

# sanwa

75  
*Anniversary*

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**SANWA ELECTRIC INSTRUMENT CO., LTD.**

Dempa Bldg., 4-4 Sotokanda 2-Chome, Chiyoda-ku, Tokyo, 101-0021 Japan

Tel: +81-3-3251-0941 Fax: +81-3-3256-9740

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GENERAL CATALOG

2016

*75 Anniversary*

*Proudly celebrating our 75th anniversary.*

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*since 1941*



**sanwa**

Top class quality  
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Measurements become valid only when people place confidence in the quality of measuring instruments. Sanwa has supported the work of professionals for over half a century, and has produced a myriad of different solutions through the utilization of high levels of quality.

This quality control includes not only “products”, but also each and every operation, maintenance services, and sales and marketing activities, and is thoroughly implemented utilizing reliable systems and the intangible awareness of each of our employees. **SANWA** is a Japanese name brand that lives up to the trust of engineers around the world through the provision of high quality measuring instruments.



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## Sanwa's mission

Sanwa sees its mission as contributing to global environmental conservation and energy management through continuous advances in electrical and on-site measuring instruments, while “putting the trust and satisfaction of customers first”.

# Clamp Meters

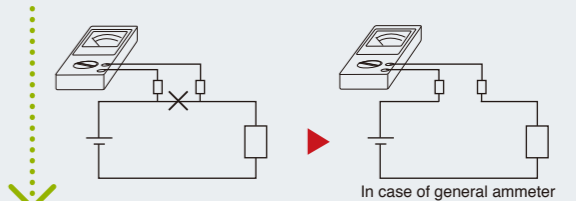
## What is Clamp Meter?

Clamp meters are convenient measuring instruments that allow the measurement of current simply by clamping a wire while being energized without cutting a circuit. In cases of measurement by a multimeter and digital multimeter, the circuit must be cut to measure current. In contrast, with a clamp meter, current can be measured simply by clamping a live wire over its sheath. In addition to its simple operation, it allows safe measurement of a higher current since it is not directly connected to the circuit.

Like a multimeter and insulation resistance tester, there are analog and digital types of clamp meters. The measuring range is typically about 20A to 200A or 400A both for DC and AC. As a special type, there are products allowing for the measurement of a higher current of 2,000A. Some types are also available to allow measurements of fine current of few milliamps for the purpose of detecting leakage current. Others allow the measurement by true RMS values for measurement of current of distorted AC waveforms other than of sine waves, for inverter power supply and switching power supply.

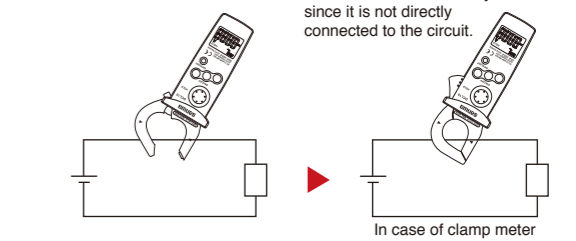
### Measurement by multimeter

Cut the wiring on the circuit and connect a multimeter in series with the circuit.



### Measurement by clamp meter

Simply clamp the wiring, and current can be measured in safety since it is not directly connected to the circuit.



## Four key points in choosing a suitable model

### 1. What are objects to be measured?

Models to be chosen differ depending on what you intend to measure, AC current, DC current or leakage current.

### 2. Measurable conductor sizes

A wide range of sizes are available from 21mm to 150mm in diameter according to measurable conductor sizes and measuring places.

### 3. Is true RMS measurement required?

A clamp meter of the mean-value type cannot provide accurate results in the measurement of an inverter circuit and a motor circuit having many distortions. To make measurements for such circuits, a clamp meter of the true RMS type is required.

### 4. Other functions

Other types are available featuring a tester function and recorder output function in addition to current measurement.

## True RMS measurement

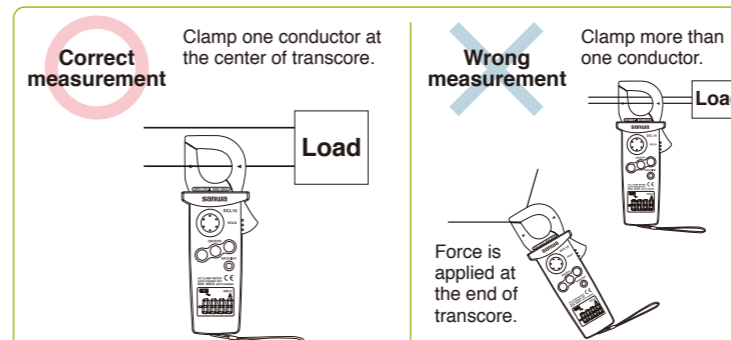
A clamp meter of the mean value type detects the mean value of sine waves in AC measurement, multiplies the value 1.11 times (sine wave AC) and indicates it as the effective value. It even indicates the waveform of a distorted wave and the non-sine wave with different form factors in values multiplied 1.11 times, so indication errors occur as a result. For these measurements, use a clamp meter of the true RMS type that detects and indicates the true RMS value itself.

## Measurement of leakage current

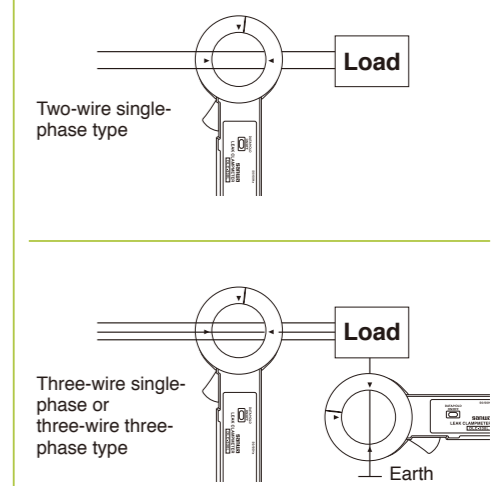
Unlike ordinary current measurement, it is required to clamp all two wires (two-wire single-phase) or three wires (three-wire single-phase or three-wire three-phase) for measuring leakage current. The earthing wire also can be measured.

## Measuring method by clamp meter

For measuring current using a clamp meter, clamp one conductor (wire) to be measured. If two wires (parallel lines) are clamped, current measurement cannot be made. Take a measurement at the center of the core of the clamped portion to minimize measuring errors. A line separator is conveniently used in measuring the consumption current of home electric appliances. There are line separators that can amplify measured current 10 times to allow measurement by amplifying current lower than 1A. When DC current (DCA) is measured using a clamp meter for DC current, the current is indicated in a negative value (-) when the direction of the current is reversed. By using this function, you can know whether your car battery is at the state of charge or discharge.



### Measurement by clamp meter



## Clamp Meter AC

**DCL1000 (with case)****Lower cost lightweight & DMM functions**

- Lightweight approx. 290g
- Large LCD
- Easy to use large size data hold button

Sampling rate : 3 times / sec.  
AC frequency bandwidth : 50~500Hz  
Safety : IEC61010-2-032, CAT. III 600V

**Optional accessories**

Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| DCL1000                       | Measuring range  | Best accuracy | Resolution |
|-------------------------------|--|---------------|------------|
| ACA                           | 400/1000A  | ± (1.7%+5)    | 0.1A       |
| DCV                           | 400m/4/40/400/600V   | ± (1.2%+3)    | 0.1mA      |
| ACV                           | 400m/4/40/400/600V   | ± (2.2%+5)    | 0.1mV      |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ  | ± (1.2%+4)    | 0.1Ω       |
| Continuity                    | Buzzer sounds at between 0Ω and 65Ω (±35Ω). Open voltage: approx. 0.4V |               |            |
| Diode test                    | Open voltage: approx. 1.6V   |               |            |
| Bandwidth                     | ACA: 50/60Hz (sine wave), ACV: 50~500Hz (sine wave)                    |               |            |
| Display                       | 4000   |               |            |
| Withstand voltage             | 5550VAC  |               |            |
| Battery                       | R03X2  |               |            |
| Clamp diameter/Conductor size | 42mm/20×54mm   |               |            |
| Size / Mass                   | H238×W95×D45mm/290g  |               |            |
| Standard accessories included | Test lead (TL-23a), Carrying case, Instruction manual                  |               |            |

**DCM400 (with case)****Low cost & DMM functions**

- 4000 count / 42 segment analog bar graph
- Frequency measurement by clamping and using test lead
- Data hold
- Continuity check buzzer
- Auto power off (30min.)
- Low battery power indication

Sampling rate : 2 times / sec. for numeral display  
AC frequency bandwidth : 50~60Hz (ACA : 1.9%±5), 60~500Hz (ACA : 2.5%±5), 50~500Hz (ACV)  
Safety : IEC61010-1 (EN61010-1) CAT. III 300V. / CAT. II 600V

**Optional accessories**

Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| DCM400                        | Measuring range   | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| ACA                           | 40/400A   | ± (1.9%+5)    | 0.01A      |
| ACV                           | 400/600V  | ± (1.5%+5)    | 0.1V       |
| DCV                           | 400/600V  | ± (1%+2)      | 0.1V       |
| Resistance                    | 400Ω  | ± (1%+2)      | 0.1Ω       |
| Frequency (A)                 | 20~4k/10kHz   | ± (0.1%+1)    | 0.01Hz     |
| Frequency (V)                 | 4k/40k/400k/1MHz  |               | 0.01kHz    |
| Continuity                    | Buzzer sounds at less than approx. 40Ω. Open voltage : approx. 1.5V   |               |            |
| Bandwidth                     | 50~60Hz (ACA : 1.9%±5) 60~500Hz (ACA:2.5%±5), 50~500Hz (ACV : 1.5%±5) |               |            |
| Display                       | 4000  |               |            |
| Clamp diameter/Conductor size | 25mm/10×34mm  |               |            |
| Withstand voltage             | Less than 3700Vrms  |               |            |
| Battery                       | R03X2   |               |            |
| Size / Mass                   | H193×W50×D28mm/approx. 230g   |               |            |
| Standard accessories included | Test lead (TL-23a), Carrying case (C-DCM400), Instruction manual      |               |            |

## Clamp Meter AC (Analog Type)

**CAM600S (with case)****AC600A, AMT functions**

- AC current measurable max. 600A
- Long analog pointer with "pointer lock" function
- Temperature measurement with optional probe

Display : Analog pointer  
AC frequency bandwidth : 50 / 60Hz

**Optional accessories**

Temperature probe : T-THP  
Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| CAM600S                       | Measuring range  | Accuracy           |
|-------------------------------|--|--------------------|
| ACA                           | 6/15/60/150/600A   | ±3% of full scale* |
| ACV                           | 150/300/600V   | ±3% of full scale  |
| DCV                           | 60V  | ±3% of full scale  |
| Resistance                    | 1k/100kΩ   | 3% of arc          |
| Temperature                   | -10~+200°C (optional probe "T-THP" is necessary)               |                    |
| Bandwidth                     | 50/60Hz  |                    |
| Clamp diameter/Conductor size | 36mm/10×50mm   |                    |
| Withstand voltage             | 5550VAC  |                    |
| Battery                       | R03X1  |                    |
| Size / Mass                   | H221×W97×D43mm/420g  |                    |
| Standard accessories included | Test lead (TL-21a), Carrying case (C-CAM6), Instruction manual |                    |

\*4% in 300~600A

## Clamp Meter DC/AC

**DCM400AD (with case)****Suitable for automotive maintenance & DMM functions**

- 4000 count / 42 segment analog bar graph
- DC / AC current 40A/400A
- Data hold / Range hold
- Relative value
- Continuity check buzzer
- Auto power off (30min.)
- Low battery power indication

Display : numeral display 3999, bar graph 42 segments  
Sampling rate : 2 times / sec. 20 times / sec. for bar graph  
AC frequency bandwidth : 50~500Hz  
Safety : IEC61010-1 (EN61010-1) CAT. III 300V / CAT. II 600V

**Optional accessories**

Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| DCM400AD                      | Measuring range   | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| ACA                           | 40/400A   | ± (2%+10)     | 0.01A      |
| DCA                           | 40/400A   | ± (2.5%+10)   | 0.01A      |
| ACV                           | 400/600V  | ± (1.5%+5)    | 0.1V       |
| DCV                           | 400/600V  | ± (1%+2)      | 0.1V       |
| Resistance                    | 400Ω  | ± (1%+2)      | 0.1Ω       |
| Continuity                    | Buzzer sounds at less than approx. 40Ω. Open voltage : approx. 1.5V |               |            |
| Bandwidth                     | 50~500Hz  |               |            |
| Display                       | 4000  |               |            |
| Clamp diameter/Conductor size | 25mm/10×34mm  |               |            |
| Withstand voltage             | Less than 3700Vrms  |               |            |
| Battery                       | LR03X2  |               |            |
| Size / Mass                   | H193×W50×D28mm/approx. 230g   |               |            |
| Standard accessories included | Test lead (TL-23a), Carrying case (C-DCM400), Instruction manual    |               |            |

**DCM-22AD (with case)****DC / AC compact type & DMM functions**

- DC / AC current measurable max. 200A
- Continuity check buzzer
- Data hold
- Slim core for narrow space

Display : numeral display 1999  
Sampling rate : 2 times / sec. for numeral display  
AC frequency bandwidth : 40~400Hz (ACA), 40~500Hz (ACV)

**Optional accessories**

Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-91M



| DCM-22AD                      | Measuring range   | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| ACA                           | 20/200A   | ± (2%+5)      | 0.01A      |
| DCA                           | 20/200A   | ± (2%+2)      | 0.01A      |
| ACV                           | 2/20/200/500V   | ± (2%+5)      | 0.001V     |
| DCV                           | 2/20/200/500V   | ± (1.5%+2)    | 0.001V     |
| Resistance                    | 2k/20k/200k/2000kΩ  | ± (2%+5)      | 0.001kΩ    |
| Continuity                    | Buzzer sounds at less than approx. 400Ω. Open voltage : approx. 0.43V |               |            |
| Bandwidth                     | 40~400Hz (ACA), 40~500Hz (ACV)  |               |            |
| Display                       | 1999  |               |            |
| Clamp diameter/Conductor size | 23mm/10×21mm  |               |            |
| Withstand voltage             | 2000VAC   |               |            |
| Battery                       | R03X2   |               |            |
| Size / Mass                   | H179×W56×D26.5mm/140g   |               |            |
| Standard accessories included | Test lead (TL-61), Carrying case (C-CL), Instruction manual           |               |            |

## Clamp Meter AC+True RMS

**DCL11R (with case)****RMS mini clamp meter with backlight**

- True RMS
- Compact pocket size
- Data hold
- Backlight
- Auto power off (approx. 15min.) (cancelable)

Sampling rate : approx. 2 times / sec.  
Safety : IEC61010-1, IEC61010-2-030 CAT. III 300V  
IEC61010-2-32



| DCL11R                        | Measuring range                             | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| ACA                           | 60/300A                                     | ± (2%+5)      | 0.01A      |
| Bandwidth                     | 45~400Hz                                    |               |            |
| Display                       | 6000  |               |            |
| Clamp diameter/Conductor size | 22mm/10×25mm                                |               |            |
| Battery                       | LR03X2                                      |               |            |
| Size / Mass                   | H145×W54×D31mm/approx. 120g                 |               |            |
| Standard accessories included | Carrying case (C-DCL10), Instruction manual |               |            |



# Clamp Sensors

## What is Clamp Sensor?

A clamp sensor allows the measurement of AC and DC current and fine AC current of milliampere level (leakage current) by connecting to a DMM without connecting a wire as in the case of a clamp meter. Its combined use with DMM of PC series connectable to a PC allows the recording and monitoring of the measurements on a PC of consumption current for home electric appliances and leakage current running through an earthing wire.

