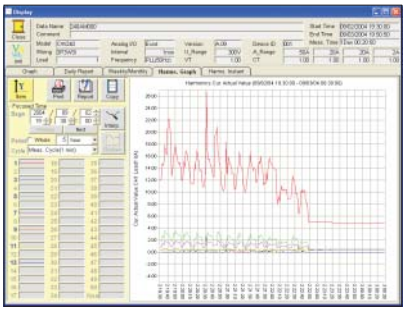
Data Analysic Program for CW series

- 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

Features

Variety of Presentations in Line with Objectives

Report formats that can be selected as a result of the types of measurement data are displayed on tabs. Report formats in line with objectives can be easily selected with tabs from a variety of report presentations.



Graph Display

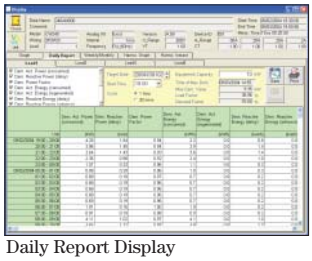
Harmonics Trend Display

Harmonics Instant Value Display

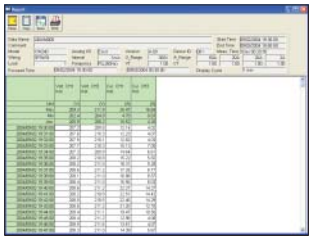
Power Phase Difference Vector Diagram Display

Waveform Display

One-Touch Selection of Daily and Weekly Reports



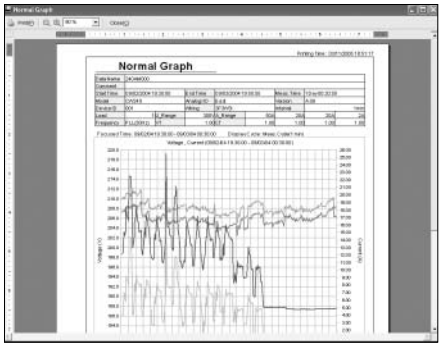
Daily Report Display



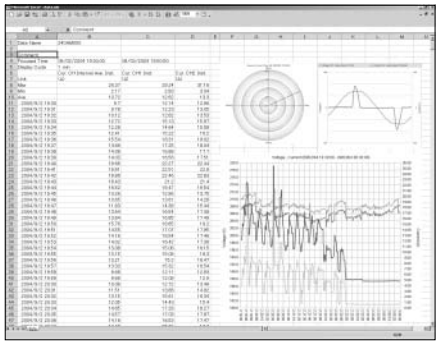
Records Display

Report Creation Customization Functions

- Graph and Record Printing
- Selectable Printer Type
- Graph Copy
- Record Copy
- Saving Record Data as CSV Format Files



Print Preview



Example of Copying Graphs and Records

CW240

●Accessories

Carrying case

93020

CW240 main unit can be packed in the carrying case with accessories like current clamps and voltage probes, without disconnecting them from the main unit. It also holds the other accessories.

Protective Cover

91022

To prevent error connection of clamp probes.

Name	Model No.	Description
Voltage probes (4 pcs/set)	91007	
NiMH battery pack	94004	
Memory Card (256MB)	97034	256MB CF with PC Card Adapter
Memory Card (512MB)	97035	512MB CF with PC Card Adapter
Memory Card (2GB)	97037	2GB CF with PC Card Adapter
Printer	97010	
AC adapter (for printer, Europe)	94006	Power Supply 200-240 VAC
AC adapter (for printer, USA)	94007	Power Supply 100-120 VAC
Thermal paper for printer (10 rolls)	97080	
AC adapter for 96035	94013	For AC 120V
	B9108WB	For AC 220-240V
CW viewer	AP240E	

CW120

●Accessories

Carrying case

93022

CW120 main unit can be packed in the carrying case with accessories like the current clamps and voltage probes. It also holds the other accessories.

Main unit case

93023

Includes magnet and stand

Portable case

93024

Power cable

98030

This cable supplies power from a measurement circuit. length 1.5m
*Not applied to CE and UL.

Printer

97010

Name	Model No.	Description
Voltage probe	91007	Four per set
Voltage probe	91018	Three per set
Communication cable	91011	RS232 communication cable for PC (9-pin)
Printer cable	91010	RS232 printer cable, length 1.5 m
Memory Card (256MB)	97034	256MB CF with PC Card Adapter
Memory Card (512MB)	97035	512MB CF with PC Card Adapter
Memory Card (2GB)	97037	2GB CF with PC Card Adapter
Printer	97010	Includes one roll of thermal paper and one battery pack
AC adapter (for printer, Europe)	94006	Power Supply 200-240 VAC
AC adapter (for printer, USA)	94007	Power Supply 100-120 VAC
Printer thermal paper	97080	10 rolls
AC adapter for 96035	94013	For AC 120V
	B9108WB	For AC 220-240V
CW viewer	AP240E	

Clamp Probes for CW240/CW120 series

Model	96036	96033	96030	96031	96032	96034	96035
Clamp Probes							
Diameter of measurable conductor	ϕ 40 mm	ϕ 18 mm	ϕ 30 mm	ϕ 30 mm	ϕ 65 mm	65 × 100 mm	ϕ 170 mm
Measuring Range	AC 2 A	AC 50 A	AC 200 A	AC 500 A	AC 700 A (1000 A 5 min)	AC 1000/2000/3000 A	AC 300/3000 A
Output Voltage	AC 50 mV	AC 500 mV	AC 500 mV	AC 500 mV	AC 250 mV	AC 500 mV	AC 500 mV
Frequency Range	20 Hz to 5 kHz	20 Hz to 20 kHz	20 Hz to 20 kHz	20 Hz to 5 kHz	45 Hz to 66 Hz	30 Hz to 1.5 kHz	10 Hz to 20 kHz
External dimensions	70 × 120 × 25 mm	52 × 106 × 25 mm	73 × 130 × 30 mm	73 × 130 × 30 mm	100 × 172.5 × 32 mm	120 × 310 × 48 mm	140 × 64 × 28 mm
Weight	Approx. 300 g	Approx. 220 g	Approx. 300 g	Approx. 300 g	Approx. 500 g	Approx. 1,390 g	Approx. 470 g

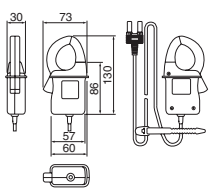
* Need AC adapter

* Need to purchase AC adapter separately

External Dimensions

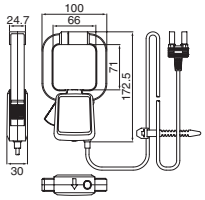
96030,31 CE

unit: mm



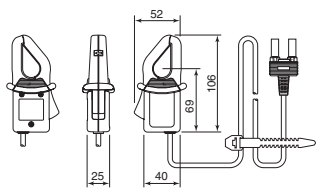
96032

unit: mm



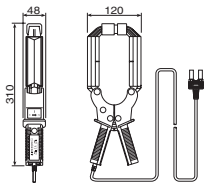
96033

unit: mm



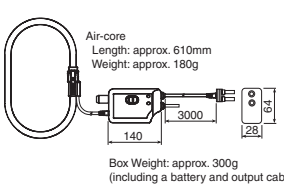
96034

unit: mm



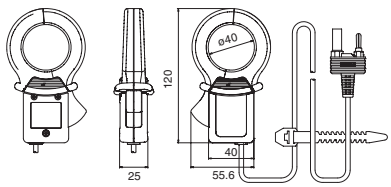
96035

unit: mm



96036 CE

unit: mm



High accuracy and compact design

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 V DC at a load of max 22 mA)
  It is possible to measure current in the mA range while supplying power
- Sink function
- Sweep functions that allow 3 types of continuous outputs:
  Step sweep function
  Linear sweep function
  Program sweep function

General Specifications

Common source specifications

- Power supply: 6 AA size alkaline batteries
  AC adapter (sold separately) or dedicated NiMH battery (sold separately)
- Battery life Conditions: Simultaneous Source/measurement
  When 6 batteries are used: Approx. 8 hours
  When NiMH battery is used: Approx. 10 hours
- Auto power-off: Approx. 10 minutes
- Insulation resistance: Between input terminal and output terminal: 500 V DC, 50 MΩ or more
- Withstand voltage: Between measurement terminal and generation terminal: 350 V AC, 1 minute
- Operating temperature/humidity range: 0 to 40°C, 20 to 80%RH (no condensation)
- Storage temperature range: -20 to 60°C 90%RH or less (no condensation)
- External dimensions: Approx. 251 × 124 × 70 mm
- Weight: Approx. 1000 g (with Batteries)
- Conforming Standrads:
  Safty: EN61010-1
  EMC: EN 61326 Class B; EN 55011 Class B Group1
  EN 61000-3-2; EN 61000-3-3, EN61326

Specifications

Source Unit

Accuracy=±(% of setting + µV, mV, µA, Ω and °C) at 23°C±5°C

	Range	Resolution	Source range	Accuracy
DC voltage	100 mV	1 uV	0 to ±110.000 mV	±(0.02% + 10 uV)
	1 V	10 uV	0 to ±1.10000 V	±(0.02% + 0.05 mV)
	10 V	0.1 mV	0 to ±11.0000 V	±(0.02% + 0.5 mV)
	30 V	10 mV	0 to ±30.00 V	±(0.02% + 10 mV)
DC current mA SINK	20 mA	1 uA	0 to +22.000 mA	±(0.025% + 3 uA)
	20 mA SINK	1 uA	0 to -22.000 mA	±(0.025% + 6 uA)
OHM	500 Ω	0.01 Ω	0 to 550.00 Ω	±(0.02% + 0.1 Ω)
	5 kΩ	0.1 Ω	0 to 5.5000 kΩ	±(0.05% + 1.5 Ω)
	50 kΩ	1 Ω	0 to 55.000 kΩ	±(0.1% + 50 Ω)
RTD	PT100	0.1°C	-200.0 to 850.0°C	±(0.025% + 0.3°C)
	JPT100		-200.0 to 500.0°C	
Thermocouple	K	0.1°C	-200.0 to -100.0°C	±(0.02% + 0.8°C)
			-100.0 to 1372.0°C	±(0.02% + 0.5°C)
	E		-200.0 to -100.0°C	±(0.02% + 0.6°C)
			-100.0 to 1000.0°C	±(0.02% + 0.4°C)
	J		-200.0 to -100.0°C	±(0.02% + 0.7°C)
			-100.0 to 1200.0°C	±(0.02% + 0.4°C)
	T		-200.0 to -100.0°C	±(0.02% + 0.8°C)
			-100.0 to 400.0°C	±(0.02% + 0.5°C)
	N		-200.0 to 0°C	±(0.02% + 1.0°C)
			0.0 to 1300.0°C	±(0.02% + 0.5°C)
	L		-200.0 to 900.0°C	±(0.02% + 0.5°C)
	U		-200.0 to 0°C	±(0.02% + 0.7°C)
			0 to 400.0°C	±(0.02% + 0.5°C)
	R	1°C	0 to 100°C	±(0.02% + 2°C)
			100 to 1768°C	±(0.02% + 1.2°C)
	S		0 to 100°C	±(0.02% + 2°C)
			100 to 1768°C	±(0.02% + 1.2°C)
	B		600 to 1000°C	±(0.02% + 1.5°C)
			1000 to 1820°C	±(0.02% + 1°C)
Frequency /pulse	100 Hz	0.01 Hz	1.00 to 110.00 Hz	±0.05 Hz
	1000 Hz	0.1 Hz	90.0 to 1100.0 Hz	±0.5 Hz
	10 kHz	0.1 kHz	0.9 kHz to 11.0 kHz	±0.1 kHz
	50 kHz	1 kHz	9 kHz to 50 kHz	±1 kHz
	CPM	0.1 CPM	1.0 to 1100.0 CPM	±0.5 CPM

Temperature coefficient: Accuracy above x (1/10)/°C
The temperature coefficient is added in the ranges from 0 to 18°C and from 28 to 40°C

Measurement Unit

Accuracy=±(% of reading + µV, mV, µA, Ω or dgt(digit)) at 23°C±5°C

	Range	Resolution	Measurement range	Accuracy
DC voltage	500 mV	10 uV	0 to ±500.00 mV	±(0.02% + 50 uV)
	5 V	0.1 mV	0 to ±5.0000 V	±(0.02% + 0.5 mV)
	35 V	1 mV	0 to ±35.000 V	±(0.025% + 5 mV)
DC current	20 mA	1 uA	0 to ±20.000 mA	±(0.025% + 4 uA)
	100 mA	10 uA	0 to ±100.00 mA	±(0.04% + 30 uA)
OHM	500 Ω	0.01 Ω	0 to 500.00 Ω	±(0.055% + 0.075 Ω)
	5 kΩ	0.1 Ω	0 to 5.0000 kΩ	±(0.055% + 0.75 Ω)
	50 kΩ	1 Ω	0 to 50.000 kΩ	±(0.055% + 10 Ω)
RTD *5	PT100	0.1°C	-200.0 to 850.0°C	±(0.05% + 0.6°C)
	JPT100		-200.0 to 500.0°C	
Thermocouple	K	0.1°C	-200.0 to 1372.0°C	±(0.05% + 1.5°C)/-100°C or more ±(0.05% + 2°C)/-100°C or less
	E		-200.0 to 1000.0°C	
	J		-200.0 to 1200.0°C	
	T		-200.0 to 400.0°C	
	N		-200.0 to 1300.0°C	
	L		-200.0 to 900.0°C	
	U		-200.0 to 400.0°C	
	R	1°C	0 to 1768°C	±(0.05% + 2°C)/100°C or more ±(0.05% + 3°C)/100°C or less
	S		0 to 1768°C	
	B		600 to 1800°C	
Pulse	100 Hz	0.01 Hz	1.00 to 110.00 Hz	±2 dgt
	1000 Hz	0.1 Hz	1.0 to 1100.0 Hz	
	10 kHz	0.001 kHz	0.001 to 11.000 kHz	
	CPM	1 CPM	0 to 100000 CPM	----
	CPH	1 CPH	0 to 100000 CPH	----
Loop power supply	24 V LOOP			24 V±2 V

Temperature coefficient: Accuracy above x (1/10)/°C
The temperature coefficient is added in the ranges from 0 to 18°C and from 28 to 40°C

Optional Accessories (sold separately)

Product name	AC adapter	RJ sensor	Accessory storage case	NiMH battery	Main body case
					
Model name	94010	B9108WA	B9108XA	94015	93027
Remark	-D For UL/CSA Standard -F For VDE Standard -H For GB Standard -R For AS Standard -S For BS Standard	For reference junction compensation	Lead cables, RJ sensor, etc. can be stored.	NiMH battery Dedicated	With strap and accessory storage case

Simultaneous Signal Source and Measurement Capability

CA51/CA71

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.
  - Source
    Values set in steps of 4-20 mA
    24V DC Power Supply to Transmitter
  - Divided output (n/m) function
    Output settings are divided, eliminating the need for bothersome calculations for percentage output.
  - Autostep function
    Changes the output value in step form based on the setting from the divided output (n/m) function. Changes can be sourced automatically every 10% or 25%.
  - Online communication (CA71 only)
    RS-232C-compliant optically isolated interface
  - Sweep function
    Linearly increases or decrease 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

General Specifications

Parameter	Specifications
Power supply	Four AA alkaline batteries, or special AC adapter (sold separately)
Battery life	Measurement off, output 5 V DC/10 kΩ or greater: Approximately 40 hours Simultaneous signal generation/measurement, output 5 V DC/10 kΩ or greater: Approximately 20 hours Simultaneous signal generation/measurement, output 20 mA/5 V: Approximately 12 hours (using alkaline batteries, with backlight off)
Auto-power-off function	Approximately 10 minutes (auto-power-off can be disabled through a DIP switch setting)
Applicable standards	IEC61010-1, IEC61010-2-31 EN61326-1 EN55011, Class B, Group 1
Operating temperature and humidity ranges	0–50°C, 20–80% RH (no condensation)
External dimensions (WHD)	Approximately 190 × 120 × 55 mm
Weight	Approximately 730 g (including batteries)

Specifications

Source Unit

Parameter	Reference	Range	Accuracy (23±5°C per year)	Resolution
DC voltage	100 mV	-10.00–110.00 mV	±(0.02% + 15 µV)	10 µV
	1 V	0–1.1000 V	±(0.02% + 0.1 mV)	0.1 mV
	10 V	0–11.000 V	±(0.02% + 1 mV)	1 mV
	30 V	0–30.00 V	±(0.02% + 10 mV)	10 mV
DC current	20 mA	0–24.000 mA	±(0.025% + 3 µA)	1 µA
	4–20 mA	4/8/12/16/20 mA		4 mA
mA SINK	20 mA	0.1–24.000 mA	±(0.05% + 3 µA)	1 µA
Resistance	400 Ω	0–400.00 Ω	±(0.025% + 0.1 Ω)	0.01 Ω
RTD	Pt100	-200.0–850.0°C	±(0.025% + 0.3°C)	0.1°C
	JPt100	-200.0–500.0°C		
TC	K	-200.0–1372.0°C	±(0.02% + 0.5°C) (-100°C or greater) ±(0.02% + 1°C) (-100°C or less)	0.1°C
	E	-200.0–1000.0°C		
	J	-200.0–1200.0°C		
	T	-200.0–400.0°C	±(0.02% + 0.5°C) (0°C or greater) ±(0.02% + 1°C) (0°C or less)	
	N	-200.0–1300.0°C		
	L	-200.0–900.0°C		
	U	-200.0–400.0°C		
	R	0–1768°C	±(0.02% + 2.5°C) (100°C or less) ±(0.02% + 1.5°C) (100°C or greater)	1°C
	S			
	B	600–1800°C	±(0.02% + 2°C) (1000°C or less) ±(0.02% + 1.5°C) (1000°C or greater)	
Frequency, pulse	500 Hz	1.0–500.0 Hz	±0.2 Hz	0.1 Hz
	1000 Hz	90–1100 Hz	±1 Hz	1 Hz
	10 kHz	0.9 kHz–11.0 kHz	±0.1 kHz	0.1 kHz
	Pulse cycle	1–99,999 cycles	–	1 cycle

Measurement Unit

• Both CA51 and CA71

Parameter	Reference	Accuracy (23±5°C per year)	Resolution
DC voltage	100 mV	±(0.025% + 20 µV)	10 µV
	1 V	±(0.025% + 0.2 mV)	0.1 mV
	10 V	±(0.025% + 2 mV)	1 mV
	100 V	±(0.05% + 20 mV)	0.01 V
DC current	20 mA	±(0.025% + 4 µA)	1 µA
	100 mA	±(0.04% + 30 µA)	10 µA
Resistance	400 Ω	±(0.05% + 0.1 Ω)	0.01 Ω
AC voltage	1 V	±(0.5% + 5 dgt)	1 mV
	10 V		0.01 V
	100 V		0.1 V
	300 V	±(0.5% + 2 dgt)	1 V
Frequency, pulse	100 Hz	±2 dgt	0.01 Hz
	1000 Hz		0.1 Hz
	10 kHz		0.001 kHz
	CPM		1 CPM
	CPH		1 CPH

• CA71 only

Parameter	Reference	Accuracy (23±5°C per year)	Resolution
TC	K	±(0.05% + 1.5°C) (-100°C or greater) ±(0.05% + 2°C) (-100°C or less)	0.1°C
	E		
	J		
	T		
	N		
	L		
	U		
	R	±(0.05% + 2°C) (100°C or greater) ±(0.05% + 3°C) (100°C or less)	1°C
	S		
	B		
RTD	Pt100	±(0.05% + 0.6°C)	0.1°C
	JPt100		

Spare parts

Product	Source signal lead cable	Measurement lead cable	Carrying case	Terminal adapter	Fuse
					
Model	98020	RD031	93016	99021	A1501EF

Optional accessories (sold separately)

Product	AC adapter	RJ sensor	Accessory storage case	Communication cable (RS232)
				
Model	94012, 94013, B9108WB	B9108WA	B9108XA	91017
Remarks	94012: 100 V AC power supply adapter 94013: 120 V AC power supply adapter B9108WB: 220–240 V AC power supply adapter	For reference junction compensation	Lead cables, RJ sensor, etc. can be stored	D-sub 9-pin (female)

Source and Measuring of Voltage and Current

CA11E
Voltage/Current Calibrator

Features

- Source and Measuring of Voltage and Current
  Generates and measures voltages up to 30 V DC and currents up to 24 mA DC.
- Improved display resolution for current
  The generation /measurement resolution has improved to 0.001 mA.
- 24 V (20 mA)/Loop check function*
- Enables measurement of generated current signals while supplying loop power to two-wire transmitter.
  * Load current: Max. DC22 mA
- 20 mA SINK Function
  Absorbs the voltage supplied from an external power supply to its H terminal and simulates a two-wire transmitter making it ideal for loop checks.
- 4-20 mA and 1-5 V DC Step-up/ down Function
- Sweep Function

Specifications

Source Functions

Accuracy = ±(% of setting + value in mV, µV, or µA), at 23 ±5°C for one year

Range Selection	Range of Generated Signal	Accuracy	Setting Resolution	Remarks
30 V	0 to 30.00 V	0.05% + 20 mV	10 mV	Maximum current: 1 mA
10 V	0 to 11.000 V	0.05% + 2 mV	1 mV	Maximum output current: 10 mA
1-5 V	1/2/3/4/5 V	0.05% + 2 mV *2	1 V step	*2 When the load is 1 kΩ or geater, and the error of the lead cables is excluded
1 V	0 to 1.1000 V	0.05% + 0.2 mV *2	0.1 mV	
100 mV	0.00 to 110.00 mV	0.05% + 50 µV	10 µV	
20 mA *1	0 to 24.000 mA	0.05% + 4 µA	1 µA	Maximum load: 12 V
4-20 mA *1	4/8/12/16/20 mA		4 mA step	
24 V (20 mA) *1	24 V	±10%	—	Maximum curret: 22 mA
20 mA SINK *1	0.1 to 24.000 mA	0.1% + 4 µA	1 µA	External power supply: 5 to 28 V

Temperature effect: 1/10 of accuracy/°C; however, for 100-mV range, 0.005% + 10 µV/°C

*1 The display resolution can select 24.000 or 24.00 displays with dip switch.

Measurement Functions

Accuracy = ±(% of reading + value in the least significant digit), at 23 ±5°C for one year

Range Selection	Indication	Accuracy	Resolution	Remarks
30 V	0 to ±30.00 V DC	0.05% + 2 digits	10 mV	Input impedance: Approx. 1 MΩ
10 V	0 to ±11.000 V DC	0.05% + 2 digits	1 mV	
1 V	0 to ±1100.0 mV	0.05% + 2 digits	0.1 mV	
100 mV	0 to ±110.00 mV DC	0.05% + 7 digits	0.01 mV	
20 mA *1	0 to ±24.000 mA DC	0.05% + 4 digit	0.001 mA	Input impedance: Approx. 45 Ω

*1 The display resolution can select 24.000 or 24.00 displays with dip switch.

Simulator of Common Thermocouples and RTD Sensors

CA12E
Temperature Calibrator

Features

- Simulator of Common Thermocouples and RTD Sensors
  Outputs a signal equivalent to signals of ten types of thermocouple K, E, J, T, N, S, B, L, U and R as well as Pt100 resistance temperature detector.
  Suitable for a broad range of applications such as maintenance of industrial process instruments and various thermometers.
- Multi-range Thermometer
  Can be used as a multi-range thermometer. Three-wire RTD connection for an RTD is possible.
- Built-in Sensor for Reference Junction Compensation
  Reference junction compensation when generating a thermocouple signal can be performed by the built-in temperature sensor. For more precise compensation, use the external RJC sensor (model B9108WA, sold separately).