**Measurable current differs by models. Check it before use.**

ACA ..... **CL-22AD, CL3000**

DCA ..... **CL-22AD, CL33DC**

## Prior to making a measurement

The following description is given on a digital multimeter of 6000-count display type (PC700), but it also applies to 1999-count and 3999-count display types. Check a DMM compatibly used with a clamp sensor (Refer to the information of compatible models of each product in p. 10, 11). Values are indicated in mV, which should be read in mA by multiplying a factor for each product. Models RD700 and RD701 have a separate fixed range of 400.0mV AC / DC (high impedance 1000MΩ) for exclusive use with an adaptor probe to give clear viewing of milli-volt display.

### e.g. When PC700 is used with CL-22AD

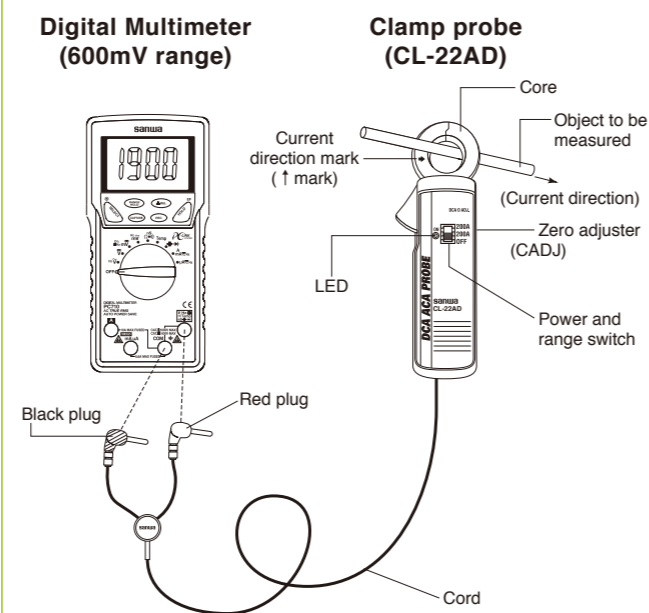
Fix the range at 600mV and set the clamp probe at 20~200A range. In this case, the measured value is obtained by multiplying the indicated value of the multimeter by the factor given below.

### e.g. When CL-22AD is used

DCA measurement → DC600mV range  
ACA measurement → AC600mV range  
20A range...Reading×0.1  
200A range...Reading×1

When CL-22AD is set to the 20A range, it will be measured as 1.900A if the DMM indicates 19.00mV (19.00×0.1).

## Connecting DMM and CL-22AD



## Clamp Sensor



### CL33DC (with case)

#### DC current

■R03×2 Length : 1.8m Battery life : approx. 70H

| CL33DC                        | DC300A                                   | DC30A      | Applicable digital multimeter  |
|-------------------------------|--|------------|--|
| Resolution                    | 0.1A                                     | 0.01A      | PC7000 PC720M PC710 PC700 PC5000a PC510a PC500a PC773 PC20 RD701 RD700 CD772 CD771 CD770 CD750P CD731a CD732 |
| Minimum scale                 | 5A<br>10A                                | 0.5A<br>1A | TA55 (Analog)  |
| Core diameter                 | φ23mm                                    |            |  |
| Size / Mass                   | H179×W56×D26.5mm/approx. 120g            |            |  |
| Standard accessories included | Carrying case (C-CL), Instruction manual |            |  |

Resolution of TA55 (Analog) on 1999 display when measuring 199A max. at 300A range and 19A max. at 30A range. Resolution is one digit bigger at the upper range. Output voltage : DC300mV when measuring max. current at each range.



### CL-22AD (with case)

#### DC / AC current

■R03×2 Length : 1.8m Battery life : approx. 70H

| CL-22AD                       | DC200A                                   | DC20A | AC200A | AC20A | Applicable digital multimeter  |
|-------------------------------|--|-------|--------|-------|--|
| Resolution                    | 0.1A                                     | 0.01A | 0.1A   | 0.01A | PC7000 PC720M PC710 PC700 PC5000a PC510a PC500a PC773 PC20 RD701 RD700 |
| Core diameter                 | φ23mm                                    |       |        |       |  |
| Size / Mass                   | H179×W56×D26.5mm/approx. 120g            |       |        |       |  |
| Standard accessories included | Carrying case (C-CL), Instruction manual |       |        |       |  |

Output voltage : DC200mV/AC200mV (0~400Hz) when measuring max. current at each range. Waveform measurement by oscilloscope is impractical.



### CL3000 (with case)

#### AC current, Flexible type

■LR03×2 Length : 1.8m Battery life : approx. 110H

| CL3000                        | AC30/300/3000A                               | Applicable digital multimeter  |
|-------------------------------|--|--|
| Accuracy                      | ±(2.0%+0.3%FS)                               | PC7000 PC720M PC710 PC700 PC773 PC20 RD701 RD700 CD772 CD771 CD770 CD750P CD731a CD732 |
| Frequency range               | 45~65Hz                                      |  |
| Output impedance              | 250Ω and less                                |  |
| Core diameter                 | Approx. φ150mm max.                          |  |
| Size / Mass                   | H120×W70×D26mm/approx.300g                   |  |
| Standard accessories included | Carrying case (C-CL3000), Instruction manual |  |

\* Output voltage : AC3V when measuring max. current at each range.

# Insulation Resistance Testers

## What is Insulation Resistance Tester?

The measurement of insulation resistance is performed to check the insulation status of electric equipments and circuits, which constitutes one of the important measuring items for safety control. The measurement of the insulation of electric equipments and circuits is made using an insulation resistance tester by stopping the operation of the electric equipments and circuits (by stopping power distribution). Voltage of several megohms to tens of megohms is measured in case of the measurement of insulation resistance of electronic parts and electric equipments, and voltage of 1MΩ or less is measured in case of electric works for interior wiring and others.

### Is not the resistance range of a multimeter adequate for the measurement of insulation resistance?

The resistance of a digital multimeter or multimeter covers the applied voltage (measured voltage) of approx. 0.3V up to 12V. An insulation resistance tester needs to make measurements at voltage higher than the working voltage of a circuit and electric and electronic equipment to be measured. The table on the right lists examples of rated voltage and uses of the insulation resistance tester.

### Examples of major applications of insulation resistance tester

| Rated measurement voltage | General electric equipments  | Electric equipments and circuits  |
|---------------------------|--|---|
| 25V<br>50V                | Insulation measurement at safe voltage   | Insulation measurement of telephone circuits  |
|                           | Insulation measurement of telephone circuit equipments and explosion-proof equipments                                  |   |
| 100V<br>125V              | Insulation measurement of control equipments   | Insulation measurement for maintaining and controlling low-voltage distribution wiring and equipments of 100V or less   |
|                           |  | Insulation measurement for maintaining and controlling low-voltage wiring and equipments of 200V class or lower   |
| 250V                      | Insulation measurement of low-voltage distribution circuits and equipments   | Insulation measurement for maintaining and controlling low-voltage wiring and equipments of 400V class or lower   |
|                           |  | Insulation measurement of 100V, 200V and 440V classes at the time of new installation   |
| 500V                      | Insulation measurement of newly installed distribution circuits, and circuits and equipments of 600V or less (General) | Insulation measurement for maintaining and controlling low-voltage wiring and equipments of lower than 600V   |
|                           |  | Insulation measurement of 100V, 200V and 400V distribution wiring at the time of new installation   |
| 1000V                     | Insulation measurement of circuits, equipments, and facilities of higher than 600V (General)                           | Insulation measurement of equipments normally operating at high working voltage (e.g. high-voltage cable, high-voltage electric equipment, and communications equipment using high voltage) |

## Three key points in choosing a suitable model

### 1. Analog type or digital type?

Analog type is suitable for visually checking the measurement.  
Digital type is suitable for verifying the measurement by precise values.

### 2. What do you like to measure by your insulation resistance tester?

For measurement of electronic circuits and the like (See Figure ① below)  
→ For easy reading of higher resistance : DM series / Digital type  
For use in measurement in electric works and the like (See Figure ② below)  
→ For easy reading of lower resistance : PDM series / Digital type

### 3. Required rated voltage

A wide voltage range is available from 15V (optimum for maintaining and controlling elevators) up to 1000V / 4000MΩ  
There are types allowing two to seven ranges by one unit.

## Measuring method of low-voltage circuit

In order to measure the insulation resistance of a low-voltage circuit, use an insulation resistance tester with the rated voltage of 500V. Open switches in the distribution board, shut off the power distribution and measure the insulation resistance between wires on the circuit and between wire and ground. If the measured value is below the reference value, open all branch switches and make measurements separately for each branch line of the mains line. The insulation resistance value of the low-voltage circuit is stipulated according to the Electrical Equipment Standard.

| Use voltage class of circuit | Insulation resistance value   |
|------------------------------|---|
| 300V or less                 | When voltage to ground is 150V or less (Voltage to ground: Voltage between wire and the earth in case of a ground type circuit, and voltage between wires in case of a non-ground type circuit. The same applies hereinafter.)<br>0.1MΩ |
|                              | Other cases<br>0.2MΩ  |
| More than 300V               | 0.4MΩ   |

## Scale-division method of the 1st and 2nd effective measurement range

### ① Scale of DM series



### ② Scale of PDM series





## Digital Type



### MG1000 MG500

Allows you to measure insulation resistance more safely by avoiding operation mistakes.

- Hot-line state (30V minimum) detection
- Large volt mark with the buzzer sound
- Automatic data hold function
- Bargraph just like analog meter
- Large display with backlight
- Easy to use & tough body

Display : numeral display 4000 Sampling rate : 2 times / sec.  
Safety : IEC61010 CAT.III 600V

#### Optional accessories

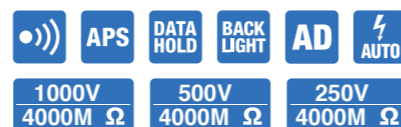
Clip adapter : CL-16  
Test lead : TLF-120 (MG500 Only)

CE

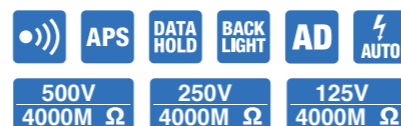


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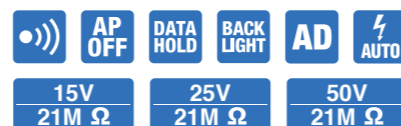
Front cover image ▶



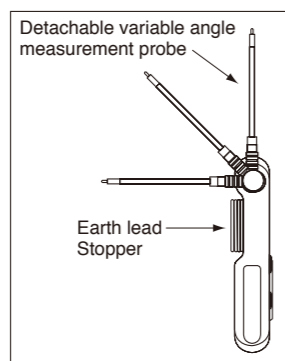
| MG1000                        | Measuring range  | Best accuracy | Resolution |
|-------------------------------|--|---------------|------------|
| MΩ                            | 4M/40M/400M/4000M  | ± (3%+4)      | 0.001MΩ    |
| Test voltage                  | 1000/500/250V  |               |            |
| ACV/DCV                       | 600V (AC/DC Automatic detection)   | ± (3%+2)      | 1V         |
| Ω                             | 4000Ω (Buzzer and ALARM indicator)   | ± (3%+3)      | 1Ω         |
| Ω                             | 40Ω  | ± (3%+10)     | 0.01Ω      |
| Open circuit voltage          | 1 to 1.3 times of nominal test voltage   |               |            |
| Rated current                 | 1.0~1.2mA  |               |            |
| Short-circuit current         | 2mA or less  |               |            |
| Live circuit detection        | At ≥30V AC/DC or more, inhibits test, buzzer sounds and ALARM indicator lights up. |               |            |
| Battery                       | LR6×6  |               |            |
| Size / Mass                   | H170×W142×D57mm/approx. 600g   |               |            |
| Standard accessories included | Test Lead (TL-112a), Strap (ST-50), Instruction Manual                             |               |            |



| MG500                         | Measuring range  | Best accuracy | Resolution |
|-------------------------------|--|---------------|------------|
| MΩ                            | 4M/40M/400M/4000M  | ± (3%+4)      | 0.001MΩ    |
| Test voltage                  | 500/250/125V   |               |            |
| ACV/DCV                       | 600V (AC/DC Automatic detection)   | ± (3%+2)      | 1V         |
| Ω                             | 4000Ω (Buzzer and ALARM indicator)   | ± (3%+3)      | 1Ω         |
| Ω                             | 40Ω  | ± (3%+10)     | 0.01Ω      |
| Open circuit voltage          | 1 to 1.3 times of nominal test voltage   |               |            |
| Rated current                 | 1.0~1.2mA  |               |            |
| Short-circuit current         | 2mA or less  |               |            |
| Live circuit detection        | At ≥30V AC/DC or more, inhibits test, buzzer sounds and ALARM indicator lights up. |               |            |
| Battery                       | R6×6   |               |            |
| Size / Mass                   | H170×W142×D57mm/approx. 600g   |               |            |
| Standard accessories included | Test Lead (TL-112a), Strap (ST-50), Instruction Manual                             |               |            |



| HG561H                              | Measuring range  | Best accuracy | Resolution |
|-------------------------------------|--|---------------|------------|
| MΩ                                  | 15V/25V/50V 9.99MΩ/21.0MΩ<br>100V/125V/250V/500V<br>9.99MΩ/99.9MΩ/110MΩ                            | ±(2%+5)       | 0.1MΩ      |
| Test voltage                        | 15V/25V/50V/100V/125V/250V/500V  |               |            |
| ACV/DCV                             | 600V (AC/DC Automatic Detection)   | ±(1.6%+7)     | 0.1V       |
| Ω                                   | 999.9Ω/99.99kΩ/999.9kΩ   | ±(1.5%+7)     | 0.1Ω       |
| Insulation Resistance (Level meter) | 15V/25V/50V 5 Levels(LED light up/blinking)<br>100V/125V/250V/500V 7 Levels(LED light up/blinking) |               |            |
| Continuity                          | Buzzer sounds at 30Ω or less   |               |            |
| Rated current                       | 1.0~1.2mA  |               |            |
| Battery                             | LR03×4   |               |            |
| Size / Mass                         | H139×W91×D29mm/approx. 230g  |               |            |
| Standard accessories included       | Measurement probe (TL-561), Alligator clip (CL-561), Carrying case (C-DG3a), Instruction manual    |               |            |



CE

### HG561H

Pocket size, 7 test voltage ranges

- Test voltage selection mode
- LED level meter shows MΩ
- Easy-to-read LCD with fixed decimal point
- Automatic data hold function
- LCD with backlight & LED light for dark place

Sampling rate : approx. 2 times / sec.  
Safety : IEC61010 CAT.III 300V CAT.II 600V

## Digital Type



### M53

2 test voltage ranges for elevator maintenance

- Test voltage DC500V / 15V
- Auto range
- Auto power off (1min.)
- Low battery power indication
- Remote speed measurement (Speed meter SE-9000 is necessary.)