Specifications

Source and Measurement Functions

Accuracy = ±(% of setting or reading + value in °C), at 23 ±5°C for one year

Range Selection		Range of Generated Signal/Indication	Accuracy		Resolution
			Source *4	Measurement *5	
TC *1*4	**K**	–200.0 to 1372.0°C	0.05% + 1°C (>-100°C) 0.05% + 2°C (≤-100°C)	0.07% + 1.5°C (>-100°C) 0.07% + 2°C (≤-100°C)	0.1°C
	E	–200.0 to 1000.0°C			
	J	–200.0 to 1200.0°C			
	T	–200.0 to 400.0°C			
	N	–200.0 to 1300.0°C			
	R	0 to 1768°C	0.05% + 3°C (<100°C) 0.05% + 2°C (≥100°C)	0.07% + 3°C (<100°C) 0.07% + 2°C (≥100°C)	1°C
	S				
	B	600 to 1800°C	0.05% + 4°C (<1000°C) 0.05% + 3°C (≥1000°C)	0.07% + 4°C (<1000°C) 0.07% + 3°C (≥1000°C)	
	L	–200 to 900°C	0.05% + 0.5°C (<0°C) 0.05% + 1°C (≥0°C)	0.07% + 1.5°C (<0°C) 0.07% + 2°C (≥0°C)	0.1°C
	U	–200 to 400°C			
100 mV		0 to ±110.00 mV	0.05% + 30 µV	0.05% + 30 µV	10 µV
RTD PT100 *2 *3 **(JPT100)**		–200.0 to 850.0°C (–200.0 to 500.0°C)	0.05% + 0.6°C *6	0.05% + 0.6°C *7	0.1°C
400 Ω		0 to 400.0 Ω	0.05% + 0.2 Ω *6	0.05% + 0.2 Ω *7	0.1 Ω

Temperature effect: 1/10 of accuracy/°C

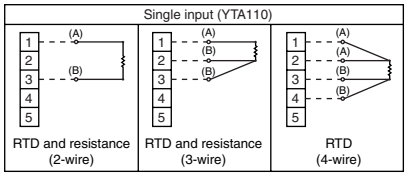
*1 Based on the reference thermal EMF table of JIS C1602-1995
*2 Based on the reference resistance table of JIS C1604-1997.
*3 Based on the international temperature standard 1990 (ITS-90).
*4 The accuracy for generation of thermocouple signals does not include the error of the reference junction compensation. When compensating the output using an RJC sensor, add the accuracy of the RJC sensor. The output compensation is performed every 4 seconds. RJC sensor specifications - measurement range: –10 to 50°C; accuracy (in combination with the CA12E): ±0.5°C at 18 to 28°C and ±1°C at other temperatures.
*5 The accuracy for measurement of thermocouple signals indicates the error against the reference EMF table and includes the error of the internal reference junction compensation when the temperature at the terminals is stable.
*6 External excitation current: 0.5 to 2 mA; add 0.05% + 1°C (or 0.4 Ω) when it is 0.1 mA. Input capacitance of receiver instrument: 0.1 µF or less.
*7 When measuring a temperature using a three-wire RTD.

Example of connecting a temperature transmitter

Operation check of Yokogawa Temperature Transmitter

Example of connection:
YTA 110 series temperature transmitter
Connecting method:
Connect the loop power supply of the CA150 to YTA +, -terminals.
Connect the source cable to the YTA input terminals.
(See the following example of connecting YTA input terminals.)
Features: The input can be changed while monitoring the output with the connected transmitterís power supply, allowing operation checks to be performed with easy connection.

■ Example of connecting YTA sensors (drawing of YTA input terminals)



YTA110 Series calibration: Pt100 input

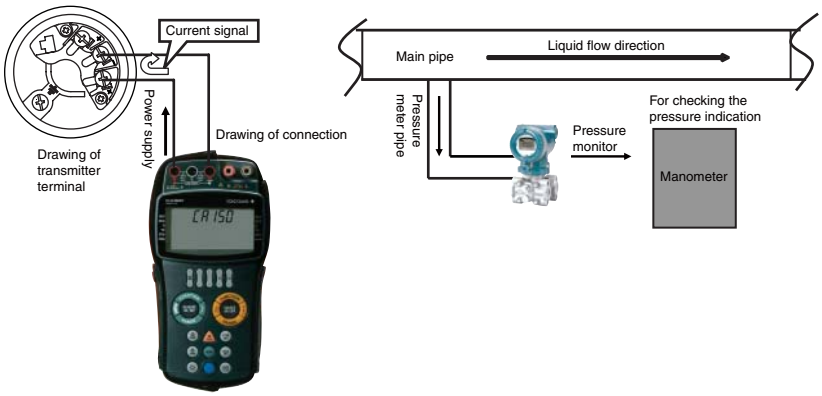
Example of connecting a Temperature Transmitter

Example of connecting a pressure transmitter

Operation check of Yokogawa Pressure Transmitter

EJ Series Pressure Transmitter
EJA Series
Pressure Transmitter
EJX Series Pressure Transmitter

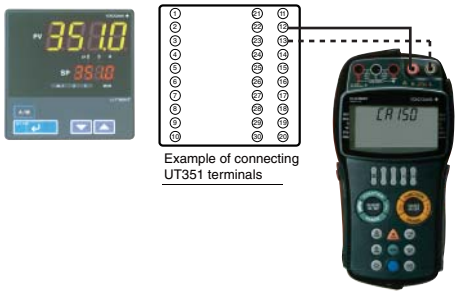
Example of connection:
EJ110 series
Connecting method:
Connect the loop power supply of the CA150 to the power supply terminals of the EJ, and measure the output of 4 to 20 mA.
Features: The output current can be monitored while operating EJ with the connected loop power supply. Actual pressure has to be checked by the pressure indication of the manometer.



Example of connecting a temperature controller / indicating controller

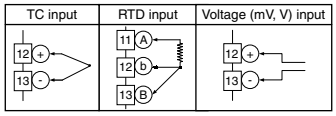
Calibration and operation check of Yokogawa's
UT series indicating controller and
UP series program indicating controller.

Example of connection:
UT351 series temperature controller
Connecting method:
Connect the source cable of the CA150 to the sensor input terminals of UT (See the following example of connecting measurement input terminals.), and check the indication.
Features: The CA150 has many functions, so a single CA150 can be used as an indicator for universal inputs.



■ Example of connecting UT/UP

Measurement input

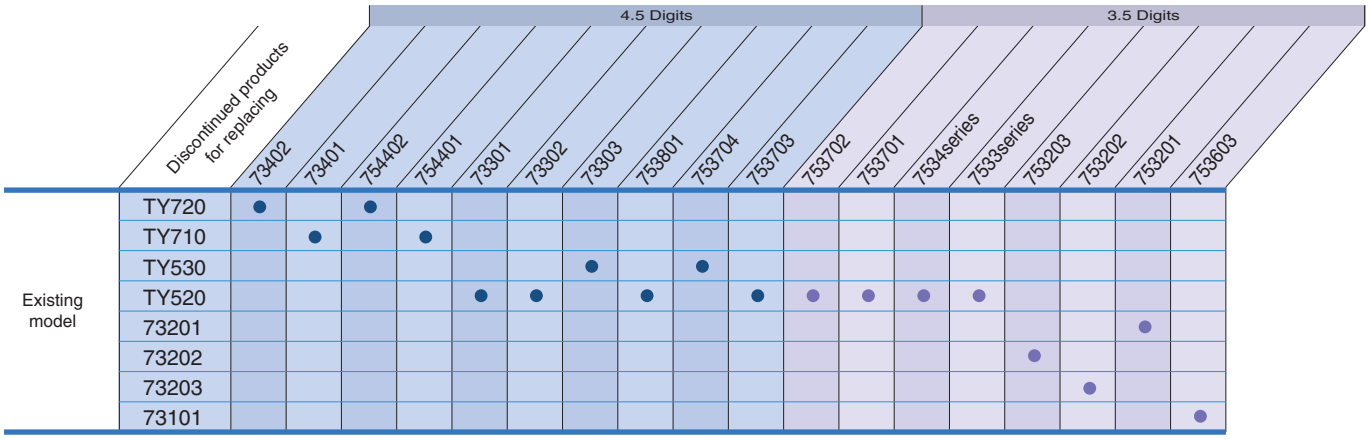


Handheld Digital Multi Meter Sellection

Function item	Handhel Digital Multi Meter Models								
	TY710	TY720	TY520	TY530	73201	73202	73203	73204	73101
Measurment Function	Ture RMS	Ture RMS MEAN Sellect	RMS	RMS MEAN Sellect	MEAN	MEAN	MEAN	MEAN	MEAN
Max. Measurrement Accuracy at DCV	0.02%		0.09%		0.5%	0.5%	0.3%	0.5%	0.7%
Wide bandwidth	20KHz	100KHz	1kHz		—				—
Display Digits(Uint:Digit)	5 digits		3.5 Digits		3.5 Digits				3.5 Digits
Max. Value	50000		6000		4300				4300
Bar Graph Dsiplay (Uints:Segment)	51		31		—				32
LCD Back Light	White LED		LED		—				—
Max.Measurement Voltage (AC/or DC)	50.000mV to 1000.0V	50.000mV to 1000.0V	600.0mV to 1000V	600.0mV to 1000V	4.000V*3 to 600V	4.000V*3 to 600V	4.000V*3 to 600V	4.000V*3 to 600V	4.000V*3 to 600V
Max.Measurement Currents (AC/or DC)	500.00μA to 10.000A	500.00μA to 10.000A	600.0μA to 10.00A	600.0μA to 10.00A	400.0μA to 10.00A	400.0μA to 10.00A	400.0μA to 10.00A	—	—
Max.Measurement Resistance	500.00Ω to 50.000MΩ	500.00Ω to 50.000MΩ	600.0Ω to 60.00MΩ	600.0Ω to 60.00MΩ	400.0Ω to 40.00MΩ	400.0Ω to 40.00MΩ	400.0Ω to 40.00MΩ	400.0Ω to 40.00MΩ	400.0Ω to 40.00MΩ
Max.Measurement Frequency	2.000Hz to 99.99kHz	2.000Hz to 99.99kHz	10.00Hz to 99.99kHz	10.00Hz to 99.99kHz	—	—	—	—	—
Max.Measurement Capcitance	5.000nF to 50.00mF	5.000nF to 50.00mF	10.00nF to 1000μF	10.00nF to 1000μF	—	20.00nF to 200.0μF	20.00nF to 200.0μF	—	—
Max.Measurement Temperature	+1372°C*1	+1372°C*1	+600°C*1	+600°C*1	—	—	—	—	—
Duty Ratio (%) Measuement	●	●	—	—	—	—	—	—	—
Low-Power	—	●	—	—	—	—	—	—	—
AC+DC Measurement	●	●	—	—	—	—	—	—	—
Max./Min./Ave. Value Memory	●	●	—	●	—	—	—	—	—
Diode Test	●	●	●	●	●	●	●	●	●
Continuity Check	●	●	●	●	●	●	●	●	●
Relative/Percentage (%) calculation	●	●	●	●	—	—	—	—	—
Decibel calculation	●	●		—	—	—	—	—	—
Selection Auto range or Manual range	●	●	●	●	●	●	●	●	—
Peak Hold	—	●	—	—	—	—	—	—	—
Data Hold	●*2	●	●	●	●	●	●	●	●
Auto Hold	●	●	●	●	●	●	●	●	
Communication for PC	●*2	●*2	—	●*2	—	—	—	—	—
Data Logging Memory	●*2	●*2	—	●*2	—	—	—	—	—
Data Memory	1000	10000	—	1600	—	—	—	—	—
Operating Temp. and Humidity	-20 to 55°C	-20 to 55°C	-10 to 55°C	-10 to 55°C	0 to 50°C	0 to 50°C	0 to 50°C	0 to 50°C	0 to 50°C
Electric Safty 1000V	CAT III		CAT III		—				—
Electric Safty 600V	CAT IV		CAT IV		CAT II			CAT III	CAT III
Electric Safty 300V	—		—		CAT III			—	CAT II

*1 Temperature probe is necessary when measuring temperature.
*2 The communications package (model: 92015) for DMM is necessary when connecting it with PC.
*3 73101,732Series minimum range of DCvoltage is 400. 0 mVDC.

Simple selection for replacing discontinued products



A New De Facto Standard for Handheld DMM

- Maximum Measurement Accuracy: 0.020% rdg + 2 dgt
- Highly Reliable: Closed case calibration
- Full Support of Data Management: Measured data stored in internal memory
- Safe Design: Shutters prevent erroneous insertion of test leads into current measurement-terminals (terminal shutters)
- Shockproof elastomer casing
- Wide operating temperature range: -20 °C to 55°C

General Specifications

Additional Functions	USB communication (optional adapter & software), data memory (TY720: 10,000 data, TY710: 1,000 data), max/min value memory, 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) × 192 (H) × 49 (D) mm
Weight	Approximately 560 g (including batteries)
Safety Standards	1000 V CAT. Ⅲ, 600 V CAT. Ⅳ

TY700 Series

Digital Multimeters

		TY710			TY720		
Detection		RMS			Switching detection (RMS or MEAN)		
Item	Range	Accuracy					
DCV	50mV	0.05+10					
	500mV/2400mV	0.02+2					
	5V	0.025+5					
	50V/500V/1000V	0.03+2					
ACV [RMS]		Upper: 10 to 20Hz Lower: 20Hz to 1kHz	Upper: 1kHz to 10kHz Lower: 10kHz to 20kHz	Upper: 20kHz to 50kHz Lower: 50kHz to 100kHz	Upper: 10 to 20Hz Lower: 20Hz to 1kHz	Upper: 1kHz to 10kHz Lower: 10kHz to 20kHz	Upper: 20kHz to 50kHz Lower: 50kHz to 100kHz
	50mV	— —	— —	— —	2+80 0.4+40	5+40 5.5+40	15+40 15+40
	50mV/5V/ 50V/500V	1.5+30	0.7+30 2+50	— —	1+30	0.4+30 1+40	2+70 5+200
	1000V	0.7+30	3+30 —	— —	0.4+30	3+30 —	— —
ACV [MEAN]					10 to 20Hz	20Hz to 500Hz	500Hz to 1kHz
	50mV	—			4+80	1.5+30	5+30
	50mV/5V/ 50V/500V/1000V	—			2+30	1+30	3+30
DCV+ACV		Upper: DC,10 to 20Hz Lower: DC,20Hz to 1kHz	Upper: DC,1kHz to 10kHz Lower: DC,10kHz to 20kHz	Upper: DC,20kHz to 50kHz Lower: DC,50kHz to 100kHz	Upper: DC,10 to 20Hz Lower: DC,20Hz to 1kHz	Upper: DC,1kHz to 10kHz Lower: DC,10kHz to 20kHz	Upper: DC,20kHz to 50kHz Lower: DC,50kHz to 100kHz
	5V/50V/500V	1.5+10 1+10	1+10 2+10	— —	1.5+10 0.5+10	0.5+10 1+10	2+10 5+20
	1000V	1.5+10 1+10	— —	— —	1.5+10 0.5+10	— —	— —
DCA	500µA/5000µA/ 50mA/500mA	0.2+5					
	5A	0.6+10					
	10A	0.6+5					
ACA [RMS]		10Hz to 20Hz	20Hz to 1kHz	1kHz to 5kHz	10Hz to 20Hz	20Hz to 1kHz	1kHz to 5kHz
	500µA/5000µA/ 50mA/500mA	1.5+20	1+20	—	1+20	0.75+20	1+30
	5A/10A				1.5+20	1+20	2+30
ACA [MEAN]					10Hz to 20Hz	20Hz to 1kHz	1kHz to 5kHz
	500µA/5000µA/ 50mA/500mA	—			2+20	1.5+20	2+30
	5A/10A	—			3+20	2+20	4+30
DCA+ACA		DC,10 to 20Hz	DC,20Hz to 1kHz	DC,1kHz to 5kHz	DC,10 to 20Hz	DC,20Hz to 1kHz	DC,1kHz to 5kHz
	500µA/5000µA/ 50mA/500mA	2+10	1.5+10	—	1.5+10	1+10	1.5+10
	5A/10A				2+10	1.5+10	3+10
Resistance	500Ω/5kΩ/50kΩ 500kΩ	0.1+2			0.05+2		
	5MΩ	0.5+2					
	50MΩ	1+2					
Low-power Resistance	5kΩ/50kΩ/500kΩ	—			0.2+3		
	5MΩ	—			1+3		
Frequency	2.0Hz to 99.99kHz	0.02+1					
Capacitance	5nF/50nF/500nF 5µF/50µF	1+5					
	500µF	2+5					
	5mF/50mF	3+5					
Continuity check	550Ω	Buzzer sounds at 100±50Ω or less					
Diode test	2.4V	1+2					
Temperature	-200 to 1372°C	1+1.5°C					

●DMM of dedicated application software (Model: 92015)
DMM's and you can easily manage the data in memory. Is also capable of real-time communications

Features

- Data saved in the internal memory PC transfer is possible (Save memories or Logging Memories)
- DMM measurements show in real time monitor display is possible.
- Large amounts of data not covered by the internal memory PC communication with data transfer is possible. At the same time Excel transferable is also. Maximum incoming data: 32767
- Measurement data to Excel direct deployment is possible. Automatically creates a chart sheet.

92015 product specification:

Communication cable

Communications cable:	infrared communication adapter + communications cable (USB specifications) 2 m length
Interface standards:	USB specification conforms to the 1.1
Available models :	TY710 , TY720 , TY530

Application software

Operating environment of the personal computer

OS:	Windows 2000 / XP / Vista
CPU:	Pentium 133 MHz or higher
Memory:	64 MB
Hard disk has free space or more storage:	10 MB Over, CD drive
Excel: since the Excel2000	
Software:	CD, communication cable (including adapter), User's manual

Provides Safety Levels Demanded in Field Work

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. Ⅲ, 600 V CAT. Ⅳ

TY500 Series Specifications

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

		TY520		TY530
Detection		RMS		Switching detection (RMS or MEAN)
Item	Range	Accuracy		
DCV	600mV/6V/60V/600V	0.09 + 2		
	1000V	0.15 + 2		
ACV		50/60Hz	40 to 500Hz	500Hz to 1kHz
	600mV/6V/60V/600V 1000V	0.5 + 5	1 + 5	1.5 + 5
				—
DCA	600µA/6000µA/60mA	0.2 + 2		
	600mA/6A/10A	0.5 + 5		
ACA		50/60Hz		40Hz to 1kHz
	600µA/6000µA/60mA/ 600mA/6A/10A	0.75 + 5		1.5 + 5
Resistance	600Ω/6kΩ/60kΩ/600kΩ	0.4 + 1		
	6MΩ	0.5 + 1		
	60MΩ	1 + 2 (0 to 40MΩ) 2 + 2 (40 to 60MΩ)		
Frequency	10.0Hz to 99.99kHz	0.02 + 1		
Capacitance	10nF	2 + 10		
	100nF/1µF/10µF	2 + 5		
	100µF/1000µF	3 + 5		
Continuity check	600Ω	Buzzer sounds at 50±30Ω or less		
Diode test	2V	1 + 2		
Temperature	-50 to 600°C	2 + 2°C		

General Specifications
- External dimensions:
  90 (W) × 192 (H) × 49 (D) mm
- Weight: Approx. 570 g
- Power Supply: Four AA (R6) dry cells

Low-cost Handheld DMM

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

732 Series Specifications

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

Model		73201	73202	73203	73204
Detection		Mean value			
Item	Range	Accuracy			
DCV	400.0 mV/4.000 V/ 40.00 V/400.0 V/600 V	0.5%+1 0.75%+1	0.5%+1	0.3%+1	0.5%+1
ACV	4.000 V/40.00 V/ 400.0 V/600 V	1.0%+5		0.75%+5	
DCA	400.0 µA/4000 µA/ 40.00 mA/400.0 mA/ 10.00 A	1.0%+2 2.0%+2			–
ACA (40 to 500 Hz)	400.0 µA/4000 µA/ 40.00 mA/400.0 mA/ 10.00 A	2.0%+20 2.0%+5 2.0%+20 2.0%+5 2.0%+20			–
Resistance	400.0 Ω/4.000 kΩ/ 40.00 kΩ/400.0 kΩ/ 4.000 MΩ/40.00 MΩ	0.75%+2 0.75%+1 2.0%+1 5.0%+2			

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

Pocket DMM with Superb Portability

73101

Pocket Digital Multimeter

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

73101 Specifications

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

Item	Range	Accuracy	Input Resistance
DCV	400.0 mV 4.000 V 40.00/400.0/600 V	1.2%+2 0.7%+1 1.2%+1	>100 MΩ 11 MΩ 10 MΩ
ACV	4.000 V 40.00/400.0/600 V	2.0%+5	10 MΩ
Resistance	400.0 Ω 4.000 k/40.00 k/400.0 kΩ 4.000 MΩ 40.00 MΩ	1.2%+2 2.0%+3 5.0%+3	
Continuity check	400.0 Ω	–	
Diode test	2.00 V	1.5%+1	Open-circuit Voltage<3.4 V Testing Current<1.0 mA

Genetal Specifications
- External dimensions:
  76 (W) × 117 (H) × 18 (D) mm
- Weight: Approx. 110 g
- Power Supply: Two LR-44 dry cells

96095

AD/DC Clamp-on Probe

- Light and compact, easy to carry and easy to clamp on crowded wirings.
- Expands measuring span of currents and assure safety when measuring with any kind of DMM.

Specifications

Model	96095		
Conductor Size	φ12mm		
Measurement range	Output voltage	Accuracy (at 23°C±5°C)	
AC 0.1 to 130A	AC10mV/A(AC 1~1300mVrms)	50/60Hz	40Hz to 1kHz
		1.2%+0.4mV	2.5%+0.4mV
DC 0 to ±180A	DC10mV/A (DC 0~±1800mV)	1.2%+0.4mV	
General specifications			
Operating Temp&Humidity range	-10 to 55°C relative Humidity 85% or less (no condensation)		
Storage Temp&Humidity range	-30 to 70°C relative Humidity 85% or less (no condensation)		
Power source	DC3V(Size AAA alkaline Battery LR03 × 2pcs) Low battery warning : 2.2V±0.2V or less red LED flash 1.9V±0.2V or less Power off		
Continuous use	Approx. 35Hours till a low battery indicator flashes *1		
Dimensions&Weight	127 (L) × 42 (W) × 22 (D) mm Cord length: Approx.1200mm Weight: Approx 140g		
Applicable standards	EN61010-1 : CAT Ⅲ Pollution degree2, Altitude 2000m or less for indoor use EN61326-1 : ClassB, EN61326-2-032		
Accessories	Soft case(94030),Battery,User's Manual		

*1 From low battery warning to power off is about 5hours

Standerd Accessories

			Applicable DMM Models							
			TY700		TY500		732			
Name	Model	Specification	TY710	TY720	TY520	TY530	01	02	03	04
Test leads	98015	1000V CAT Ⅲ 600V CAT Ⅳ Red/Black(1set)	●	●	●	●				
	RD031	L-plag,Red/Black(1set)					●	●	●	●
Fuse	99015	440mA/1000V	●	●	●	●				
	99016	10A/1000V	●	●	●	●				
	F02	15A/250V					●	●	●	●
	F05	500mA/250V					●	●	●	●

Accessorise

			Applicable DMM Models							
			TY700		TY500		732			
Name	Model	Specification	TY710	TY720	TY520	TY530	01	02	03	04
Communication Package for Digital Multimeters	92015	Communication Adapter for USB+cable+Application Software	●	●		●				
Printer Adapter and Cable	97016	Printer Adapter and Cable	●	●		●				
Printer	97010	Thermal printer(paper width:112mm)	●	●		●				
AC adpter	94006	For Europe 230VAC±10%	●	●		●				
	94007	For USA 120VAC±10%	●	●		●				
Thermal printer paper	97080	1 Package of 10 rolls	●	●		●				
Test leads with Alligator Clip	99014	1000V CAT Ⅲ 600V CAT Ⅳ Red/Black(1set)	●	●		●				
Alligator Clips	B9646HF	Red/Black(1set)	●	●	●	●	●	●	●	●
Rubber Case	93007						●	●	●	●
Carrying Case	93029	Hard case	●	●	●	●				
	B9646GB	Hard case	●	●	●	●	●	●	●	●
Temperature Probe (Thermocouple type K) (Banana plag output)	90050	-50 to 150°C for liquld	●	●	●	●				
	90051	-50 to 600°C for liquld	●	●	●	●				
	90055	-20 to 250°C for surface	●	●	●	●				
	90056	-20 to 500°C for surface	●	●	●	●				
Currents Clamp-on probe	96001	For 400AAC Output:AC10mV/A*1	●	●	●	●	●	●	●	●
	96095	For 130AAC/180ADC Output: AC10mV/A or DC10mV/A*2	●	●	●	●	●	●	●	●

*1 Please use it with the ACV range. It is necessary to read the indicated value in a different way as TY710 and the TY720,732 series. The example: In AC1V display = 100A TY520 and TY530, it is possible to scale it. (Even 60A or less display is possible in case of 96001.)
*2 Please use it with ACV or DCV range. It is necessary to read the indicated value in a different way as TY710 and the TY720,732 series. The example: In AC1V display = 100A TY520 and TY530, it is possible to scale it. (Even 60A or less display is possible in case of 96095.)