Display : numeral display 1999

#### Optional accessories

Carrying case : C-M53



| M53                           |  |
|-------------------------------|--|
| MΩ                            | 2/20/200MΩ (3 auto ranges)<br>Accuracy: Within ± (2%+2)                                      |
| ACV                           | 200/750V (2 auto ranges)<br>Accuracy: Within ± (1%+0.5%RNG+1)                                |
| DCV                           | 20/750V (2 auto ranges)<br>Accuracy: Within ± (0.5%+0.5%RNG+1)                               |
| Rated current                 | 500V/1.0~1.2mA   |
| Battery                       | LR6×6  |
| Size / Mass                   | H175×W115×D55mm/approx. 600g   |
| Standard accessories included | Test lead (red/black with plug) and clip lead connecting to pin (TL-M54), Instruction manual |

## Analog Type



CE

### PDM1529S

3 test voltage ranges

- Test voltage DC1000V / 500V/ 250V
- Easy viewing and readable scale graduations
- One-shot or continuous measurement push switch
- DCV measurement range (DC60V)
- Auto discharge function
- Inner battery check range
- Shoulder Strap

Safety : IEC61010-1 CAT.III 600V



| PDM1529S                      |  |
|-------------------------------|--|
| Insulation resistance (MΩ)    | 0.5~2~1000~2000MΩ 1000V<br>0.02~0.1~50~100MΩ 500V/250V<br>Accuracy: ±5% of reading (1st effective measurement range : written in thick print above)<br>±10% of reading (2nd effective measurement range : written in small type above) |
| ACV                           | 600V<br>Accuracy: ±5% of full scale (50~60Hz sine wave)  |
| DCV                           | 60V<br>Accuracy: ±5% of full scale   |
| Rated current                 | 1.0~1.2mA  |
| Battery                       | 6LR61 (9V)×1   |
| Size / Mass                   | H144×W99×D43mm/approx. 310g  |
| Standard accessories included | Test lead (TL-508Sa), Carrying case (C-08S), Instruction manual  |

### PDM5219S

3 test voltage ranges

- Test voltage DC500V/ 250V / 125V
- Easy viewing and readable scale graduations
- One-shot or continuous measurement push switch
- DCV measurement range (DC60V)
- Auto discharge function
- Inner battery check range
- Shoulder Strap

Safety : IEC61010-1 CAT.III 600V

#### Optional accessories

Test lead : TLF-120



| PDM5219S                      |  |
|-------------------------------|--|
| Insulation resistance (MΩ)    | 0.02~0.1~50~100MΩ 500V/250V/125V<br>Accuracy: ±5% of reading (1st effective measurement range : written in thick print above)<br>±10% of reading (2nd effective measurement range : written in small type above) |
| ACV                           | 600V<br>Accuracy: ±5% of full scale (50~60Hz sine wave)  |
| DCV                           | 60V<br>Accuracy: ±5% of full scale   |
| Rated current                 | 1.0~1.2mA  |
| Battery                       | 6LR61 (9V)×1   |
| Size / Mass                   | H144×W99×D43mm/approx. 310g  |
| Standard accessories included | Test lead (TL-508Sa), Carrying case (C-08S), Instruction manual  |



CE

# MΩ Tester

## Analog Type



### DM1008S

#### Single test voltage range

- Test voltage DC1000V
- One-shot or continuous measurement push switch
- DCV measurement range (DC60V)
- Auto discharge function
- Inner battery check range
- ACV measurement range
- Shoulder Strap

AD 1000V  
2000MΩ

| DM1008S                       |  |
|-------------------------------|--|
| Insulation resistance (MΩ)    | 1~2~1000~2000MΩ  |
| Accuracy                      | ±5% of reading (1st effective measurement range: written in thick print above)<br>±10% of reading (2nd effective measurement range: written in small type above) |
| ACV                           | 600V   |
| Accuracy                      | ±5% of full scale (50~60Hz sine wave)  |
| DCV                           | 60V  |
| Accuracy                      | ±5% of full scale  |
| Rated current                 | 1.0~1.2mA  |
| Battery                       | 6LR61 (9V)×1   |
| Size / Mass                   | H144×W99×D43mm/approx. 310g  |
| Standard accessories included | Test lead (TL-508Sa), Carrying case (C-08S), Instruction manual  |

### DM508S

#### Single test voltage range

- Test voltage DC500V · 1000MΩ
- One-shot or continuous measurement push switch
- DCV measurement range (DC60V)
- Auto discharge function
- Inner battery check range
- Shoulder Strap

AD 500V  
1000MΩ

| DM508S                        |  |
|-------------------------------|--|
| Insulation resistance (MΩ)    | 0.5~1~500~1000MΩ   |
| Accuracy                      | ±5% of reading (1st effective measurement range: written in thick print above)<br>±10% of reading (2nd effective measurement range: written in small type above) |
| ACV                           | 600V   |
| Accuracy                      | ±5% of full scale (50~60Hz sine wave)  |
| DCV                           | 60V  |
| Accuracy                      | ±5% of full scale  |
| Rated current                 | 1.0~1.2mA  |
| Battery                       | 6LR61 (9V)×1   |
| Size / Mass                   | H144×W99×D43mm/approx. 310g  |
| Standard accessories included | Test lead (TL-508Sa), Carrying case (C-08S), Instruction manual  |

#### Optional accessories

Test lead : TLF-120

### PDM508S

#### Single test voltage range

- Test voltage DC500V · 100MΩ
- One-shot or continuous measurement push switch
- DCV measurement range (DC60V)
- Auto discharge function
- Inner battery check range
- ACV measurement range
- Shoulder Strap

AD 500V  
100MΩ

| PDM508S                       |  |
|-------------------------------|--|
| Insulation resistance (MΩ)    | 0.05~0.1~50~100MΩ  |
| Accuracy                      | ±5% of reading (1st effective measurement range: written in thick print above)<br>±10% of reading (2nd effective measurement range: written in small type above) |
| ACV                           | 600V   |
| Accuracy                      | ±5% of full scale (50~60Hz sine wave)  |
| DCV                           | 60V  |
| Accuracy                      | ±5% of full scale  |
| Rated current                 | 1.0~1.2mA  |
| Battery                       | 6LR61 (9V)×1   |
| Size / Mass                   | H144×W99×D43mm/approx. 310g  |
| Standard accessories included | Test lead (TL-508Sa), Carrying case (C-08S), Instruction manual  |

#### Optional accessories

Test lead : TLF-120

## MΩ Tester



Max 100A  
MΩ 400  
TILT-UP CLAMP  
Hybrid Mini Tester

### DG34a

#### Hybrid pocket size MΩ Tester + Clamp meter

- Lightweight approx. 160g
- Easy to use, pocket size
- ACV / DCV measurement range
- DCA / ACA measurement range
- Inorganic EL backlight
- Test leads holder with thermo plastic elastomer which is easy to reel
- Current measurement with thin U-shaped current sensor (7mm) at angles of 0 and 180 degrees
- Data hold
- Measurement of relative value
- With Clip adapter

Display : 3999

Sampling rate : 2 times / sec.

#### Optional accessories

Carrying case : C-DG3a  
Clip adapter : CL-13a, CL-15a, TL-9IC



Max 100A  
MΩ 40  
TILT-UP CLAMP  
Hybrid Mini Tester

### DG35a

#### Hybrid pocket size MΩ Tester + Clamp meter

- Lightweight approx. 160g
- Easy to use, pocket size
- ACV / DCV measurement range
- DCA / ACA measurement range
- Inorganic EL backlight
- Current measurement with thin U-shaped current sensor (7mm) at angles of 0 and 180 degrees
- Data hold
- Measurement of relative value
- With Clip adapter

Display : 3999

Sampling rate : 2 times / sec.

#### Optional accessories

Carrying case : C-DG3a  
Clip adapter : CL-13a, CL-15a, TL-9IC



Max 100A  
MΩ 40  
TILT-UP CLAMP  
Hybrid Mini Tester

### DG36a

#### Hybrid pocket size MΩ Tester + Clamp meter

- Lightweight approx. 160g
- Easy to use, pocket size
- ACV / DCV measurement range
- DCA / ACA measurement range
- Inorganic EL backlight
- Current measurement with thin U-shaped current sensor (7mm) at angles of 0 and 180 degrees
- Data hold
- Measurement of relative value
- With Clip adapter

Display : 3999

Sampling rate : 2 times / sec.

#### Optional accessories

Carrying case : C-DG3a  
Clip adapter : CL-13a, CL-15a, TL-9IC

Max 100A  
DCA  
ACA  
DATA HOLD  
REL  
BACK LIGHT

500V  
400MΩ  
250V  
400MΩ  
125V  
400MΩ

| DG34a                         | Measuring range   | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| MΩ                            | 400MΩ   | ± (3%+3)      | 0.1MΩ      |
| Test voltage                  | 125V/250V/500V  |               |            |
| DCV                           | 600V  | ± (1.1%+3)    | 1V         |
| ACV                           | 600V  | ± (1.6%+7)    | 1V         |
| DCA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| ACA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| Open circuit voltage          | 1 to 1.2 times of nominal test voltage                  |               |            |
| Rated measurement current     | 125V/approx.1.25 μA 250V/approx.2.5 μA 500V/approx.5 μA |               |            |
| Battery                       | LR03×2  |               |            |
| Size / Mass                   | H130×W75×D19.9mm / approx. 160g                         |               |            |
| Clamp diameter                | φ 10mm  |               |            |
| Standard accessories included | Clip adapter (CL-DG3a), Instruction manual              |               |            |

Max 100A  
DCA  
ACA  
DATA HOLD  
REL  
BACK LIGHT

500V  
40MΩ  
250V  
40MΩ  
125V  
40MΩ

| DG35a                         | Measuring range   | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| MΩ                            | 40MΩ  | ± (3%+3)      | 0.01MΩ     |
| Test voltage                  | 125V/250V/500V  |               |            |
| DCV                           | 600V  | ± (1.1%+3)    | 1V         |
| ACV                           | 600V  | ± (1.6%+7)    | 1V         |
| DCA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| ACA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| Open circuit voltage          | 1 to 1.2 times of nominal test voltage                  |               |            |
| Rated measurement current     | 125V/approx.12.5 μA 250V/approx.25 μA 500V/approx.50 μA |               |            |
| Battery                       | LR03×2  |               |            |
| Size / Mass                   | H130×W75×D19.9mm / approx. 160g                         |               |            |
| Clamp diameter                | φ 10mm  |               |            |
| Standard accessories included | Clip adapter (CL-DG3a), Instruction manual              |               |            |

Max 100A  
DCA  
ACA  
DATA HOLD  
REL  
BACK LIGHT

250V  
40MΩ  
125V  
40MΩ  
50V  
40MΩ

| DG36a                         | Measuring range                                       | Best accuracy | Resolution |
|-------------------------------|---|---------------|------------|
| MΩ                            | 40MΩ  | ± (3.0%+3)    | 0.01MΩ     |
| Test voltage                  | 50V/125V/250V   |               |            |
| DCV                           | 600V  | ± (1.1%+3)    | 1V         |
| ACV                           | 600V  | ± (1.6%+7)    | 1V         |
| DCA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| ACA                           | 100A  | ± (2.0%+5)    | 0.1A       |
| Open circuit voltage          | 1 to 1.2 times of nominal test voltage                |               |            |
| Rated measurement current     | 50V/approx.5 μA 125V/approx.12.5 μA 250V/approx.25 μA |               |            |
| Battery                       | LR03×2  |               |            |
| Size / Mass                   | H130×W75×D19.9mm / approx. 160g                       |               |            |
| Clamp diameter                | φ 10mm  |               |            |
| Standard accessories included | Clip adapter (CL-DG3a), Instruction manual            |               |            |

# PC Link System

**Enhanced operational efficiency by means of data retrieval software, PC Link 7, which can handle measurements for up to a maximum of 8 channels.**

The PC Link system is the software dedicated to a PC for retrieving data outputted from a SANWA digital multimeter (PC series). The operation screen displays graphs in real time to allow you to check changes in measured values (voltage, current, etc.) with ease. Measured data can be saved on a CSV file, so it is easily processed on Excel. The ease of use in a variety of applications from data retrieval, processing and analysis results in its extensive acceptance for business, education and personal use.