DMM Accessories


93029


92015

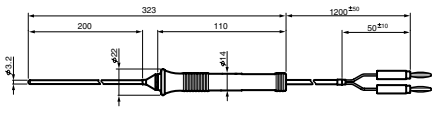

98015


96095

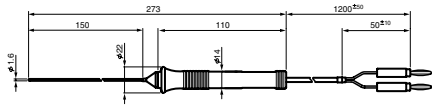

96001


RD031

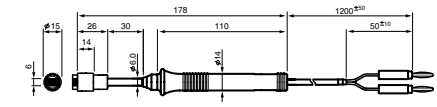
90050



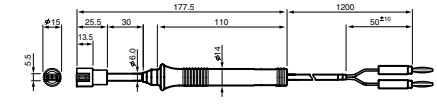
90051



90055



90056



Model	Diameter of measurable conductor	Range	Accuracy	AC current	DC current	Leak current	DC voltage	AC voltage	Resistance	Continuity check	Frequency	True RMS	Output	Data hold	Peak hold	Filter
CL120	ϕ24	20 to 200 A	2.0+7	●										●		
CL130	ϕ33	200 to 600 A	1.5+6	●			●		●	●				●		
CL135	ϕ33	200 to 600 A	1.5+4	●			●		●	●		●		●		
CL150	ϕ54	400 to 2000 A	1.0+3	●			●	●	●	●			●	●	●	
CL155	ϕ54	400 to 2000 A	1.0+3	●			●	●	●	●		●	●	●	●	
CL220	ϕ24	400 to 300 A	1.0+4	●	●									●		
CL235	ϕ33	400 to 600 A	1.0+5	●	●		●	●	●	●	●	●		●		
CL250	ϕ55	400 to 2000 A	1.5+2	●	●		●	●	●	●			●	●		
CL255	ϕ55	400 to 2000 A	1.5+2	●	●		●	●	●	●		●	●	●	●	
CL320	ϕ24	20 mA to 200 A	2.0+4	●		●								●		●
CL340	ϕ40	40 mA to 400 A	1.0+5	●		●								●	●	●
CL345	ϕ40	40 mA to 400 A	1.0+5	●		●						●		●	●	●
30031A	ϕ40	3 mA to 60 A	1.0+5	●		●								●		
30032A	ϕ40	3 mA to 60 A	1.0+5	●		●								●		●
CL360	ϕ68	200 mA to 1000 A	1.0+2	●		●							●	●	●	●

Light weight & compact design

CL120
Clamp-on Tester

- ACA
- ϕ 24
- AC/20 to 200 A

CL120 Specifications

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

Item	Range	Accuracy
ACA	200A	2.0+7 (50 to 1 kHz)
	20A	2.0+5 (50/60 Hz)
		3.0+10 (40 to 1 kHz)

Both AC/DC Current Measurement

CL130/135
Clamp-on Testers

- ACA
- ϕ 33
- AC/200 to 600 A
- AC V/Ω
- RMS for CL135

CL130/CL135 Specifications

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

Item	Range	Accuracy (CL130/CL135)	
ACA	200A	1.5+6 (50/60 Hz)	1.5+4 (50/60 Hz)
		2.0+5 (40 to 1 kHz)	2.0+5 (40 to 1 kHz)
	600A	1.0+3 (50/60 Hz)	1.5+4 (50/60 Hz)
		2.0+5 (40 to 1 kHz)	2.0+5 (40 to 1 kHz)
ACV	200V/600V	1.0+2 (50/60 Hz)	1.0+2 (50/60 Hz)
		1.5+4 (40 to 1 kHz)	1.5+4 (40 to 1 kHz)
Resistance	200 Ω	1.2+4, Beeps at below 30 Ω (continuity check)	

Wide Range of Current Measurement

CL150/CL155
Clamp-on Testers

- ACA
- ϕ 54
- AC/400 to 2000 A
- AC V/DC V/Ω
- DC Output
- RMS for CL155

CL150/CL155 Specifications

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

Item	Range	Accuracy
ACA	400A	1.0 + 3 (50/60 Hz)
		2.0 + 3 (40 to 1 kHz)
	2000 A (0 to 1500 A)	1.0 + 3 (50/60 Hz)
		3.0 + 3 (40 to 1 kHz)
	2000 A (1500 to 2000 A)	3.0 (50/60 Hz)
ACV	40/400/750V	1.0 + 2 (50/60 Hz)
		1.5 + 3 (40 to 1 kHz)
DCV	40/400/1000V	1.0 + 2
Resistance	400/4 k/40 k/400 kΩ	1.5 + 2, Beep sound at less than 50 ±35 Ω

Both AC/DC Current Measurement

CL220
Clamp-on Tester

- ACA/DCA
- ϕ 24
- AC/40 to 300 A
- DC/40 to 300 A

CL220 Specifications

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

Item	Range	Accuracy
ACA	40A	1.0 + 4
	300 A (±20 to ±200 A)	1.5 + 4
	300 A (±200 to ±300 A)	3.0
DCA	40A	1.0 + 4 (50/60 Hz)
		2.5 + 4 (20 to 1 kHz)
	300 A (20 to 200 A)	1.5 + 4 (50/60 Hz)
		2.5 + 4 (20 to 1 kHz)
	300 A (200 to 300 A)	3.5 (50/60 Hz)
		4.0 (20 to 1 kHz)

RMS ACA/DCA measurement

CL235
Clamp-on Tester

- ACA/DCA
- ϕ 33
- AC/400 to 600A, DC/400 to 1000A
- AC V/DC V/Ω/Hz
- RMS

CL235 Specifications

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

Item	Range	Accuracy
ACA	400/600A	1.5+5 (50/60Hz) 3.5+5 (40 to 1kHz)
DCA	400/1000A	1.0+5
ACV	40/400/600V	1.5+5 (50/60Hz) 3.5+5 (40 to 1kHz)
DCV	40/400/600V	1.0+5
Resistance	400/4000Ω	1.0+5, Beeps at below 20Ω (continuity check)
Frequency	10 to 3000Hz	1.5+5

Wide Range of ACA/DCA measurement

CL250/CL255
Clamp-on Testers

- ACA/DCA
- ϕ 55
- AC/400 to 2000A, DC/400 to 2000A
- AC V/DC V/Ω
- DC Output
- Hz,RMS for CL255

CL250 Specifications

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

Item	Range	Accuracy
DCA	400/2000A	1.5+2
ACA	400A/2000A (0 to 1000A)	1.5+2 (50/60Hz) 3.0+4 (40 to 500Hz) 5.0+4 (500 to 1kHz)
	2000A (1001 to 2000A)	3.0+2 (50/60Hz)

CL255 Specifications

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

Item	Range	Accuracy
DCA	400/2000A	1.5+2
ACA	400A/2000A (150 to 1700A)	1.5+3 (50/60Hz) 3.0+4 (30 to 1kHz)
	2000A (1701 to 2000A)	3.5+3 (50/60Hz)

Compact design of Leakage current measurement

CL320
Leakage Clamp-on Tester

- ACA
- ϕ 24
- AC/20mA to 200A

CL320 Specifications

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

Item	Range	Accuracy	
		WIDE (40 to 400Hz)	50/60Hz
ACA	20mA/200mA	2.0+4 (50/60Hz)	3.0+5 (50/60Hz)
	200A (0 to 100A)	5.0+6 (40 to 400Hz)	
	200A (100.1 to 200A)	5.0+4 (50/60Hz)	5.0+5 (50/60Hz)

Leakage current measurement

CL340/CL345
Leakage Clamp-on Testers

- ACA
- ϕ 40
- AC/40mA to 400A
- RMS for CL345

CL340 Specifications

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

Item	Range	Accuracy	
		WIDE (20Hz)	50/60Hz
ACA	40mA/400mA	2.5+10 (20 to 1kHz)	1.0+5 (50/60Hz)
	400A (0 to 350A)	2.5+10 (40 to 1kHz)	1.0+5 (50/60Hz)
	400A (350 to 400A)	5.0 (40 to 1kHz)	2.0 (50/60Hz)

CL345 Specifications

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

Item	Range	Accuracy	
		WIDE (20Hz)	50/60Hz
ACA	40mA/400mA	2.5+10 (20 to 1kHz)	1.0+5 (50/60Hz)
	400A (0 to 300A)	2.5+10 (40 to 1kHz)	1.0+5 (50/60Hz)
	400A (300 to 400A)	5.0 (40 to 1kHz)	2.0 (50/60Hz)

Wide Range of Leakage current measurement

CL360
Leakage Clamp-on Tester

- ACA
- ϕ 68
- AC/200mA to 1000A
- DC/AC Output

CL360 Specifications

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

Item	Range	Accuracy	
		WIDE (40 to 1kHz)	50/60Hz
ACA	20mA/2A/20A	1.0+2 (50/60Hz) 3.0+2 (40 to 1kHz)	1.5+2
	200A	1.5+2 (50/60Hz) 3.5+2 (40 to 1kHz)	2.0+2
	1000A (0 to 500A)	1.5+2 (50/60Hz) 3.5+2 (40 to 1kHz)	2.0+2
	1000A (501 to 1000A)	5.0+2 (50/60Hz) 10.0+2 (40 to 1kHz)	5.5

Leakage Currents of 1 mA measurement

30031A/30032A
Leakage Clamp-on Tester

- ACA
- ϕ 40
- AC/3 mA to 60 A

30031A/30032A Specifications

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

Item	Range	Accuracy	
		30031A, 30032A Filter OFF	30032A Filter ON
ACA	0 to 30 mA	1.0+5 (50±1.0Hz/60±1.0Hz)	1.5+5 (50±1.0Hz/60±1.0Hz)
	0 to 50 A		
	50 to 60 A	5.0+5 (50±1.0Hz/60±1.0Hz)	5.5+5 (50±1.0Hz/60±1.0Hz)

Selection Guide

Type		Series/ Model	Suffix Code & Backlight	Rating	AC Voltage Measuring range	Display	Additional Function	External View	Page
Digital insulation testers	4 ranges	MY40 CE *	01 (EL-illuminated)	125V/200MΩ 250V/200MΩ 500V/2000MΩ 1000V/2000MΩ	0–600V	3 1/2-digit LCD	Automatic discharge Conductor resistance measurement Comparator function Memory function		P.3
Analog insulation testers	2 & 3 ranges	2406E CE	31 (N/A)	25V/5MΩ 50V/10MΩ 125V/20MΩ	0–300V	Analog	Automatic discharge Battery check		P.4
			41 (EL-illuminated)						
			32 (N/A)	125V/20MΩ 250V/50MΩ	0–300V				
			42 (EL-illuminated)						
			33 (N/A)	125V/20MΩ 250V/50MΩ 500V/100MΩ	0–600V				
			43 (EL-illuminated)						
			34 (N/A)	250V/50MΩ 500V/100MΩ 1000V/2000MΩ	0–600V				
			44 (EL-illuminated)						
			35 (N/A)	250V/500MΩ 500V/1000MΩ 1000V/2000MΩ	0–600V				
			45 (EL-illuminated)						
	Single range	MY10 CE	01 (afterglow-illuminated)	125V/20MΩ	0–250V	Analog	Automatic discharge Battery check		P.5
			02 (afterglow-illuminated)	250V/50MΩ	0–300V				
			03 (afterglow-illuminated)	500V/100MΩ	0–500V				
			04 (afterglow-illuminated)	500V/1000MΩ	0–500V				
			05 (afterglow-illuminated)	1000V/2000MΩ	0–500V				
	Single range	3213A *	41 (N/A)	100V/20MΩ	0–150V	Analog	Battery check		P.6
			42 (N/A)	250V/50MΩ	0–250V				
			43 (N/A)	500V/100MΩ	0–300V				
			44 (N/A)	500V/1000MΩ	0–300V				
			45 (N/A)	1000V/2000MΩ	0–300V				
			46 (N/A)	125V/20MΩ	0–250V				

* JIS mark has changed from 2008

Points on How to Choose an Insulation Tester

1 Type

Two choices:
Choose an analog model if visual recognition is of utmost importance, or a digital model if precise numeric recognition is of utmost importance.

2 Ratings

A wide choice of voltage/resistance ratings, from 25 V/5 MΩ to 1000 V/2000 MΩ
Some models have two or three ranges; thus, you need not take more than one instrument to the site.

3 Functionality

Each series includes a model or models with a backlight for working in dark places. Multi-functional models capable of, for example, AC voltage measurement, are also available.

4 Accessories

Optional test probes and probe tips are available for a variety of test environments.