## PC Link 7 Max 8 Channels



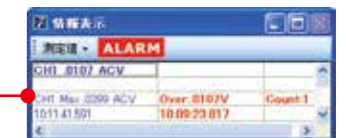
Applicable Model

PC7000, PC720M, PC710  
PC700, PC773, PC20, PC20TK

### Data acquisition screen

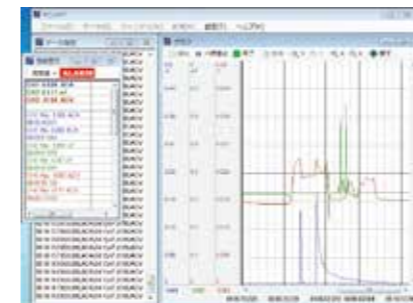


### Alert indication



Highly visible alert  
Send alert information by e-mails  
Save them into files

### Multi-window flexible screen layout (Flexible size and position of each window)

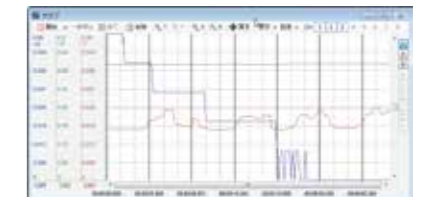


Customizable screen

### Traditional overlapped graphs and separated graphs by each channel. Also, easily switchable display/hide.



Separated graphs



Overlapped graphs

### Major features:

- Automatically detects a port connected with a digital multimeter
- No additional driver installation required with Windows standard USB drivers
- The retrieval interval can be set by seconds. The shortest reading interval of 0.2 – 0.3 seconds depending on the digital multimeter measuring function.
- Allows setting for vertical/horizontal zoom, reading at the cursor position, and Y axis split while retrieving data.
- Allows automatic retrieval by schedule setting.
- Allows data saving into CSV files and sending e-mails of alert information with alarm setting.
- Allows data saving into CSV files with the date and time appended.
- Multi-window, separated graphs by each channel
- Allows automatic e-mail of measurement data.
- Allows limited operations depending on the user with usage restriction function.
- Allows conditional recording by event function.

### PC Link 7 operating environment

OS: Windows XP (32bit) / 7 (32bit / 64bit) / 8 (32bit / 64bit) / 10 (64bit) CPU: Pentium IV 1.6GHz or better Memory: 1GB or better Resolution: 800×600 or above

### Optional accessories for PC Link products

KB-USB773  
Optical link USB



For PC773

KB-USB7  
Optical link USB



For PC7 series

KB-USB20  
Optical link USB



For PC20, PC20TK

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# Digital Multimeters

## What is Digital Multimeter?

A digital multimeter is a convenient measuring instrument that allows by itself the measurement of DC voltage, AC voltage, DC current, AC current and resistance (Pocket type DMM normally cannot be used for the measurement of current for safety reasons). In addition to these basic measuring functions, most models are provided with features such as a diode test function and continuity buzzer. Some of recent products feature the measurement of frequency and capacitor capacity. Some have added functions of maximum and minimum value hold and relative value measurement as well as data hold and range hold functions. The PC series DMMs connect to a PC making it possible to let a PC assume the function of expensive recording meters and recorders.

## Advantages of digital multimeters (DMMs)

1. Highly accurate measurement. Higher accuracy (1% or less) compared with an analog multimeter (approximately 3%).
2. Reduced measuring loss due to high internal impedance (low voltage drop between terminals).
3. No parallax reading error occurs as with an analog multimeter.

## Four key points in choosing a suitable model

### 1. What are the necessary measuring functions?

Choose the necessary functions, except voltage and resistance measurement. (including need for the measurement of current (400mA, 10A, 12A, 20A), capacitor, frequency, temperature and measurement of 4-20mA, etc.)

### 2. Other necessary functions

Functions required differ depending on where the measurement is taken.

- 1) To record measured values concurrently with the process of measurement
  - To fix data by the data hold function.
  - To secure the test lead in the holster.
- 2) To check changes in measured values
  - Measurement of maximum values, minimum values, and relative values.

### 3. For measurements of waveforms of non-sine waves, choose a model supporting measurements by RMS values.

In measuring distorted sine and non-sine waves (square wave, triangular wave, pulse), significant errors occur in measurement by models making measurements by mean values.

#### There are two types of RMS values.

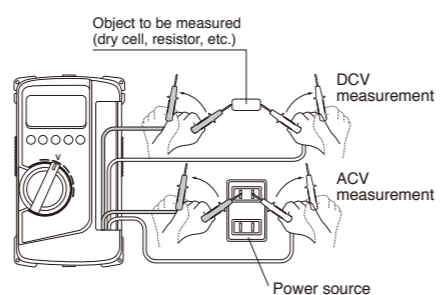
AC-Coupled true RMS value: Adapted to measurements of distorted sine and non-sine waves of the AC  
 AC + DC-coupled true RMS value: Adapted to measurements of waveform containing a DC component.

### 4. Other functions

There are other types including a function to transfer data during measurement to a PC in real time and a function to record measured data in a built-in memory. To transfer data to a PC, optional connecting cables and data retrieval software (PC Link or PC Link Plus) are required in addition to a DMM of PC series.

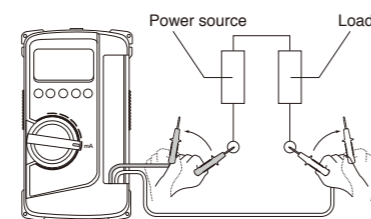
## Measurement

### Voltage, Resistance measurement



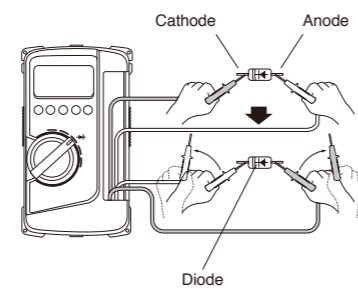
In making measurements, connect your DMM in parallel with an object to be measured. Do not apply signals exceeding the maximum rated input voltage.

### Current measurement



In making measurements, connect your DMM in series with an object to be measured. Do not apply signals exceeding the maximum rated input current.

### Diode test



When the black test lead is connected to the cathode side of the diode and the red test lead to the anode side, the forward voltage can be measured. In contrast, if the black test lead is connected to the anode side of the diode and the red test lead to the cathode side, the reverse voltage can be measured and "OL" display appears.

## High accuracy & high resolution (PC Link)

### PC7000



#### 500000 Count for DCV, Dual Display

- 4-4 / 5digits 50000 count (Selectable 5-4 / 5 digits 500000 count for DCV)
- Dual Display shows voltage/current and its frequency, and AC components and DC components of voltage/current
- AC True RMS
- Low-pass filter for variable frequency drive (VFD) circuit
- Current (mA /  $\mu$ A) %4-20mA measurement
- Capture (peak hold) 0.8ms in duration
- MAX, MIN, AVE recording mode
- K type temperature -50°C ~ 1000°C  
\*Optional accessory K-AD is necessary.  
\*K type temp. sensor K-250PC is included as a standard accessory.
- Frequency measurement (AC sine wave only)
- Logic frequency measurement, duty cycle measurement
- Conductance measurement
- Dual display with backlight
- Data hold, Range hold
- Relative value
- Auto power saving mode (30min.) (cancelable)
- Optical Link USB interface (optional)

- Display : numeral display 50000 & 500000 selectable, bar graph 41 segments
- Sampling rate : 5 times/sec. for 50000 count, 1.25 times/sec. for 500000 count, 60 times/sec. for bar graph
- Safety : IEC61010-1, IEC61010-31 CAT.III 600V Max./CAT. II 1000V Max., EN61326-1
- Battery life : Approx. 100h (alkaline battery) at DCV range



| PC7000                        | Measuring range  | Best accuracy               | Resolution    | Input impedance |
|-------------------------------|--|-----------------------------|---------------|-----------------|
| DCV                           | 500m/5/50/500/1000V  | $\pm$ (0.03%+2)             | 0.01mV        | 10M $\Omega$    |
| ACV                           | 500m/5/50/500/1000V  | $\pm$ (0.5%+40)             | 0.01mV        |                 |
| DCA                           | 500 $\mu$ /5000 $\mu$ /50m/500m/5/10A  | $\pm$ (0.1%+20)             | 0.01 $\mu$ A  |                 |
| ACA                           | 500 $\mu$ /5000 $\mu$ /50m/500m/5/10A  | $\pm$ (0.6%+40)             | 0.01 $\mu$ A  |                 |
| Resistance                    | 500/5k/50k/500k/5M/50M $\Omega$ /99.99nS *1  | $\pm$ (0.2%+6)              | 0.01 $\Omega$ |                 |
| Capacitance                   | 50n/500n/5 $\mu$ /50 $\mu$ /500 $\mu$ /5m/25mF $\pm$                                   | $\pm$ (0.8%+3)*2            | 0.01nF        |                 |
| Temperature                   | -50~1000°C (thermocouple K type)   | $\pm$ (0.3%+2)              | 0.1°C         |                 |
| Frequency                     | 10Hz~200kHz  | $\pm$ (0.02%+4)             | 0.001Hz       |                 |
| Logic frequency               | 5Hz~2MHz   | $\pm$ (0.002%+4)            | 0.001Hz       |                 |
| Duty cycle                    | 0.1%~99.99%  | $\pm$ (3d / kHz+2)          | 0.01%         |                 |
| dBm                           | -29.83dBm~54.25dBm   | $\pm$ (0.25dB+2)            | 0.01dB        |                 |
| Continuity                    | Buzzer sounds at between 20 $\Omega$ and 200 $\Omega$                                  | Open voltage : approx. 1.3V |               |                 |
| Diode test                    | Open voltage : approx. 3V  |                             |               |                 |
| Bandwidth                     | V : 45Hz~1kHz 1kHz~20kHz (below 500V), A : 40Hz~1kHz                                   |                             |               |                 |
| Fuse / Battery                | 11A/1000V IR20kA $\phi$ 10 $\times$ 38<br>0.4A/1000V IR30kA $\phi$ 6.3 $\times$ 32     | 6LR61(9V) $\times$ 1        |               |                 |
| Size / Mass                   | H184 $\times$ W86 $\times$ D52mm/430g (including holster)                              |                             |               |                 |
| Standard accessories included | Test Lead (TL-23a), Holster (H-700), Thermocouple K type (K-250PC), Instruction manual |                             |               |                 |

\*1 nS(Conductance): High-value resistance of Giga-Ohms for leakage measurements. Conductance is the inverse of Resistance, that is S=1/ $\Omega$  or nS=1/G $\Omega$   
 \*2 Accuracy of film capacitor or equivalent with low leakage.

#### Optional accessories

- Software : PC Link7
- Optical PC link cable : KB-USB7
- Clamp probe : CL-22AD, CL33DC, CL3000
- Temperature probe : T-300PC (PC Link software is necessary.)  
K-8-250~800
- K type adapter : K-AD
- Test lead : TL-21M, TLF-120
- Carrying case : C-PC7
- Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## High accuracy & built-in memory (PC Link)

### PC720M



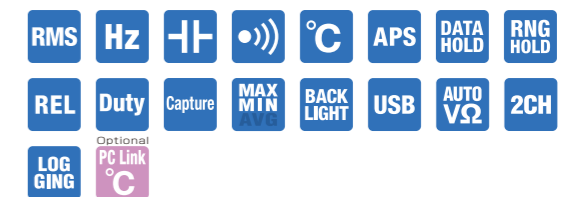
#### 87,328 points data logging in built-in memory

- 4 digits 9999 count & 3-5/6 digits 6000 count
- AC True RMS
- Dual display with backlight
- Automatic measurement for ACV/DCV/ $\Omega$  under low impedance
- High speed bar graph
- Capacitance measurement  
\*Not suitable for measurement of condensers with large leak current.
- K type temperature -50°C ~ 1000°C  
\*Optional accessory K-AD is necessary.  
\*K type temp. sensor K-250PC is included as a standard accessory.
- Frequency measurement (AC sine wave only)
- Logic frequency measurement, duty cycle measurement
- Conductance measurement
- MAX, MIN, MAX-MIN recording mode
- Capture (peak hold) 1ms in duration
- Data hold, Range hold
- Relative value
- Auto power saving mode (30min.) (cancelable)
- Optical Link USB interface (optional)

#### Data Logging Mode

- 87,328 data points in built-in memory (single display)
- 43,664 data points in built-in memory (dual display)
- Selection of measurement interval  
0.05s/0.1s/0.5s/1s/2s/3s/4s/5s/10s/15s/30s/60s/120s/180s/300s/600s
- Auto-standby mode when a sampling speed of 30s or longer is selected
- Export logged data to PC  
\*Optional accessory PC Link7 is necessary.

- Display : numeral display 9999 & 6000, bar graph 41 segments
- Sampling rate : 5 times/sec., 60 times/sec. for bar graph
- Safety : IEC61010-1, IEC61010-31 CAT.III 600V Max./CAT. II 1000V Max. EN61326-1
- Battery life : Approx. 100h (alkaline battery) at DCV range



| PC720M                        | Measuring range  | Best accuracy               | Resolution   | Input impedance |
|-------------------------------|--|-----------------------------|--------------|-----------------|
| DCV                           | 60m/600m/9.999/99.99/999.9V  | $\pm$ (0.06%+2)             | 0.01mV       | 10M $\Omega$    |
| ACV                           | 60m/600m/9.999/99.99/999.9V  | $\pm$ (0.5%+3)              | 0.01mV       |                 |
| DCA                           | 600 $\mu$ /6000 $\mu$ /60m/600m/6/10A  | $\pm$ (0.2%+4)              | 0.1 $\mu$ A  |                 |
| ACA                           | 600 $\mu$ /6000 $\mu$ /60m/600m/6/10A  | $\pm$ (0.6%+3)              | 0.1 $\mu$ A  |                 |
| Resistance                    | 600/6k/60k/600k/6M/60M $\Omega$ /99.99nS *1  | $\pm$ (0.1%+3)              | 0.1 $\Omega$ |                 |
| Capacitance                   | 60n/600n/6 $\mu$ /60 $\mu$ /600 $\mu$ /6m/25mF $\pm$                                   | $\pm$ (0.8%+3)*2            | 0.01nF       |                 |
| Temperature                   | -50~1000°C (thermocouple K type)   | $\pm$ (0.3%+2)              | 1°C          |                 |
| Frequency                     | 15Hz~50kHz   | $\pm$ (0.04%+4)             | 0.01Hz       |                 |
| Logic frequency               | 5Hz~1MHz   | $\pm$ (0.03%+4)             | 0.001Hz      |                 |
| Duty cycle                    | 0%~100%  | $\pm$ (3d / kHz+2)          | 0.01%        |                 |
| Continuity                    | Buzzer sounds at between 20 $\Omega$ and 300 $\Omega$                                  | Open voltage : approx. 1.2V |              |                 |
| Diode test                    | Open voltage : approx. 3.5V  |                             |              |                 |
| Bandwidth                     | V : 40~3kHz 3kHz~20kHz (below 99.99V), A : 40~1kHz                                     |                             |              |                 |
| Fuse / Battery                | 11A/1000V IR20kA $\phi$ 10 $\times$ 38<br>0.4A/1000V IR30kA $\phi$ 6.3 $\times$ 32     | 6LR61(9V) $\times$ 1        |              |                 |
| Size / Mass                   | H184 $\times$ W86 $\times$ D52mm/430g (including holster)                              |                             |              |                 |
| Standard accessories included | Test Lead (TL-23a), Holster (H-700), Thermocouple K type (K-250PC), Instruction manual |                             |              |                 |

\*1 nS(Conductance): High-value resistance of Giga-Ohms for leakage measurements. Conductance is the inverse of Resistance, that is S=1/ $\Omega$  or nS=1/G $\Omega$   
 \*2 Accuracy of film capacitor or equivalent with low leakage.