Simple selection for replacing discontinued products

Existing products					Discontinued products for replacing	
Type		Series /Models	Suffix Code (BackLight)	Rating	Series/Models	References and notes
Digital insulation testers	4 ranges	MY40 CE	01 (EL-illuminated)	125V/200MΩ 250V/200MΩ 500V/2000MΩ 1000V/2000MΩ	240651 to 55*1 240661 to 65*1 3213D31 to D35*2	*1 2406D series is single or 2 range. *2 3213D series is single range.
Analog insulation testers	2 & 3 ranges	2406E CE	31	25V/5MΩ 50V/10MΩ 125V/20MΩ	240631	
			41 (EL-illuminated)			
			32	125V/20MΩ 250V/50MΩ	–	
			42 (EL-illuminated)			
			33	125V/20MΩ 250V/50MΩ	240622	
			43 (EL-illuminated)	500V/100MΩ	240626	
			34	250V/50MΩ 500V/100MΩ 1000V/2000MΩ	240623/25	
			44 (EL-illuminated)			
			35	250V/500MΩ 500V/1000MΩ 1000V/2000MΩ	240621	
			45 (EL-illuminated)			
	Single range	MY10 CE	01	125V/20MΩ	321346	
			02	250V/50MΩ	240301	
			03	500V/100MΩ	240302	
			04	500V/1000MΩ	–	
			05	1000V/2000MΩ	240305	
	Single range	3213A	41	100V/20MΩ	321321	
			42	250V/50MΩ	321322	
			43	500V/100MΩ	321323	
			44	500V/1000MΩ	321324	
			45	1000V/2000MΩ	321325	

Digital model with 4 voltage/resistance ratings

CE

MY40
Digital Insulation Tester

Features

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

General Specifications

Dimensions: 125 (W) × 103 (H) × 53 (D) (mm)
Weight: 420 g (main unit and batteries only)
Batteries: Four AA (R6P) batteries

Testing Performance Specifications

Model	Rating	Range Option	Resolution	Measuring Range	Tolerance	Lower Limit of measured Ω	Rated Current	Central Scale Value
MY40-01	125V/200MΩ	.4000	.1kΩ	0–.0199MΩ	± (5%of rdg+6dgt)	0.125MΩ	1mA	5MΩ
		4.000	1kΩ	.0200–10.00MΩ*	± (2%of rdg+6dgt)			
		40.00	10kΩ	10.01–200.0MΩ	± 5%of rdg			
		200.0	100kΩ					
	250V/200MΩ	.4000	.1kΩ	0–.0499MΩ	± (5%of rdg+6dgt)	0.25MΩ	1mA	5MΩ
		4.000	1kΩ	.0500–20.00MΩ*	± (2%of rdg+6dgt)			
		40.00	10kΩ	20.01–200.0MΩ	± 5%of rdg			
		200.0	100kΩ					
	500V/2000MΩ	4.000	1kΩ	0–0.999MΩ	± (5%of rdg+6dgt)	0.5MΩ	1mA	50MΩ
		40.00	10kΩ	1.000–500MΩ*	± (2%of rdg+6dgt)			
		400.0	100kΩ	501–2000MΩ	± 5%of rdg			
		2000	1MΩ					
	1000V/2000MΩ	4.000	1kΩ	0–1.999MΩ	± (5%of rdg+6dgt)	2MΩ	0.5mA	50MΩ
		40.00	10kΩ	2.000–1000MΩ*	± (2%of rdg+6dgt)			
		400.0	100kΩ	1001–2000MΩ	± 5%of rdg			
		2000	1MΩ					

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

Standard test conditions
Ambient temperature/humidity ranges: 23 ±5℃/45-75% RH
Tolerances under the above-mentioned conditions:
Deviation from zero scale value: 6 digits maximum
Indication of ∞ mark on bar graph: Approx. 4000 MΩ min. (500 V/1000 V)
Approx. 400 MΩ min. (125 V/250 V)
Open circuit voltage: 130% max. of rated voltage
Rated measuring current: 1 mA (0 to 20%) when in first effective measuring range
Short-circuit Current: 2 mA max.

AC voltage measurement (45-400 Hz)

Model	Range	Resolution	Accuracy	Input Impedance
MY40-01	600V	1V	±(2% of rdg + 6dgt)	Approx. 2 MΩ

Conductor resistance measurement

Model	Range	Resolution	Accuracy	Open-circuit Voltage
MY40-01	400Ω	0.1Ω	±(2% of rdg + 8dgt)	Buzzer sound resistance: <40Ω.

Analog models with two and three ratings

2406E Series
Analog Insulation Testers

Features

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

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

Model	Rating	Effective Measuring range	Central Scale Value	AC Voltage Measuring range	Lower limit of measured Ω	Rated Current
240631	25V/5MΩ	0.001–5MΩ	0.1MΩ	0–300V	0.025MΩ	1mA
	50V/10MΩ	0.005–10MΩ	0.2MΩ		0.05MΩ	1mA
240641	125V/20MΩ	0.01–20MΩ	0.5MΩ		0.125MΩ	1mA
240632	125V/20MΩ	0.01–20MΩ	0.5MΩ	0–300V	0.125MΩ	1mA
240642	250V/50MΩ	0.01–50MΩ	1MΩ		0.25MΩ	1mA
240633	125V/20MΩ	0.01–20MΩ	0.5MΩ	0–600V	0.125MΩ	1mA
	250V/50MΩ	0.01–50MΩ	1MΩ		0.25MΩ	1mA
240643	500V/100MΩ	0.05–100MΩ	2MΩ		0.5MΩ	1mA
240634	250V/50MΩ	0.01–50MΩ	1MΩ	0–600V	0.25MΩ	1mA
	500V/100MΩ	0.05–100MΩ	2MΩ		0.5MΩ	1mA
240644	1000V/2000MΩ	1–2000MΩ	50MΩ		1MΩ	1mA**
240635	250V/500MΩ	0.1–500MΩ	10MΩ	0–600V	0.25MΩ	1mA**
	500V/1000MΩ	0.5–1000MΩ	20MΩ		0.5MΩ	1mA**
240645	1000V/2000MΩ	1–2000MΩ	50MΩ		1MΩ	1mA**

EL-Back-Light Non-Back-Light

* 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

MY10 Series
Analog Insulation Testers

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)
Weight: Approx. 400 g (main unit and batteries only)
Batteries: Four AA (R6P) batteries

Testing Performance Specifications

Model	Rating	Effective Measuring Range	Central Scale Value	AC Voltage Measuring Range	Lower Limit of Measured Ω*	Rated Current
MY10-01	125V/20MΩ	0.01–20MΩ	0.5MΩ	0–250V	0.125MΩ	1–1.2mA
MY10-02	250V/50MΩ	0.01–50MΩ	1MΩ	0–300V	0.25MΩ	1–1.2mA
MY10-03	500V/100MΩ	0.05–100MΩ	2MΩ	0–500V	0.5MΩ	1–1.2mA
MY10-04	500V/1000MΩ	0.5–1000MΩ	20MΩ	0–500V	1MΩ	0.5–0.6mA
MY10-05	1000V/2000MΩ	1–2000MΩ	50MΩ	0–500V	2MΩ	0.5–0.6mA

* The minimum value at which the rated voltage can be maintained

Analog models with single rating

3213A Series
Analog Insulation Testers

Features

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

General Specifications

Dimensions: Approx. 110 (W) × 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

Model	Rating	Effective Measuring Range	Central Scale Value	AC Voltage Measuring Range	Lower Limit of measured Ω	Rated Current
321341	100V/20MΩ	0.02–20MΩ	0.5MΩ	0–150V	0.1MΩ	1mA
321342	250V/50MΩ	0.05–50MΩ	1MΩ	0–250V	0.25MΩ	1mA
321343	500V/100MΩ	0.1–100MΩ	2MΩ	0–300V	0.5MΩ	1mA
321344	500V/1000MΩ	1–1000MΩ	20MΩ	0–300V	0.5MΩ	1mA**
321345	1000V/2000MΩ	2–2000MΩ	50MΩ	0–300V	1MΩ	1mA**

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

Quick-reference Table of Accessories

Series/Model		3213A	2406E	MY10	MY40
Spare probe tip	For breaker pins	–	–	99011	
	General-purpose	B9600GN		B9600GN *2	
	Hook-shaped	B9600NW		B9600NW *2	
	Extended	B9600NX		B9600NX *2	
	Sharp-pointed	B9600NZ		B9600NZ *2	
	Pickax-shaped	B9635JK		B9635JK *2	
Probe	Line probe	–	98007 Earth and Line probes	98001	
	Earth probe	–		98002	
	Measuring Lead unit (Paired earth/line terminals)	98050	–	–	–
	Probe with switch	98051	B9204FX	–	–
	Replaceable type Line Probe	–	–	98052	
Case *1	Bag for housing spare probe tips	B9600NV	–	–	–
	Accessory-housing case	B9646CA	B9108XA	B9108XA	
	Carrying case	B9600HA w/accessory-housing case	B9075MU(hard case) B9075MV(soft case) Note: Includes an accessory-housing case.	93015 Store main unit /accessories	93015 Store main unit /accessories
Others	Protection cover	–	–	93013	
	Shoulder strap	–	–	99005	
	Handle	B9303XE	–	–	–
	Lead for guard terminals	321803		–	–

Note that the color of the plastic part of a probe tip may not always match that of the probe, depending on the combination.

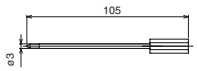
*1 Regarding external dimensions of cases, Pls refer to each product specification.

*2 For using with MYSeries, 98052 is necessary.

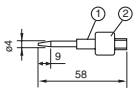
Spare Probe Tips

Unit: mm

99011



B9600GN



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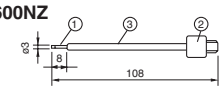
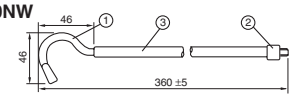
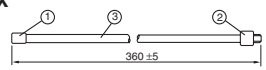


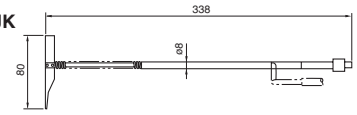
B9600NW



B9600NX



B9635JK

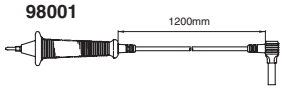


No.	Description	Remarks
①	Testing shank	Metal shank with ø6 screw
②	Fastening nut	ABS resin
③	PVC-clad	

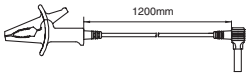
Probes

Unit: mm

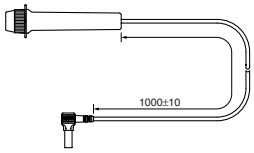
98001



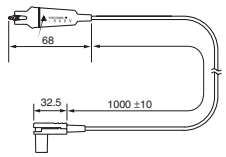
98002



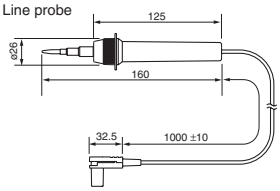
98052



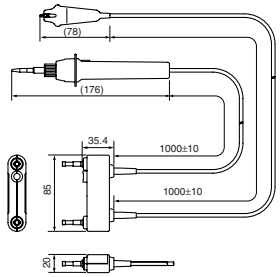
98007 Earth probe



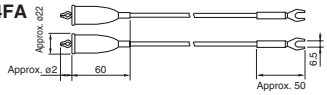
Line probe



98050



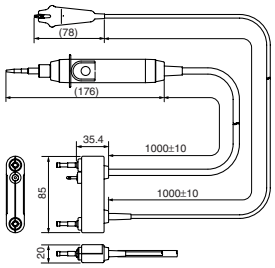
B9634FA



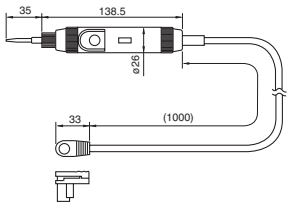
Probes with Switch

Unit: mm

98051



B9204FX

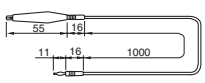


Others

Unit: mm

B9303XE

3218 03



Single Dial Measurement Without Range Change

323511

Earth Tester

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

323511 Specifications

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

Handy Universal Tester for Checking Electrical Appliances

322610

Leakage Current Tester

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

322610 Specifications

Range: DC current ... 0.1, 1, 10 mA,
AC current .... 0.1, 1, 10 mA,
(DC + AC) current ... 0.1, 1, 10 mA,
AC Voltage ... 150, 300 V (50 and 60 Hz)
Accuracy: ±2.5% of full scale value on current and voltage ranges
Input Impedance: Current range; 1 kΩ, 1.5 kΩ, and 2 kΩ
Voltage range; More than 100 kΩ
Frequency Range: 20 Hz to 5 kHz
Power Source: Two 9 V dry cells,
Continuous Operating Time; Approx. 290 hours
Overload Protection: Up to 30 mA AC for one minute will not damage instrument on current ranges
Dimensions: Approx. 190 × 124 × 90 mm not including handle
Weight: Approx. 1.0 kg

Excellent Performance, Multiple Functions

510 Series

Digital Illuminance Meters

Measuring range: 9.99 (51002)/99.9/999/9,990/99,900/999,000 lx
Accuracy: +/-(4% rdg + 1 dgt) (51001), +/-(2% rdg + 1 dgt) (51002)
Features: Timer hold, Ripple measurement, Average illuminance computation function

510 Series Specifications

Photoelectric Element: Silicon Photodiode
Measuring Range:
0.0 to 99.9/999/9,990/99,900/999,000lX
Response Time: 5 sec. (Auto Range)
2 sec. (Manual Range)
Accuracy: ±4% rdg. ±1 dgt. (51001)
±2% rdg. ±1 dgt. (51002)
General Specifications
- External dimensions (main unit):
Approx. 67 (W) × 177 (H) × 38 (D) (mm)
- Weight: Approx. 260 g
- Batteries: One 9 V 6F22(S-006P)

Handy temperature data logger

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 houres.)
  Information on **when**, **by whom** and **what** is measured is saved along with the data.