#### Optional accessories

- Software : PC Link7
- Optical PC link cable : KB-USB7
- Clamp probe : CL-22AD, CL33DC, CL3000
- Temperature probe : T-300PC (PC Link software is necessary.)  
K-8-250~800
- K type adapter : K-AD
- Test lead : TL-21M, TLF-120
- Carrying case : C-PC7
- Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## High accuracy & multi-function (PC Link)

### PC710



#### True RMS, Dual Display

- 4 digits 9999 count & 3-5/6 digits 6000 count
- Dual Display shows voltage/current and its frequency, and AC components and DC components of voltage/current
- AC True RMS
- EF(Electric Field) Detection to indicate signal strength of electric field which surrounds current-carrying conductors
- Capture (peak hold) 1ms in duration
- MAX, MIN, AVE recording mode
- K type temperature -50°C ~ 1000°C  
\* Optional accessory K-AD is necessary.  
\* K type temp. sensor K-250PC is included as a standard accessory.
- Frequency measurement (AC sine wave only)
- Logic frequency measurement, duty cycle measurement
- Conductance measurement
- Dual display with backlight
- Data hold, Range hold
- Relative value
- Auto power saving mode (30min.) (cancelable)
- Optical Link USB interface (optional)

**Display** : numeral display 9999 & 6000, bar graph 41 segments  
**Sampling rate** : 5 times/sec., 60 times/sec. for bar graph  
**Safety** : IEC61010-1, IEC61010-31 CAT.III  
 600V Max./CAT. II 1000V Max.EN61326-1  
**Battery life** : Approx. 60h (manganese battery) at DCV range

| PC710                         | Measuring range  | Best accuracy  | Resolution | Input impedance |
|-------------------------------|--|----------------|------------|-----------------|
| DCV                           | 60m/600m/9.999/99.99/999.9V  | ± (0.06%+2)    | 0.01mV     | 10MΩ            |
| ACV                           | 60m/600m/9.999/99.99/999.9V  | ± (0.5%+3)     | 0.01mV     |                 |
| DCA                           | 600 μ/6000 μ/60m/600m/6/10A  | ± (0.2%+4)     | 0.1 μA     |                 |
| ACA                           | 600 μ/6000 μ/60m/600m/6/10A  | ± (0.6%+3)     | 0.1 μA     |                 |
| Resistance                    | 600/6k/60k/600k/6M/60MΩ/99.99ns*1  | ± (0.1%+3)     | 0.1 Ω      |                 |
| Capacitance                   | 60n/600n/6 μ/60 μ/600 μ/25mF± (0.8%+3)*2   | ± (0.3%+2)     | 0.01nF     |                 |
| Temperature                   | -50~1000°C (thermocouple K type)   | ± (0.3%+2)     | 1°C        |                 |
| Frequency                     | 15Hz~50kHz   | ± (0.4%+4)     | 0.01Hz     |                 |
| Logic frequency               | 5Hz~1MHz   | ± (0.03%+4)    | 0.001Hz    |                 |
| Duty cycle                    | 0%~100%  | ± (3d / kHz+2) | 0.01%      |                 |
| Continuity                    | Buzzer sounds at between 20 Ω and 300 Ω Open voltage : approx. 1.2V                    |                |            |                 |
| Diode test                    | Open voltage : approx. 3.5V  |                |            |                 |
| Bandwidth                     | V : 40Hz~3kHz 3kHz~20kHz(below 99.99V), A : 40Hz~1kHz                                  |                |            |                 |
| Fuse / Battery                | 11A/1000V IR20kA φ 10×38 6F22(9V)×1<br>0.4A/1000V IR30kA φ 6.3×32                      |                |            |                 |
| Size / Mass                   | H184×W86×D52mm/430g (including holster)  |                |            |                 |
| Standard accessories included | Test Lead (TL-23a), Holster (H-700), Thermocouple K type (K-250PC), Instruction manual |                |            |                 |

\*1 nS(Conductance): High-value resistance of Giga-Ohms for leakage measurements. Conductance is the inverse of Resistance, that is S=1/Ω or nS=1/GΩ  
 \*2 Accuracy of film capacitor or equivalent with low leakage.

#### Optional accessories

Software : PC Link7  
 Optical PC link cable : KB-USB7  
 Clamp probe : CL-22AD, CL33DC, CL3000  
 Temperature probe : T-300PC (PC Link software is necessary.)  
 K-8-250~800  
 K type adapter : K-AD  
 Test lead : TL-21M, TLF-120  
 Carrying case : C-PC7  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## Digital Multimeter

### PC773



A fuse of large breaking capacity (30kA) is used to further improve the safety.



#### 11000 Count Minimum resolution 0.01mV, 0.01Ω

- 4-1/2 digits 11000 count
- 0.28% best accuracy
- AC True RMS
- Thermo plastic elastomer, high resistance against drop shock
- Maximum DC/AC 11A can be measured
- Continuity buzzer and LED
- Data hold, Range hold, Relative function
- Auto power off function (30 min.)
- Optical link USB interface (optional)

**Display** : numeral display 11000  
**Sampling rate** : 4 times / sec.  
**AC frequency bandwidth** : 45~100Hz(110mV range), 45~500Hz(1.1V range), 45~1kHz(11V range and above, ACA)  
**Safety** : IEC61010-1 (EN61010-1) CAT.III  
 600V Max. / CAT.II1000V Max.

| PC773       | Measuring range   | Best accuracy | Resolution | Input impedance |
|-------------|---|---------------|------------|-----------------|
| DCV         | 110m/1.1/11/110/1000V   | ± (0.28%+2)   | 0.01mV     | 10MΩ            |
| ACV         | 110m/1.1/11/110/1000V   | ± (0.7%+50)   | 0.01mV     | 100MΩ           |
| DCA         | 110 μ/1100 μ/11m/110m/11A   | ± (0.5%+4)    | 0.01 μA    |                 |
| ACA         | 110 μ/1100 μ/11m/110m/11A   | ± (0.9%+6)    | 0.01 μA    |                 |
| Resistance  | 110/1.1k/11k/110k/1.1M/11M/110MΩ  | ± (0.3%+6)    | 0.01 Ω     |                 |
| Capacitance | 11n/110n/1.1 μ/110 μ/1.1m/11m/110mF   | ± (2.0%+20)   | 0.001nF    |                 |
| Frequency   | 110Hz/1.1kHz/11kHz/110kHz/1.1MHz  | ± (0.01%+2)   | 0.1Hz      |                 |
| Continuity  | Buzzer sounds and LED lights up at less than 30Ω Open Voltage: approx. 0.2V |               |            |                 |
| Diode test  | Open Voltage: approx. 0.2V  |               |            |                 |

|                               |  |
|-------------------------------|--|
| Bandwidth                     | 45Hz~100Hz(110mV range), 45Hz~500Hz(1.1V range), 45Hz~1kHz(11V range and above, ACA) |
| Fuse / Battery                | 315mA/1000V, breaking capacity 30kA R6×2<br>12A/1000V, breaking capacity 30kA        |
| Size / Mass                   | H166×W82×D44mm/360g  |
| Standard accessories included | Test lead (TL-25a), Instruction manual   |

#### Optional accessories

Software : PC Link 7 (This model works with PC Link 7 only.)  
 Clamp probe : CL-22AD, CL33DC, CL3000  
 Temperature probe : T-300PC (PC Link software is necessary.)  
 Optical PC link cable : KB-USB773 Test lead : TLF-120  
 Carrying case : C-77, C-77H  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## High accuracy (PC Link)

### PC700



#### Dual Display, Best Accuracy 0.06%

- 4 digits 9999 count & 3-5/6 digits 6000 count
- Maximum DC/AC voltage measurement resolution 0.01mV
- Dual Display shows voltage/current and its frequency, and AC components and DC components of voltage/current
- High speed bar graph
- Frequency measurement (AC sine wave only)
- Logic frequency measurement, duty cycle measurement
- Data hold, Range hold
- Relative value
- Auto power saving mode (30min.) (cancelable)
- Optical Link USB interface (optional)

**Display** : numeral display 9999 & 6000, bar graph 41 segments  
**Sampling rate** : 5 times/sec., 60 times/sec. for bar graph  
**Safety** : IEC61010-1, IEC61010-31 CAT.III  
 600V Max./CAT. II 1000V Max.EN61326-1  
**Battery life** : Approx. 60h (manganese battery) at DCV range

| PC700                         | Measuring range   | Best accuracy  | Resolution | Input impedance |
|-------------------------------|---|----------------|------------|-----------------|
| DCV                           | 60m/600m/9.999/99.99/999.9V   | ± (0.06%+2)    | 0.01mV     | 10MΩ            |
| ACV                           | 60m/600m/9.999/99.99/999.9V   | ± (0.5%+3)     | 0.01mV     |                 |
| DCA                           | 600 μ/6000 μ/60m/600m/6/10A   | ± (0.2%+4)     | 0.1 μA     |                 |
| ACA                           | 600 μ/6000 μ/60m/600m/6/10A   | ± (0.6%+3)     | 0.1 μA     |                 |
| Resistance                    | 600/6k/60k/600k/6M/60MΩ   | ± (0.1%+3)     | 0.1 Ω      |                 |
| Capacitance                   | 60n/600n/6 μ/60 μ/600 μ/25mF± (0.8%+3)*                             | ± (0.3%+2)     | 0.01nF     |                 |
| Frequency                     | 15Hz~50kHz  | ± (0.04%+4)    | 0.01Hz     |                 |
| Logic frequency               | 5Hz~1MHz  | ± (0.03%+4)    | 0.001Hz    |                 |
| Duty cycle                    | 0%~100%   | ± (3d / kHz+2) | 0.01%      |                 |
| Continuity                    | Buzzer sounds at between 20 Ω and 300 Ω Open voltage : approx. 1.2V |                |            |                 |
| Diode test                    | Open voltage : approx. 3.5V   |                |            |                 |
| Bandwidth                     | V : 40Hz~3kHz 3kHz~20kHz(below 99.99V), A : 40Hz~1kHz               |                |            |                 |
| Fuse / Battery                | 11A/1000V IR20kA φ 10×38 6F22(9V)×1<br>0.4A/1000V IR30kA φ 6.3×32   |                |            |                 |
| Size / Mass                   | H184×W86×D52mm/430g (including holster)                             |                |            |                 |
| Standard accessories included | Test Lead (TL-23a), Holster (H-700), Instruction manual             |                |            |                 |

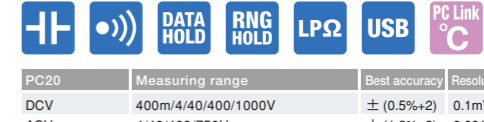
\*Accuracy of film capacitor or equivalent with low leakage.

#### Optional accessories

Software : PC Link7  
 Optical PC link cable : KB-USB7  
 Clamp probe : CL-22AD, CL33DC, CL3000  
 Temperature probe : T-300PC (PC Link software is necessary.)  
 K type adapter : K-AD  
 Test lead : TL-21M, TLF-120  
 Carrying case : C-PC7  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## Data processing (PC Link)

### PC20



#### AC adapter connectable for long haul measurement

- 3-3 / 4 digits 4000 count
- 0.5% best accuracy
- Capacitance measurement  
\*Not suitable for measurement of condensers with large leak current.
- Data hold / Range hold
- Safety cover for the 4 · 10A terminal
- Safety cap for AC adapter terminal
- Protective holster with wall hanger and lead holder
- Tilt stand
- Optical link USB interface (optional)

**Display** : numeral display 4000  
**Sampling rate** : 3 times / sec.

| PC20        | Measuring range  | Best accuracy | Resolution | Input impedance |
|-------------|--|---------------|------------|-----------------|
| DCV         | 400m/4/40/400/1000V  | ± (0.5%+2)    | 0.1mV      | DCV: 10MΩ       |
| ACV         | 4/40/400/750V  | ± (1.2%+2)    | 0.001V     | 100MΩ           |
| DCA         | 400 μ/4000 μ/40m/400m/4A/10A   | ± (1.5%+2)    | 0.1 μA     | ACV: 10MΩ       |
| ACA         | 400 μ/4000 μ/40m/400m/4A/10A   | ± (1.8%+2)    | 0.1 μA     | 10MΩ            |
| Resistance  | 400/4k/40k/400k/4M/40MΩ  | ± (1.2%+2)    | 0.1 Ω      | 11MΩ            |
| Capacitance | 50n/500n/5 μ/50 μ/100 μF   | ± (5%+6)      | 0.01nF     |                 |
| Continuity  | Buzzer sounds at between 10 Ω and 120 Ω. Open voltage : approx. 0.4V |               |            |                 |
| Diode test  | Open voltage : approx. 1.5V  |               |            |                 |

|                               |   |
|-------------------------------|---|
| Bandwidth                     | 40Hz~500kHz (below 500V) 40Hz~1kHz (ACA)                        |
| Fuse / Battery                | 0.5A/250V IR1500A φ 5×20mm R6×2<br>12.5A/250V IR125A φ 6.3×32mm |
| Size / Mass                   | H167×W90×D48mm/330g (including holster)                         |
| Standard accessories included | Test lead (TL-21a), Holster (H-70), Instruction manual          |

#### Optional accessories

Software : PC Link 7 Optical PC link cable : KB-USB20  
 Clamp probe : CL-22AD, CL33DC, CL3000  
 Temperature probe : T-300PC (PC Link software is necessary.)  
 AC adapter : AD-71AC (100V), AD-72AC (220V)  
 Test lead : TL-21M, TLF-120  
 Carrying case : C-PC10/S or C-SP  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## Standard type



### CD770

#### New Standard

- 3-3/4 digits 4000 count
- Easy to read large LCD
- Thermo plastic elastomer, high resistance against drop shock
- Safety cap on current terminal
- Data hold, Range hold, Relative function
- Continuity check, Diode test
- Auto power off function (30min.)