TM20 Specifications

Product name (Model)	**TM20 Thermo-collector Thermocouple model (54011)**
Number of measuring channels	2
Measuring range (only the main unit)	Thermocouple Type K : -200°C to 1372°C Type J : -200°C to 1000°C Type E : -200°C to 700°C Type T : -200°C to 400°C Voltage input ±100 mV, ±1 V
Accuracy (only the main unit)	Thermocouple -200.0 to 100.1°C : ±(0.1% of rdg + 0.7°C) -100.0°C or above : ±(0.1% of rdg + 1.0°C) Voltage input ±(0.1% of rdg + 0.2% of range)
Measuring interval	Collector mode: 0.5 seconds or longer when 1 channel is used. Logging mode: 1 second to 24 hours when 1 channel is used.
Data capacity	5000 data items when used in collector mode only, 20000 data items when used in logging mode only.
External dimensions	Approx. 151(H) × 56(W) × 33(D) mm (excluding protrusions) Weight: Approx. 180 g (including batteries)
Supplied accessories	Software, two AA-size alkaline dry batteries (LR6), a waterproof cover, and an instruction manual

Optional Accessories for TM20

Product name	Model
RS-232C cable for PC connection (9-pin)	91011
Printer	97010
AC adapter for printer (Europe)	94006
Thermal paper for printer (10 rolls)	97080
RS-232C cable for printer connection	91010

Simplified Thermometer with easy operation

TX10 Series

Digital Thermometers

TX1001:
1-channel Single-function with data hold function

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

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

TX10 Series Specifications

- Thermocouple measurement ranges
  Type K: -200 to 1372 deg.C
  Type J: -200 to 1000 deg.C
  Type E: -200 to 700 deg.C
  Type T: -200 to 400 deg.C
- Resolution
  -200.0 to 199.9 deg.C: 0.1 deg.C, 200 deg.C: 1 deg.C (TX1001)
  -200.0 to 199.9 deg.C: 0.1 deg.C or 1 deg.C (when resolution is set at 1 deg.C), 200deg.C: 1 deg.C (TX1002, 03)
- Accuracy
  -200.0 to -100.1 deg.C: +/-(0.1% of rdg + 1.0deg.C);
  -100.0 to 199.9 deg.C: +/-(0.1% of rdg + 0.7deg.C);
  200deg.C and when resolution is set at 1deg.C:+/-(0.2% of rdg + 1 deg.deg.C)

General Specifications
- External dimensions:
  56 (W) × 151 (H) × 33 (D) mm
- Weight: Approx. 180 g
- Power: Two AA size (LR6) dry batteries

Probes for TM20/TX10

Temperature Probe (for type K)

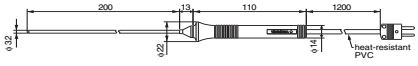
Model	Probe type	Measuring range	Accuracy	Response time (second)	Sensor Dimenter / Length (m/m)
90020	rounded end	-50 to 600°C	0.4% or ±1.5°C	1.4	ϕ3.2 / 200
90021	rounded end	-50 to 600°C	0.4% or ±1.5°C	0.4	ϕ1.6 / 150
90022	rounded end	-50 to 600°C	0.4% or ±1.5°C	1.4	ϕ3.2 / 500
90023	needle	-50 to 500°C	0.4% or ±1.5°C	0.4	ϕ1.6 / 100
90024	needle	-50 to 500°C	0.4% or ±1.5°C	1	ϕ2.1 / 100
90030	Surface straight	-20 to 250°C	0.75% or ±2.5°C	2	ϕ15 (temp. sensing portion)
90031	Surface angled	-20 to 250°C	0.75% or ±2.5°C	2	ϕ15 (temp. sensing portion)
90032	Surface straight	-20 to 500°C	0.75% or ±2.5°C	2	ϕ15 (temp. sensing portion)
90033	Surface angled	-20 to 500°C	0.75% or ±2.5°C	2	ϕ15 (temp. sensing portion)
245907	Bead TC	-40 to 260°C	0.75% or ±2.5°C	(90% response)	1200 (included cord)

NOTE: 90030 is using polyimide to insulate from objects to be measured.
Manufacturers of polyimide are announcing not to apply polyimide directly for food, internal and body fluid.

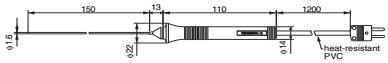
Dimensions

TM20 TX10

90020
Material:
SUS316



90021
Material:
SUS316



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Material:
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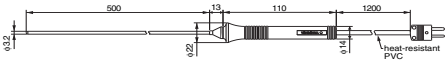

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Material:
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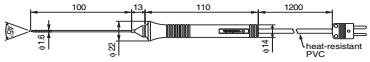

90024
Material:
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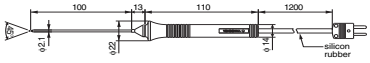
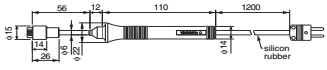


245907

90030
Material:SUS316



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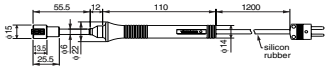
Material:SUS316



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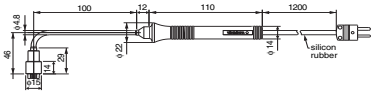
Material:SUS316



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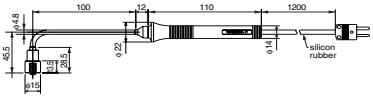
Material:SUS316



Metal foil resistors

2792A series
Standard Resistors

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

2792A series Specifications

Model	Nominal value	Accuracy 23˚C±2˚C
2792A01	0.001 Ω	±100ppm
2792A02	0.01 Ω	±75ppm
2792A03	0.1 Ω	±50ppm
2792A04	1 Ω	±30ppm
2792A05	10 Ω	±30ppm
2792A06	100 Ω	±30ppm
2792A07	1 kΩ	±30ppm
2792A08	10 kΩ	±30ppm

Operating temperature and humidity ranges: 0-50°C / 20-80% RH
Maximum allowable power: 3 W
Test (calibrated) accuracy: ±5 ppm
Power characteristics: ±100 ppm/W
Insulation resistance:
More than 1000 MΩ at 500 V DC
Withstand voltage: 1.5 kV for one minute between measurement terminal and casing
Terminal construction: 4 terminals
External dimensions: Approximately ϕ104 × 150 mm (current terminal width: approximately 174 mm)
Weight: Approximately 1.2 kg
Accessories: User'S Manual, One Test Certificate

High-accuracy, DC variable resistor with 6 dials

279301/279303
Decade Resistance Boxes

279301
- High accuracy and stability
- High reproducibility
- 1 mΩ resolution

279303
- Up to 100 MΩ in 100 Ω step
- Low voltage coefficient
- Shock- and vibration-proof construction

279301 Specifications

Resistance Range: 0.100 to 1,111.210 Ω (Minimum resistance is 0.100 Ω).
Dial Composition: 0.001 × 10 + 0.01 Ω × 10 + 0.1 Ω × 11 + 1 Ω × 10 + 10 Ω × 10 + 100 Ω × 10
Resolution: 0.001 Ω
Accuracy: ± (0.01% + 2 mΩ) at temperature 23 ± 2°C, humidity 45 to 75%, and 0.1 W power application

279303 Specifications

Resistance Range: 0 to 111. 1110 MΩ.
Dial Composition: 100 Ω × 10 + 1 kΩ × 10 + 10 kΩ × 10 + 100 kΩ × 10 + 1 MΩ × 10 + 10 MΩ × 10.
Accuracy: 100Ω, 1 kΩ, 10 kΩ and 100 kΩ steps ... ± (0.05% + 0.05Ω)
1 MΩ and 10 MΩ steps ... ±0.2%
(At temperature 23 ± 2°C, humidity below 75%, including residual resistance of ap-

Quick and easy setting

278610/278620
Decade Resistance Boxes

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

278610/278620 Specifications

Available Models:

Model Number	Resistance Range
278610	0.1 to 111,111 Ω (six 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: -10 to 50°C
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
Slide Resistors

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

2791 series Specifications

Available Models:

Code	Nominal Value	Allowable Input Current
279101	4,800 Ω	0.18 A
279102	1,400 Ω	0.35 A
279103	600 Ω	0.5 A
279105	170 Ω	1.0 A
279108	39 Ω	2.0 A
279110	10 Ω	4.0 A
279112	4.7 Ω	6.0 A

Allowable Deviation: ±20% 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.

1Ω to 10MΩ by operation of dials and switches

2755
Portable Wheatstone Bridge

Model 2755 measures resistances from 1 Ω to 10 MΩ by operation of dials and switches. Batteries and a galvanometer are self-contained. The front control panel is provided with power and galvanometer circuit selectors, one ratio arm dial, and four measuring arm dials.

2755 Specifications

Measuring Range: 1,000 Ω to 10.00 Ω.
Measuring Arms: 1Ω × 10 + 10 Ω × 10 + 100 Ω × 10 + 1,000 Ω × 10 (min. one step: 1 Ω).
Ratio Arms (Multiplier): × 0.001, × 0.01, × 0.1, × 1, × 10, × 100, × 1,000 (M10, M100, M1000 ... Murray & Varley loop testing).
Accuracy: ±0.1% of reading on 100 Ω to 100 kΩ range, ±0.3% of reading on 10 Ω to 1 MΩ range, ±0. 6% of reading on 1Ω to 10 MΩ range.
Temperature Coefficient of Resistance Elements:
$\pm 5 \times 10^{-5}$/°C at ambient temperature of 5 to 35°C, $\pm 2 \times 10^{-5}$/°C at ambient temperature 20 to 35°C.
Galvanometer: Sensitivity ... 0.9 μA/div., internal resistance ... Approx. 150 Ω, external critical damping resistance ... Approx. 800 Ω, period ... within 1.5 seconds.
Power Source: Three 1.5 V batteries (built-in).
Operating Temperature Range: 5 to 35°C.
Humidity Range: 85% max., relative humidity.
Outer Case: ABS resin.
Accessory supplied at no extra cost: Carrying case.

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

2769
Portable Double Bridge

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

2769 Specifications

Measuring Range: 0.1 mΩ* to 110 Ω.
Measuring Dial: 1.00 to 11.00 Ω at × 1.
Multipliers: × 0.0001*, × 0.001, × 0.01, × 0.1, × 1, × 10 (plug-in system).
Min. Division: 0.005 mΩ at × 0.0001*, 0.05 mΩ at ×0.001, 0.5 mΩ at × 0.01, 5 mΩ at × 0.1, 50 mΩ at × 1, 0.5 Ω at × 10.
Accuracy: ± (0.05 Ω × multiplier + 0.01 mΩ)
Current Rating: 10 A at × 0.0001* (0.01 Ω), 3A at × 0.001 (0.1 Ω), 1A at × 0.01 (1 Ω). 0.3A at × 0.1 (10 Ω), 0.1A at × 1 (100 Ω), 0.01A at × 10 (1,000 Ω).
Galvanometer: Built-in electronic DC galvanometer, voltage sensitivity ... approx. 20 μV/div.
sensitivity changeover;
G_0 ... (Input resistance: approx. 11 kΩ).
G_1 ... approx. 1/11 of G_0 sensitivity.
G_2 ... approx. 1/110 of G_0 sensitivity.
Operating Temperature Range: 5 to 35°C
Humidity Range: Less than 85%
Bridge Power Source: Tow 1.5 V batteries, External power source is also usable.
*Note: Standard Resistor (Model 2771) is required for measurement on 0.1 to 1.1 mΩ range at 0.0001 multiplier.