**Display :** numeral display 4000  
**Sampling rate :** 3 times / sec.  
**AC frequency bandwidth :** 40~400Hz (sine wave)



| CD770                         | Measuring range  | Best accuracy | Resolution | Input impedance |
|-------------------------------|--|---------------|------------|-----------------|
| DCV                           | 400m/4/40/400/600V   | ± (0.5%+2)    | 0.1mV      | DCV: 10M~       |
| ACV                           | 4/40/400/600V  | ± (1.2%+7)    | 1mV        | 10M~            |
| DCA                           | 400 μ/4000 μ/40m/400mA   | ± (1.4%+3)    | 0.1 μ      | 100MΩ           |
| ACA                           | 400 μ/4000 μ/40m/400mA   | ± (1.8%+5)    | 0.1 μ      | ACV: 10M~       |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ  | ± (1.2%+5)    | 0.1 Ω      | 11MΩ            |
| Capacitance                   | 50n/500n/5 μ/50 μ/100 μF   | ± (5%+10)     | 0.01nF     |                 |
| Frequency                     | 5/50/500/5k/50k/100kHz   | ± (0.3%+3)    | 0.001Hz    |                 |
| Continuity                    | Buzzer sounds at between 0Ω and 85Ω (±45Ω). Open voltage: approx. 0.4V |               |            |                 |
| Diode test                    | Open voltage: approx. 1.5V   |               |            |                 |
| Bandwidth                     | 40~400Hz (sine wave)   |               |            |                 |
| Fuse / Battery                | 0.5A/250V 1.5kA Φ5×20mm  | R6P×2         |            |                 |
| Size / Mass                   | H166×W82×D44mm/340g  |               |            |                 |
| Standard accessories included | Test lead (TL-21a), Instruction manual                                 |               |            |                 |

#### Optional accessories

Clamp probe : CL-22AD, CL33DC, CL3000  
 Carrying case : C-77, C-77H  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
 Test lead : TL-21M, TLF-120

## Multifunctional new standard



### CD771

#### Backlight & Cont. buzzer with LED

- 3-3/4 digits 4000 count
- Easy to read large LCD with Backlight
- Large breaking capacity fuse 30kA
- 1.5V battery check function
- Thermo plastic elastomer, high resistance against drop shock
- Safety cap on current terminal
- Data hold, Range hold, Relative function
- Continuity check, Diode test
- Auto power off function (30min.)
- Maximum 20A can be measured if the measurement time is less than 10 seconds. (Take 10 minutes or longer intervals between measurements)

**Display :** numeral display 4000  
**Sampling rate :** 3 times / sec.  
**AC frequency bandwidth :** 40~400Hz (sine wave)  
**Safety :** IEC61010-1 (EN61010-1) CAT. III 600V Max. / CAT. II DC1000V



| CD771                         | Measuring range  | Best accuracy | Resolution | Input impedance |
|-------------------------------|--|---------------|------------|-----------------|
| DCV                           | 400m/4/40/400/1000V  | ± (0.5%+2)    | 0.1mV      | DCV: 10M~       |
| ACV                           | 4/40/400/1000V   | ± (1.2%+7)    | 1mV        | 10M~            |
| DCA                           | 400 μ/4000 μ/40m/400mA/10A   | ± (1.4%+3)    | 0.1 μ      | 100MΩ           |
| ACA                           | 400 μ/4000 μ/40m/400mA/10A   | ± (1.8%+5)    | 0.1 μ      | ACV: 10M~       |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ  | ± (1.2%+5)    | 0.1 Ω      | 11MΩ            |
| Capacitance                   | 50n/500n/5 μ/50 μ/100 μF   | ± (5%+10)     | 0.01nF     |                 |
| Frequency                     | 5/50/500/5k/50k/100kHz   | ± (0.3%+3)    | 0.001Hz    |                 |
| Continuity                    | Buzzer sounds and LED lights up at between 0Ω and 85Ω (±45Ω). Open voltage: approx. 0.4V |               |            |                 |
| Diode test                    | Open voltage: approx. 1.5V   |               |            |                 |
| Battery check                 | Approximate value (30Ω load) 1.5V battery only   |               |            |                 |
| Bandwidth                     | 40~400Hz (sine wave)   |               |            |                 |
| Fuse / Battery                | 0.5A/1000V 30kA Φ6.35×32mm<br>10A/1000V 30kA Φ10×38mm                                    | R6P×2         |            |                 |
| Size / Mass                   | H166×W82×D44mm/360g  |               |            |                 |
| Standard accessories included | Test lead (TL-23a), Instruction manual   |               |            |                 |

#### Optional accessories

Clamp probe : CL-22AD, CL33DC, CL3000  
 HV probe : HV-60  
 Carrying case : C-77, C-77H  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
 Test lead : TL-21M, TLF-120

## True RMS new standard



### CD772

#### Backlight & Temperature measurement

- 3-3/4 digits 4000 count
- AC True RMS
- Easy to read large LCD with Backlight
- Large breaking capacity fuse 30kA
- K-type thermocouple temperature measurement -20°C~300°C
- Thermo plastic elastomer, high resistance against drop shock
- Safety cap on current terminal
- Data hold, Range hold, Relative function
- Continuity check, Diode test
- Auto power off function (30min.)
- Maximum 20A can be measured if the measurement time is less than 10 seconds. (Take 10 minutes or longer intervals between measurements)

**Display :** numeral display 4000  
**Sampling rate :** 3 times / sec.  
**AC frequency bandwidth :** 45~500Hz (4V range), 45~1KHz (40V range and above)  
**Safety :** IEC61010-1 (EN61010-1) CAT. III 600V Max. / CAT. II DC1000V



| CD772                         | Measuring range  | Best accuracy | Resolution | Input impedance |
|-------------------------------|--|---------------|------------|-----------------|
| DCV                           | 400m/4/40/400/1000V  | ± (0.5%+2)    | 0.1mV      | DCV: 10M~       |
| ACV                           | 4/40/400/1000V   | ± (1.2%+8)    | 1mV        | 10M~            |
| DCA                           | 400 μ/4000 μ/40m/400mA/15A   | ± (1.4%+3)    | 0.1 μ      | 100MΩ           |
| ACA                           | 400 μ/4000 μ/40m/400mA/15A   | ± (1.8%+5)    | 0.1 μ      | ACV: 10M~       |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ  | ± (1.2%+5)    | 0.1 Ω      | 11MΩ            |
| Capacitance                   | 50n/500n/5 μ/50 μ/100 μF   | ± (5%+10)     | 0.01nF     |                 |
| Frequency                     | 5/50/500/5k/50k/100kHz   | ± (0.3%+3)    | 0.001Hz    |                 |
| Temperature                   | -20°C~300°C  | ± (0.3%+30)   | 0.1°C      |                 |
| Continuity                    | Buzzer sounds and LED lights up at between 0Ω and 85Ω (±45Ω). Open voltage: approx. 0.4V |               |            |                 |
| Diode test                    | Open voltage: approx. 1.5V   |               |            |                 |
| Bandwidth                     | 45~500Hz (4V range), 45~1KHz (40V range and above)                                       |               |            |                 |
| Fuse / Battery                | 0.5A/1000V 30kA Φ6.35×32mm<br>16A/1000V 30kA Φ10×38mm                                    | R6P×2         |            |                 |
| Size / Mass                   | H166×W82×D44mm/360g  |               |            |                 |
| Standard accessories included | Test lead (TL-25a), Thermocouple K type (K-250CD) Instruction manual                     |               |            |                 |

#### Optional accessories

Clamp probe : CL-22AD, CL33DC, CL3000 HV probe : HV-60  
 Temperature probe : K-8-800, K-8-650, K-8-300, K-8-500, K-8-250  
 K type adapter : K-AD  
 Carrying case : C-77, C-77H  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
 Test lead : TLF-120

A fuse of large breaking capacity (30kA) is used to further improve the safety.



## Multifunction



### CD732

#### High-speed bar graph & Cont. buzzer with LED

- 6000 count
- Using fire-retarding materials for holster and circuit board
- Wide-range capacitance measurement (0.01nF to 3999 μF)
- Data hold / Range hold
- Safety cap on 6 · 15A terminal
- Protective holster with wall hanger and lead holder
- Auto Power Save (16min.) (cancelable)

**Display :** numeral display 6000, bar graph 61 segments  
**Sampling rate :** 3 times/sec., 30 times/sec., for bar graph

**Safety :** EN61010-1, EN61010-2-030, EN61010-2-033  
 CAT.III 600V / CAT.II DC1000V · AC750V  
 IEC61010-031



| CD732                         | Measuring range   | Best accuracy | Resolution | Input impedance |
|-------------------------------|---|---------------|------------|-----------------|
| DCV                           | 600m/6/60/600/1000V   | ± (0.5%+2)    | 0.1mV      | DCV: 10M~       |
| ACV                           | 6/60/600/750V   | ± (1.2%+5)    | 0.001V     | 10M~            |
| DCA                           | 600 μ/6000 μ/60m/600mA/15A  | ± (1.5%+3)    | 0.1 μ      | 100MΩ           |
| ACA                           | 600 μ/6000 μ/60m/600mA/15A  | ± (1.8%+5)    | 0.1 μ      | ACV: 10M~       |
| Resistance                    | 600/6k/60k/600k/6M/60MΩ   | ± (1.2%+4)    | 0.1 Ω      | 11MΩ            |
| Capacitance                   | 40n/400n/4 μ/40 μ/400 μ/4000 μF   | ± (5.0%+6)    | 0.01nF     |                 |
| Frequency                     | 9.999/99.99/999.9/9.999k/99.99kHz   | ± (0.5%+3)    |            |                 |
| Duty cycle                    | 20~80%  | ± (0.5%+5)    |            |                 |
| Continuity                    | Buzzer sounds and LED lights up at between 10~60Ω. Open voltage : approx. 0.63V |               |            |                 |
| Diode test                    | Open voltage : approx. 2.7V   |               |            |                 |
| Bandwidth                     | 45~500Hz  |               |            |                 |
| Fuse / Battery                | 0.4A/1000V 30kA Φ6.3×32mm<br>16A/1000V 30kA Φ10×38mm                            | R6(1.5V) X 2  |            |                 |
| Size / Mass                   | H167×W90×D48mm/320g (including holster)   |               |            |                 |
| Standard accessories included | Test lead(TL-25a), Holster(H-70), Instruction manual                            |               |            |                 |

#### Optional accessories

Clamp probe : CL-22AD, CL3000, CL33DC  
 HV probe : HV-60  
 Carrying case : C-SP  
 Clip adapter: CL-14

### RD700 RD701

#### High input impedance 1000MΩ

- 3-3 / 4 digits 4000 count
- 0.3% best accuracy
- AC True RMS ※RD701 only
- Capacitance measurement  
 ※ Not suitable for measurement of condensers with large leak current.
- K type temperature  
 ※ Optional accessory K-AD is necessary.  
 ※ K type temp. sensor K-250PC is included as a standard accessory
- Frequency measurement  
 ※ Input voltage : 20VACrms and under  
 ※ Input signal : sign wave or square wave with 40%-70% duty  
 ※ Input sensitivity : 10Hz~20kHz/0.9Vrms and above  
 : 20kHz~50kHz/2.6Vp or 1.9Vrms and above  
 : 50kHz~1MHz/4.2Vp or 3Vrms and above
- ADP function (for current sensor)
- Max recording measurement
- Data hold / Range hold
- Auto power off (30min.) (cancelable)
- Alarm for improper test lead insertion to current terminal
- Protective holster with wall hanger and lead holder
- Tilt stand

**Display :** numeral display 4000 (Hz : 9999, capacitance : 5000)

**Sampling rate :** 3 times / sec. (Hz : 2 times / sec.)  
**AC frequency bandwidth :** 50~500Hz



| RD700 / 701                   | Measuring range   | Best accuracy | Resolution | Input impedance |
|-------------------------------|---|---------------|------------|-----------------|
| DCV                           | 400m/4/40/400/1000V   | ± (0.3%+4)    | 0.1mV      | 10M~            |
| ACV                           | 400m/4/40/400/1000V   | ± (1.5%+5)    | 0.1mV      | 1000MΩ          |
| DCA                           | 400 μ/4000 μ/40m/400mA/10A  | ± (1.2%+3)    | 0.1 μ      |                 |
| ACA                           | 400 μ/4000 μ/40m/400mA/10A  | ± (1.5%+4)    | 0.1 μ      |                 |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ   | ± (0.6%+4)    | 0.1 Ω      |                 |
| Capacitance                   | 500n/5 μ/50 μ/500 μ/3000 μF   | ± (2.5%+6)    | 0.01nF     |                 |
| Temperature                   | -20°C~300°C   | ± (2%+3)      | 1°C        |                 |
| Frequency                     | 50Hz~1MHz   | ± (0.5%+4)    | 0.01Hz     |                 |
| Continuity                    | Buzzer sounds at between 20Ω and 120Ω. Open voltage : approx. 0.4V                    |               |            |                 |
| Diode Test                    | Open voltage : approx. 1.6V   |               |            |                 |
| Bandwidth                     | 50~500Hz  |               |            |                 |
| Fuse / Battery                | 12.5A/500V IR20kA Φ6.3×32mm<br>0.63A/500V IR200kA Φ6.3×32mm                           | 6LF22 (9V)×1  |            |                 |
| Size / Mass                   | H179×W87×D55mm/460g (including holster)   |               |            |                 |
| Standard accessories included | Test Lead (TL-23a), Thermocouple K type (K-250PC), Holster (H-50), Instruction manual |               |            |                 |

#### Optional accessories

Clamp probe : CL-22AD, CL33DC, CL3000  
 HV probe : HV-60  
 Temperature probe : K-8-800, K-8-650, K-8-300, K-8-500, K-8-250  
 K type adapter : K-AD  
 Test lead : TL-21M, TLF-120  
 Carrying case : C-CD  
 Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC

## ALL-IN-ONE DMM



### CD800a

#### Tough body cover

- 3-3 / 4 digits 4000 count
- 0.7% best accuracy
- Capacitance measurement  
 ※ Not suitable for measurement of condensers with large leak current.
- Frequency measurement (AC sine wave only)
- Data hold / Range hold
- Relative value
- Auto power off (30min.) (cancelable)
- Low power ohm (input voltage 0.4V) at continuity range
- Solid & protective body cover that can also be used as a tilt stand
- Chip holder behind the body cover

**Display :** numeral display 4000  
**Sampling rate :** 3 times / sec.  
**AC frequency bandwidth :** 40~400Hz

Using cover as a tilt stand ▶



| CD800a                        | Measuring range  | Best accuracy | Resolution | Input impedance |
|-------------------------------|--|---------------|------------|-----------------|
| DCV                           | 400m/4/40/400/600V   | ± (0.7%+3)    | 0.1mV      | DCV: 10M~       |
| ACV                           | 4/40/400/600V  | ± (1.6%+9)    | 0.001V     | 10MΩ            |
| DCA                           | 40m/400mA  | ± (2.2%+5)    | 0.01mA     | 100MΩ           |
| ACA                           | 40m/400mA  | ± (2.8%+5)    | 0.01mA     | ACV: 10M~       |
| Resistance                    | 400/4k/40k/400k/4M/40MΩ  | ± (1.5%+5)    | 0.1 Ω      | 11MΩ            |
| Capacitance                   | 50n/500n/5 μ/50 μ/100 μF   | ± (5%+10)     | 0.01nF     |                 |
| Frequency                     | 5Hz~100kHz   | ± (0.5%+3)    |            |                 |
| Duty cycle                    | 20%~80%  | ± (0.5%+5)    |            |                 |
| Continuity                    | Buzzer sounds at between 10Ω and 120Ω. Open voltage : approx. 0.4V |               |            |                 |
| Diode test                    | Open voltage : approx. 1.5V  |               |            |                 |
| Bandwidth                     | 40~400Hz   |               |            |                 |
| Fuse / Battery                | 0.5A/250V 1.5kA Φ5.2×20 ceramic                                    | R6P×2         |            |                 |
| Size / Mass                   | H176×W104×D46mm/approx. 340g                                       |               |            |                 |
| Standard accessories included | Hand strap , Instruction manual                                    |               |            |                 |

#### Optional accessories

Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC

## Pocket type



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### PM11

#### Tough but compact DMM

- 3-3 / 4 digits 4000 count
- 0.8% best accuracy
- Analog bar graph
- Compact storage of test leads
- Test lead can be snapped into a fixed position atop the case.

**Display** : numeral display 4000, bar graph 40 segments  
**Sampling rate** : 1.3 times / sec., 13 times / sec. for bar graph

**AC frequency bandwidth** : 45~1kHz  
**Safety** : IEC61010-1 CAT.III 300V Max. / CAT.II 500V Max.



| PM11       | Measuring range   | Best accuracy | Resolution | Input impedance |
|------------|---|---------------|------------|-----------------|
| DCV        | 400m/4/40/400/500V  | ± (0.8%+4)    | 0.1mV      | DCV: 10M~100MΩ  |
| ACV        | 4/40/400/500V   | ± (2.3%+8)    | 0.001V     | ACV: 10M~100MΩ  |
| Resistance | 400/4k/40k/400k/4M/40MΩ                                     | ± (2.0%+4)    | 0.1Ω       | ACV: 10M~11MΩ   |
| Continuity | Buzzer sounds at less than 35Ω. Open voltage : approx. 1.2V |               |            |                 |
| Diode test | Open voltage : approx. 3V                                   |               |            |                 |

|                               |                             |
|-------------------------------|-----------------------------|
| Bandwidth                     | 45~1kHz                     |
| Battery                       | Button battery LR-44X2      |
| Size / Mass                   | H117XW76XD18mm/approx. 117g |
| Standard accessories included | Instruction manual          |

#### Optional accessories

Clip adapter : CL-15a, CL-DG3a

## Volt Meter



CE

### KP1

#### CAT.IV Volt tester

- AC True RMS
- Self test - checking failures of LCD, disconnection of a lead wire
- EF (Electric Field) detection
- LCD with backlight & LED light for dark place
- Auto data hold
- Auto power off (1min.)

**Display** : numeral display 9999  
**Sampling rate** : 6 times / sec. (ACV), 5 times / sec. (DCV)  
**Safety** : IEC61010-1, IEC61010-2-030 CAT.IV600V / CAT.III1000V, IEC61010-2-33, IEC61010-31



| KP1        | Measuring range   | Best accuracy | Resolution |
|------------|---|---------------|------------|
| DCV        | 5~999.9V  | ± (0.7%+5)    | 0.1V       |
| ACV        | 5~999.9V  | ± (1.7%+5)    | 0.1V       |
| Continuity | Buzzer sounds at between 20kΩ and 500kΩ. Open voltage: approx. 0.6V |               |            |

|                               |  |
|-------------------------------|--|
| Bandwidth                     | 45~400Hz   |
| Battery                       | LR03 X 2   |
| Size / Mass                   | H130XW90XD30mm/approx. 205g  |
| Standard accessories included | Test leads (TL-35 : Test probe (red), TL-36 : Test lead (black), TL-A01 : Test probe (black), Instruction manual |

## Hybrid Digital Multimeter

Multimeter + Clamp meter

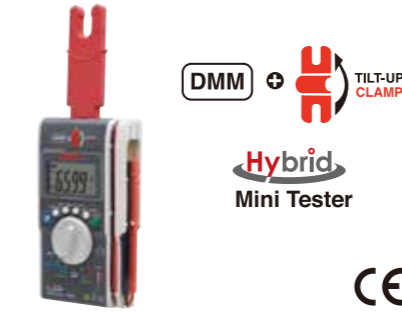


### PM33a

#### Hybrid pocket size DMM + Clamp meter

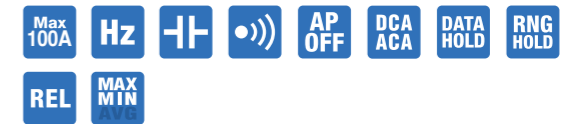
- Lightweight approx. 160g
- Maximum / Minimum value hold
- Current measurement with thin U-shaped current sensor(7mm) at angles of 0 and 180 degrees
- AC and DC currents measurable up to 100A
- Data hold
- Measurement of relative value
- Auto power off

**Safety** : IEC61010-1 CAT.II 600V, CAT.III 300V



DMM + TILT-UP CLAMP  
 Hybrid Mini Tester

CE



| PM33a       | Measuring range   | Best accuracy | Resolution |
|-------------|---|---------------|------------|
| DCV         | 660m / 6.6 / 66 / 600V                                  | ± (0.7%+3)    | 0.1mV      |
| ACV         | 660m / 6.6 / 66 / 600V                                  | ± (1.4%+6)    | 0.1mV      |
| DCA         | 100A  | ± (2.0%+5)    | 0.1A       |
| ACA         | 100A  | ± (2.0%+5)    | 0.1A       |
| Resistance  | 660 / 6.6k / 66k / 660k / 6.6M / 66MΩ                   | ± (0.9%+3)    | 0.1Ω       |
| Capacitance | 6.6n / 66n / 660n / 6.6μ / 66μ / 660μ / 6.6mF / 66mF    | ± (5.0%+10)   | 0.001nF    |
| Frequency   | 660 / 6.6k / 66kHz                                      | ± (0.5%+3)    | 0.1Hz      |
| Duty cycle  | 20%~80%   | ± (0.5%+5)    |            |
| Diode test  | Open voltage : approx. 3V                               |               |            |
| Continuity  | Buzzer sounds at below 30Ω. Open voltage : approx. 1.2V |               |            |

|                               |   |
|-------------------------------|---|
| Bandwidth                     | 40~400Hz                                |
| Battery                       | Coin type lithium battery CR2032 (3V)X1 |
| Size / Mass                   | H108XW56XD11.5mm/approx. 85g            |
| Standard accessories included | Case holder (C-PM3), Instruction manual |



| PM3         | Measuring range   | Best accuracy | Resolution | Input impedance |
|-------------|---|---------------|------------|-----------------|
| DCV         | 400m/4/40/400/500V  | ± (0.7%+3)    | 0.1mV      | DCV: 10M~100MΩ  |
| ACV         | 4/40/400/500V   | ± (2.3%+10)   | 0.001V     | ACV: 10M~100MΩ  |
| Resistance  | 400/4k/40k/400k/4M/40MΩ   | ± (2.0%+5)    | 0.1Ω       | ACV: 10M~11MΩ   |
| Capacitance | 5n/50n/500n/5μ/50μ/200μF  | ± (5.0%+10)   | 0.001nF    |                 |
| Frequency   | 9.999/99.99/999.9/9.99k/60.00kHz                                | ± (0.7%+5)    | 0.001Hz    |                 |
| Duty Cycle  | 0.1~99%   |               |            |                 |
| Continuity  | Buzzer sounds at less than 10~120Ω. Open voltage : approx. 0.4V |               |            |                 |
| Diode Test  | Open voltage : approx. 1.5V                                     |               |            |                 |

|                               |   |
|-------------------------------|---|
| Bandwidth                     | 40~400Hz                                |
| Battery                       | Coin type lithium battery CR2032 (3V)X1 |
| Size / Mass                   | H108XW56XD11.5mm/approx. 85g            |
| Standard accessories included | Case holder (C-PM3), Instruction manual |

#### Optional accessories

Clip adapter : CL-13a, CL-15a



| PM7a       | Measuring range   | Best accuracy | Resolution | Input impedance |
|------------|---|---------------|------------|-----------------|
| DCV        | 400m/4/40/400/500V                                      | ± (0.7%+3)    | 0.1mV      | DCV: 10M~100MΩ  |
| ACV        | 4/40/400/500V   | ± (2.3%+10)   | 0.001V     | ACV: 10M~100MΩ  |
| Resistance | 400/4k/40k/400k/4M/40MΩ                                 | ± (2.0%+5)    | 0.1Ω       | ACV: 10M~11MΩ   |
| Continuity | Buzzer sounds at less than 10~120Ω. Open voltage : 0.4V |               |            |                 |
| Diode test | Open voltage : approx. 1.5V                             |               |            |                 |

|                               |                            |
|-------------------------------|----------------------------|
| Bandwidth                     | 40~400Hz                   |
| Battery                       | Button battery LR-44X2     |
| Size / Mass                   | H115XW57XD18mm/approx. 85g |
| Standard accessories included | Instruction manual         |

#### Optional accessories

Clip adapter : CL-14, CL-15a



| PS8a       | Measuring range   | Best accuracy | Resolution | Input impedance |
|------------|---|---------------|------------|-----------------|
| DCV        | 400m/4/40/400/500V                                      | ± (0.7%+3)    | 0.1mV      | DCV: 10M~100MΩ  |
| ACV        | 4/40/400/500V   | ± (2.3%+5)    | 0.001V     | ACV: 10M~100MΩ  |
| Resistance | 400/4k/40k/400k/4M/40MΩ                                 | ± (2.0%+5)    | 0.1Ω       | ACV: 10M~11MΩ   |
| Continuity | Buzzer sounds at less than 10~120Ω. Open voltage : 0.4V |               |            |                 |
| Diode test | Open voltage : approx. 1.5V                             |               |            |                 |

|                               |   |
|-------------------------------|---|
| Bandwidth                     | 40~400Hz  |
| Battery                       | Amorphous solar battery + manganese dioxide lithium secondary battery |
| Size / Mass                   | H115XW57XD18mm/approx. 85g  |
| Standard accessories included | Instruction manual  |

#### Optional accessories

Clip adapter : CL-14, CL-15a



CE

### PM7a

#### Updated longtime seller

- 3-3 / 4 digits 4000 count
- 0.7% best accuracy
- Range hold
- Auto power off (15min.)
- Low power ohm (input voltage 0.4V) at continuity range
- Power saving design

**Display** : numeral display 4000  
**Sampling rate** : 3 times / sec.  
**AC frequency bandwidth** : 40~400Hz

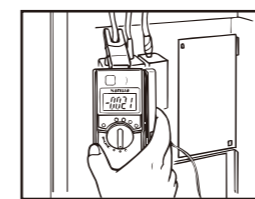


### PS8a

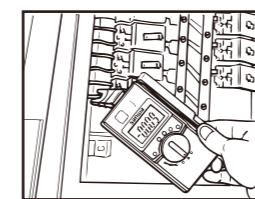
#### Solar charge battery DMM

- 3-3 / 4 digits 4000 count
- 0.7% best accuracy
- Range hold
- Auto power off (15min.)
- Low power ohm (input voltage 0.4V) at continuity range
- Power saving design

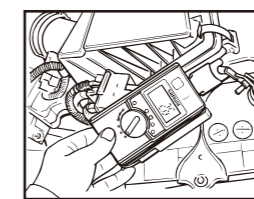
**Display** : numeral display 4000  
**Sampling rate** : 3 times / sec.  
**AC frequency bandwidth** : 40~400Hz



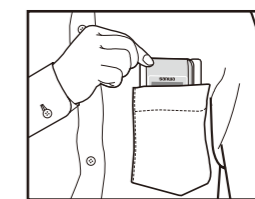
AC current measurement



Cables in a narrow space can be clamped for current measurement



DC current measurement



Easy to put in a shirt pocket

# Analog Multitesters (circuit testers)

## What is Analog Multitester?

Analog multitesters basically make measurements of DC voltage, AC voltage, DC current and resistance. Except some special products, they have no function to measure the AC current. Characteristics of recent analog multitesters include the extended measuring range function (particularly for fine voltage and current) with an amplifier installed, the function to allow the measurement of capacitor capacity, and the zero-center meter function. To enhance operability and usability, some products include the auto range function, automatic polarity switching function, and a structure integrating a case to allow the storage of a test lead. There are some testers that allow the measurement of hFE (DC current amplification factor) of a transistor and temperature measurement using a temperature sensor, which is offered as an optional accessory.

## Advantages of analog multimeters

1. Easy to read the mean value of values changing in short cycles.  
\* A digital tester does not give stable value determination.
2. No need for the operating power supply except for resistance range (excluding Model EM7000 integrating an amplifier, and CX506a integrating an oscillator) and zero-center function.
3. Suited for judgment based by intuition (in continuity test etc.).

## Four key points in choosing a suitable model

### 1. What are the necessary measuring functions?

Choose the necessary measuring functions in addition to voltage and resistance.

- Need for the measurement of current (0.25A, 0.3A, 30A), DC only.
- Measurements for remaining dry battery capacity, capacitor, and frequency.
- Measurement of DC high voltage with the use of an optional accessory.

### 2. Other necessary functions

- 1) The needle occasionally swings to the opposite direction in DC voltage measurement.
  - Check the polarity by the zero-center meter function.
- 2) Hard to check for continuity.
  - Use an LED light-up type in noisy places
  - Use a buzzer type to verify with sounds.



### 3. Graduation of scale

There are two general types of graduation of the measuring range:

- ① 2.5, 5, 10, 50, 250, 500V
- ② 3, 12, 30, 120, 600V

For measurement of a car battery (24V), measurement in the 30V range of ② is suitable. Choose a type suitable for your intended application.

### 4. Other functions

Other types are furnished with an auto range function allowing the automatic optimal setting of voltage and resistance. There are also types integrating a transistor transmitter and others integrating a current-limiting fuse with breaking capacity of 100kA for enhanced safe operation.

## Basic measuring method

### Check the range before making a measurement

Most problems with a tester are caused by overcurrent and drop of the tester. Failures due to overcurrent are most frequently caused by voltage applied to a current range and resistance range with lower internal resistance (thereby causing overcurrent of tens to hundreds times to run through the circuit). Although some testers include a meter protector and a circuit protector using a diode, it is recommended to check the range before measuring.