Portable Instruments

201314

205206

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.

Line-up

DC Ammeters and Voltmeters	2011, 2012
AC Ammeters and Voltmeters	2013, 2014
High-frequency AC Ammeters and Voltmeters	2016
Audio-frequency AC Voltmeters	2017
Frequency Meters	2038
Power Factor Meters	2039
Wattmeters	2041, 2042
Miniature DC Ammeters and Voltmeters	2051
Miniature AC Ammeters and Voltmeters	2052, 2053

Switchboard Instruments

2100A Series

Switchboard Instruments

- Compliance with JIS C1102-2007

Line-up

DC Ammeters and Voltmeters	2101A, 2181A
AC Ammeters and Voltmeters	2102A, 2182A
Wattmeters	2105A, 2185A
Varmeters	2106A, 2186A
Power Factor Meters	2107A, 2187A
Frequency Meters	2108A, 2188A
Synchroscope	2109

Front Cover Dimensions (Width × Height mm)

210□A	110×110
218□A	80×80

Panel Meters

Clearline Series

FS,FL Series
* Cover with set pointer

Clearline Series and FS,FL Series

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.

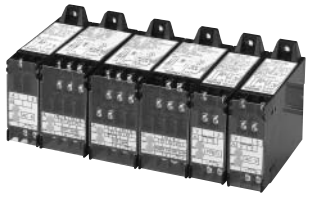
Line-up

- Clearline Series
  (2071 to 2076A, 2081 to 2086A, 2093A and 2094A)
  DC Ammeters and Voltmeters, AC Ammeters and Voltmeters and Frequency Meters
- FS,FL Series
  DC Ammeters and Voltmeters, AC Ammeters and Voltmeters,
  Frequency Meters, Wattmeters, Varmeters and Power Factor Meters

Front Cover Dimensions (Width × Height mm)

2071, 2081:	52×44
2072, 2082:	57×48
2073, 2083:	69×58
2074A, 2084A, FL80:	82×69 (FL80: 80×67)
2075A, 2085A, FL10:	102×85 (FL10: 100×83)
2076A, 2086A:	122×102
2093A, FS60:	60×60
2094A, FS80:	80×80
FS10:	100×100

0.5 Class Transducer for Power Applications



2370A Series

Class 0.5 Transducer for Power Applications

- Available for DIN rail and panel mountings

Line-up

DC-DC isolator	2371A
AC Voltage, current (average rectified)	2372A
AC Voltage, current (RMS rectified)	2373A
AC Voltage, current (True RMS rectified)	2374A
Power	2375A
Reactive power	2376A
Phase	2377A
Power factor	2377A
Frequency	2378A

Dimensions (mm)

2371A, 2372A, 2373A, 2374A, 2378A:
127(H) × 40(W) × 130(D)
2375A, 2376A, 2377A:
127(H) × 55(W) × 130(D)

Discontinuance models (sales end model) list

●List

Old Model	Name	Discontinuance (Date:YYYY.MM)	Recommendation and substitution model
244701, 02	DMM (Pen Type)	1995. 5.	73101*
244703	〃	2002. 5.	73101*
73001	DMM (3.5Digits Handhel Type)	1999. 6.	73201
73303	〃	2009. 6.	
73302	〃	2009. 5	TY520
73301	〃	2009. 2	TY520
73402	DMM (4.5Digits Handhel Type)	2009. 5	TY720
73401	〃	2009. 2	TY710
753601	DMM (Pocket Type)	1996. 8.	73101
753603	〃	2003. 5.	73101
753201	DMM (3.5Digits Handhel Type)	1999. 2.	73202
753202	〃	1999. 2.	73203
753203	〃	1999. 2.	73201
753301	〃	1999. 4.	TY520
753302	〃	1999. 4.	TY520
753303	〃	1999. 4.	TY520
753304	〃	1999. 4.	TY520
753305	〃	1999. 4.	TY520
753306	〃	1999. 4.	TY520
753401	〃	1999. 4.	TY520
753402	〃	1999. 4.	TY520
753403	〃	1999. 4.	TY520
753501	〃	1998. 3.	TY520
753502	〃	1998. 3.	TY520
753701	〃	2002. 9.	TY520
753702	〃	2002. 9.	TY520
753703	〃	2002. 9.	TY520
753704	〃	2002. 9.	TY530
753801	〃	2001.10.	TY520
754401	DMM (4.5Digits Handhel Type)	2001. 8.	TY710
754402	〃	2001. 8.	TY720
754402F	〃	2001.10.	TY720
74001 ～ 03, 13	DMM (4.5Digits Desktop Type)	2002. 9.	
74021, 22, 31, 32	〃	2002. 9.	
754101, 01/B	〃	1997. 3.	
754201	〃	1997. 3.	
753101, 02	DMM (3.5Digits Desktop Type)	2005. 8.	
751102	Temperature Probe for DMM	2002. 5.	90050*
751103	〃	2002. 5.	90051*
751104	〃	2002. 5.	90056*
751105	〃	2002. 5.	90055*
751107	RPM Probe for DMM	2002. 5.	
751108	Hight Voltage Probe for DMM	2002. 8.	
752101	Temperature Measurement Adapter for DMM	2001.10.	
752103	Capacitance Adapter for DMM	2001.10.	
752104	Transistor Adapter for DMM	2001.10.	
241100	Circuit Tester	2002. 5.	
241200, 10	〃	2002. 5.	
241400, 10	〃	2002. 5.	

Old Model	Name	Discontinuance (Date:YYYY.MM)	Recommendation and substitution model
251501, 11	〃	2002. 5.	
241300	〃	1996. 5.	
CL610	Compact Leakage Clamp-on Tester	1998. 4.	CL320
CL611	Compact Clamp-on Tester	1998. 4.	CL120
CL612	Compact AC/DC Clampe-on Tester	1998. 4.	CL220
CL613	Compact Leakage Clamp-on Tester	1998. 4.	CL340
30010	Compact Clamp-on Tester	2003. 7.	CL120
30020	Compact AC/DC Clampe-on Tester	2003. 7.	CL220
30030	Compact Leakage Clamp-on Tester	2003. 7.	30031A/CL340
30031	Compact Leakage Clamp-on Tester	2008. 9.	30031A/30032A
31030	Leakage Clamp-on Tester	2003. 9.	CL345*/CL360*
31031	Leakage Clamp-on Tester	2003. 9.	30031A*/CL360*
234301	Digtal Clamp-on Tester	2003. 7.	CL150*
234302	〃	2003. 9.	CL155*
234303	〃	2003. 9.	CL155*
234304	〃	2003. 7.	CL255*
234501	Digtal Clamp-on Tester	2003. 7.	CL130*
234503	〃	2003. 7.	CL135*
96010	Clamp-on Probe	2001. 8.	96035
96020 ～ 23	Clamp-on Probe	2006. 2.	
240301	Insulation Tester	1996. 8.	MY10-02*
240302	〃	1996. 8.	MY10-03*
240303	〃	1996. 8.	MY10-05*
240411 ～ 16	Insulation Tester(Hand-driven Type)	2002. 4.	
240501 ～ 13	Insulation Tester	1999.11.	MY10
240651 ～ 55, 57	Digital Insulation Tester	2007. 3.	MY40-01
240661 ～ 65, 67	〃	2007. 3.	MY40-01
2406A21	Insulation Tester	1996.11.	240635
2406A22	〃	1996.11.	240633
2406A23	〃	1996.11.	240634
2406A24	〃	1996.11.	240631
2406A25	〃	1996.11.	240634/84
2406A26	〃	1996.11.	240644
240701,02	Digital Insulation Tester	2002. 5.	MY40-01
242601 ～ 10, 15	〃	2001.10.	MY40-01
321322	Insulation Tester	1996. 8.	321342
321323	〃	1996. 8.	321343
321324	〃	1996. 8.	321344
321325	〃	1996. 8.	321345
321346	Insulation Tester	1999.12.	MY10-01
B9205VA	Measuring Lead Unit for 3213A	2009. 4.	98050
242201	Portable Calibrator	2000. 7.	CA71
255701-U2	CA100Compact Cal	2006. 5.	CA150
71010	CA11Handy Callibrator (DCV/DCmA)	2006. 5.	CA11E
71020	CA12Handy Callibrator (Temperature)	2006. 6.	CA12E
71030	CA13Handy Callibrator (Paluse)	2006. 7.	CA71
TX-550	Digital Thermometer	1997. 1.	TX1003
TX-560	〃	1996. 5.	

* As for the recommendation and substitution models, the sales end product and a part of specification might be different.

●List

Old Model	Name	Discontinuance (Date:YYYY.MM)	Recommendation and substitution model
TX-570	〃	1998. 6.	TX1001
TX-575	〃	1998. 6.	TX1002
245501/04	Digital Thermometer	1999. 12.	TX1001*
245502/05	〃	1999. 12.	TX1002*
245503/06	〃	1999. 12.	TX1003*
254101	Pocket-size Digital Thermometer	1999. 12.	TX1001*
254102	〃	1999. 12.	TX1002*
254241	〃	1999. 12.	TX1001
245901	Temperature Probe	1999. 12.	90032
245902	〃	1999. 12.	90032
245903	〃	1999. 12.	90020/ 21
245904	〃	1999. 12.	90022
245905	〃	1999. 12.	90023
245906	〃	1999. 12.	90020/21
XL100-1	Portable Data Station Dayum-Y	2005. 12.	XL121
XL100-2	Portable Data Station Dayum-Y	2005. 12.	XL122
XL101	Portable Data Station Dayum-Y	2007. 4.	XL121
XL102	Portable Data Station Dayum-Y	2007. 4.	XL122
XL104	Portable Data Station Dayum-Y	2007. 4.	XL124
2423A05/15	Portable Multi Thermometer	2000. 7.	XL114
90003	Emission Therno Probe	2003. 12.	
CW140	Clamp-on Power Meter	2004. 9.	CW240
243311, 12	Clip-on AC Power Meter	2002. 6.	CW120
270900	Electronic Galvanometet	1999. 12.	
272741	Portable DC Potentiometer	1999. 3.	
274901	Standard Cell	1999. 12.	
274902	〃	1999. 12.	
279201	Standard Resistors 0.001Ω	2007. 9	2792A01
279202	Standard Resistors 0.01Ω	2006. 3.	2792A02
279203	Standard Resistors 0.1Ω	2006. 7.	2792A03
279204	Standard Resistors 1Ω	2006. 11.	2792A04
279205	Standard Resistors 10Ω	2007. 9	2792A05
279206	Standard Resistors 100Ω	2006. 11.	2792A06
279207	Standard Resistors 1kΩ	2007. 9	2792A07
279208	Standard Resistors 10kΩ	2007. 9	2792A08
279209	Standard Resistors 100kΩ	2007. 9	279303*
279210	Standard Resistors 1MΩ	2007. 9	279303*
279403	Standard Resistors 0.1Ω	2007. 9	
279404	Standard Resistors 1Ω	2006. 7.	
279405	Standard Resistors 10Ω	2007. 9	
279406	Standard Resistors 100Ω	2007. 9	
3284A10	Illuminance Meter	2005. 8.	51005
360400	Sound Level Meter	1997. 3.	
360410	〃	1997. 3.	
360420	〃	2000. 12.	
360430	〃	2000. 12.	
TM300	Digital Tachometer	2002. 5.	
3631 ～ 33	Pocket Tachometer	2003. 7.	

* As for the recommendation and substitution models, the sales end product and a part of specification might be different.

YOKOGAWA

Yokogawa Meters & Instruments Corporation

World Wide Web site at
http://www.yokogawa.com/MCC

NOTICE

- Before using the product, read the instruction manual carefully to ensure proper and safe operation.

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