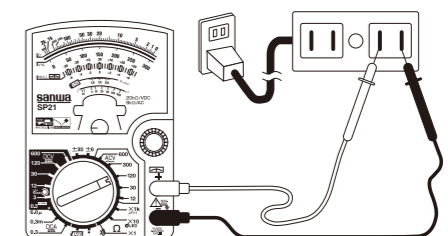
### For measuring unknown values

In measuring unknown current and voltage values, find an approximate value at the maximum range first and then make adjustments to the optimum range (1000V to 250V range in case of voltage measurement). This method prevents a failure caused by incorrect range adjustment.

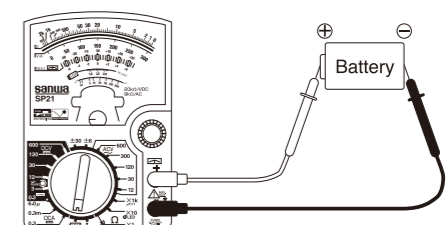
\* Do not change the range during measurement.

## Examples

### AC100V plug outlet



### Battery voltage





## FET Tester



## EM7000

## High sensitivity for measurement of lower capacitance

- High input impedance (DCV2.5~12M $\Omega$ /V), and 0.12 $\mu$ A range (DCA)
- Bandwidth 40Hz~1MHz AC sign wave
- Rectangular pulse P-P (Peak to Peak) measurement (duty cycle 20% and above)
- Wide ohm range 0.2 $\Omega$ ~200M $\Omega$

Bandwidth : 40Hz~1MHz (12V range and below)

## Optional accessories

HV probe : HV-60  
Carrying case : C-CA  
Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| EM7000                        | Measuring range   | Accuracy               |
|-------------------------------|---|------------------------|
| DCV                           | 0.3/1.2/3/12/30/120/300/1000V   | $\pm$ 3% of full scale |
| $\pm$ DCV                     | $\pm$ 0.15/0.6/1.5/6/15/60/150/600V   | $\pm$ 7% of full scale |
| ACV rms (50 / 60Hz)           | 3V (approx. 2.5M $\Omega$ /V) / 12V (approx. 1.1M $\Omega$ /V)<br>30V (approx. 800k $\Omega$ /V) / 120/300V (approx. 800k $\Omega$ /V) / 750V (approx. 10M $\Omega$ ) | $\pm$ 3% of full scale |
| ACV P-P                       | Sine wave: 8.4V (approx. 2.5M $\Omega$ /V) / 33V (approx. 1.1M $\Omega$ /V) / 84V (approx. 800k $\Omega$ /V) / 330/840V (approx. 800k $\Omega$ /V)                    | $\pm$ 5% of full scale |
| DCA                           | Square symmetric wave: 8.4V (2.5M $\Omega$ /V)<br>Triangular symmetric wave: 8.4V (2.5M $\Omega$ /V)  | $\pm$ 6% of full scale |
| DCA (NULL)                    | 0.12 $\mu$ A / 0.3mA / 3mA / 30mA / 300mA / 6A  | $\pm$ 3% of full scale |
| ACA                           | $\pm$ 0.06 $\mu$ A / $\pm$ 0.15mA / 1.5mA / 15mA / 150mA  | $\pm$ 7% of full scale |
| Resistance                    | 6A  | $\pm$ 3% of full scale |
| dB                            | 2k/20k/200k/2M/20M/200M $\Omega$  | $\pm$ 3% of arc        |
|                               | -10~+51dB   | $\pm$ 3% of arc        |
| Bandwidth                     | 40Hz~1MHz (below 12V range)   |                        |
| Battery                       | R6P 1.5V $\times$ 2, 6F22 9V $\times$ 1   |                        |
| Fuse                          | $\phi$ 5.0 $\times$ 20mm ceramic (250V / 0.5A)<br>$\phi$ 5.0 $\times$ 20mm ceramic (250V / 6.3A)  |                        |
| Size / Mass                   | H165 $\times$ W106 $\times$ D46mm / approx. 375g  |                        |
| Standard accessories included | Test lead (TL-21a), Spare fuse, Instruction manual  |                        |

The value in ( ) at DCV and ACV is input resistance.

## Multifunctional model



## SH-88TR

## Zero center meter (NULL)

- Total 35 wide ranges (22ch sw + additional fuctions)
- Capacitance measurement 1 $\mu$ F~1F
- LED for continuity check

## Optional accessories

HV probe : HV-10  
Carrying case : C-YS  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
hFE probe : HFE-6T  
Test lead : TL-91M



| SH-88TR                       | Measuring range  | Accuracy   |
|-------------------------------|--|--|
| DCV (NULL)                    | 0.12/3/12/30/120/300/1200V (20k $\Omega$ /V)<br>$\pm$ 6/15/60/150/600V (40k $\Omega$ /V) | $\pm$ 2.5% of full scale<br>$\pm$ 2.5% of full scale |
| ACV                           | 3/12/30/120/300/1200V (9k $\Omega$ /V)   | $\pm$ 3% of full scale (3V : $\pm$ 5%)               |
| DCA                           | 50 $\mu$ A / 3mA / 30mA / 0.3A   | $\pm$ 2.5% of full scale                             |
| Resistance                    | 3k/30k/300k/3M/30M $\Omega$  | $\pm$ 3% of arc                                      |
| dB                            | -10~+63dB  | $\pm$ 3% of full scale (3V : $\pm$ 5%)               |
| Capacitance                   | 1000 $\mu$ F / 0.01/0.1/1F   |  |
| Continuity                    | LED : emitting light at 10 $\Omega$ or less. Open voltage : 3V                           |  |
| hFE                           | 1000 at X10 range (optional probe "HFE-6T" is necessary)                                 | —  |
| Bandwidth                     | 40~20kHz (less than 30V : $\pm$ 3%) 30~100kHz (less than 30V : $\pm$ 1dB)                |  |
| Battery                       | R6P $\times$ 2, 6F22 $\times$ 1  |  |
| Fuse                          | $\phi$ 5.2 $\times$ 20mm (250V/0.5A)   |  |
| Size / Mass                   | H150 $\times$ W100 $\times$ D36mm/ approx. 280g  |  |
| Standard accessories included | Test lead (TL-61), Instruction manual  |  |

The value in ( ) at DCV and ACV is input resistance.

## High input impedance

AU-32  
AU-31

## Auto range, High input impedance

- Auto range selection (V,  $\Omega$ )
- Auto polarity
- High input impedance 1~10M $\Omega$
- Series capacitor input \*AU-31 ACV only
- Auto 0 $\Omega$  adjustment
- Inner battery check
- DC / AC auto selection \*AU-32 only
- 5 ranges DC / AC current \*AU-32 only

Bandwidth : 40~10kHz (0.25V :  $\pm$ 5%), 40~600Hz (2.5V and above :  $\pm$ 5%)  
40~10kHz (0.3V :  $\pm$ 5%), 40~1kHz (3V and above :  $\pm$ 4%)

## Optional accessories

HV probe : HV-50  
Carrying case : C-SP  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-91M



| AU-32                         | Measuring range  | Accuracy               |
|-------------------------------|--|------------------------|
| DCV                           | $\pm$ 250m (approx. 1M $\Omega$ /V) / 2.5/10/50/250/500V (10M $\Omega$ /V) | $\pm$ 3% of full scale |
| ACV                           | 250m (approx. 1M $\Omega$ /V) / 2.5/10/50/250/500V (10M $\Omega$ /V)       | $\pm$ 3% of full scale |
| DCA                           | $\pm$ 250 $\mu$ A / 2.5mA / 25mA / 250mA / 2.5A                            | $\pm$ 3% of full scale |
| ACA                           | 250 $\mu$ A / 2.5mA / 25mA / 250mA / 2.5A                                  | $\pm$ 3% of full scale |
| Resistance                    | 20k/200k/2M/20M/200M $\Omega$  | $\pm$ 3% of arc        |
| dB                            | -10/+10/+22/+36/+50/+56dB  | —                      |
| Bandwidth                     | 40~10kHz (0.25V : $\pm$ 5%), 40~600Hz (2.5V~ : $\pm$ 5%)                   |                        |
| Battery                       | R03 $\times$ 4   |                        |
| Fuse                          | $\phi$ 5.2 $\times$ 20mm (250V/0.3A)                                       |                        |
| Size / Mass                   | H48 $\times$ W110 $\times$ D124mm/ approx. 290g                            |                        |
| Standard accessories included | Test lead (TL-61), Instruction manual                                      |                        |

The value in ( ) at DCV and ACV is input resistance.

| AU-31                         | Measuring range   | Accuracy               |
|-------------------------------|---|------------------------|
| DCV                           | $\pm$ 300m (approx. 1M $\Omega$ /V) / 3/12/60/300/1000V (10M $\Omega$ /V) | $\pm$ 3% of full scale |
| ACV                           | 300m (approx. 1M $\Omega$ /V) / 3/12/60/300/1000V (10M $\Omega$ /V)       | $\pm$ 3% of full scale |
| DCA                           | $\pm$ 300mA   | $\pm$ 3% of full scale |
| ACA                           | 300mA   | $\pm$ 3% of full scale |
| Resistance                    | 20k/200k/2M/20M/200M $\Omega$   | $\pm$ 3% of arc        |
| dB                            | -9/+11/+23/+37/+51/+62dB  | —                      |
| Bandwidth                     | 40~10kHz (0.3V : $\pm$ 5%) 40~1kHz (3V~ : $\pm$ 4%)                       |                        |
| Battery                       | R03 $\times$ 4  |                        |
| Fuse                          | $\phi$ 5.2 $\times$ 20mm (250V/0.5A)                                      |                        |
| Size / Mass                   | H48 $\times$ W110 $\times$ D124mm/ approx. 290g                           |                        |
| Standard accessories included | Test lead (TL-61), Instruction manual                                     |                        |

The value in ( ) at DCV and ACV is input resistance.

## Multifunctional model



## CX506a

## Capacitor &amp; Transistor checker (built-in oscillator)

- 26ch switch, wide range measurement
- Capacitance measurement 50pF~2000 $\mu$ F
- High input impedance 50k $\Omega$  / V (DC3~300Vrange)
- Switchable DC polarity

Bandwidth : 40Hz~30kHz (3V and 12V), 40Hz~10kHz (30V range)

## Optional accessories

HV probe : HV-60  
Carrying case : C-CA  
Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



| CX506a                                | Measuring range  | Accuracy  |
|---------------------------------------|--|---|
| DCV                                   | 120m (4k $\Omega$ ) / 3/12/30/120<br>300 (50k $\Omega$ /V) / 1000V (15k $\Omega$ ) | 120m : $\pm$ 4%<br>$\pm$ 2.5% of full scale             |
| ACV                                   | 3/12/30/120/300/750V (8k $\Omega$ /V)  | $\pm$ 3% of full scale (Less than 12V range : $\pm$ 4%) |
| DCA                                   | 30 $\mu$ A / 0.3mA / 3mA / 30mA / 0.3A   | $\pm$ 2.5% of full scale                                |
| Resistance                            | 5k/50k/500k/5M/50M $\Omega$  | $\pm$ 3% of arc   |
| Capacitance                           | C1 : 50p~0.2 $\mu$ F C2 : 0.01 $\mu$ ~20 $\mu$ F C3 : 1~2000 $\mu$ F               | C1/C2 : $\pm$ 6% of arc                                 |
| hFE (DC Current Amplification Factor) | Transistor hFE: 0~1000   | —   |
| Bandwidth                             | 40~30kHz (12V/40Hz~30kHz 30V~ : 40Hz~10kHz)  |   |
| Battery                               | R6P $\times$ 2, 6F22 $\times$ 1  |   |
| Fuse                                  | $\phi$ 5.0 $\times$ 20mm (250V/0.5A) arc-extinguishing material in ceramic tube    |   |
| Size / Mass                           | H165 $\times$ W106 $\times$ D46mm/ approx. 370g                                    |   |
| Standard accessories included         | Test lead (TL-21a), Clip lead (CL-506a), Instruction manual, Spare fuse            |   |

The value in ( ) at DCV and ACV is input resistance.



AU-32

## Drop shock proof meter

## YX360TRF

## Best seller drop shock proof meter

- Drop shock proof meter
- Null (zero center) meter  $\pm$ 5 /  $\pm$ 25 in DCV
- High resistance up to 200M $\Omega$  with low voltage
- Protective body cover
- Capacitance, dB, Li measurement

Bandwidth : 30~100kHz (AC10V)

## Optional accessories

hFE probe : HFE-6T  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
High voltage probe : HV-10T

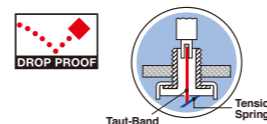


| YX360TRF                      | Measuring range  | Accuracy   |
|-------------------------------|--|--|
| DCV (NULL)                    | 0.1V (20k $\Omega$ / V)<br>0.25 / 2.5 / 10 / 50 (20k $\Omega$ / V) / 250 / 1000V (9k $\Omega$ / V)<br>$\pm$ 5 / 25V (40k $\Omega$ / V) | $\pm$ 5% of full scale<br>$\pm$ 3% of full scale<br>$\pm$ 5% of full scale |
| ACV                           | 10 / 50 / 250 / 750V (9k $\Omega$ / V)   | $\pm$ 4% of full scale   |
| DCA                           | 50 $\mu$ A / 2.5mA / 25mA / 0.25A  | *1 $\pm$ 5% of full scale  |
| Resistance                    | 2k / 20k / 200k / 2M $\Omega$ (X1 / X10 / X100 / X1k)<br>200M $\Omega$ (X100k)   | $\pm$ 3% of arc<br>$\pm$ 5% of arc   |
| Load current (LI)             | 0~150m / 15m / 1.5m / 150 $\mu$ A / 1.5 $\mu$ A  |  |
| Capacitance                   | 10 $\mu$ F   | *2   |
| dB                            | -10dB~+22dB (for 10VAC) ~+62dB   | —  |
| DC high voltage               | DC25kV (optional probe "HV-10T" is necessary)  | —  |
| hFE                           | 1000 at X10 range (optional probe "HFE-6T" is necessary)   | —  |
| Battery                       | R6 (IEC) or UM-3(1.5V) $\times$ 2  |  |
| Fuse                          | $\phi$ 5.2 $\times$ 20mm (250V / 0.5A)   |  |
| Size / Mass                   | H159.5 $\times$ W129 $\times$ D41.5mm / approx. 320g   |  |
| Standard accessories included | Instruction manual, Hand strap   |  |

The value in bracket at DCV and ACV is input resistance.

\*1 Not including the resistance of fuse.

\*2 Pointer indication of the maximum move by charged current in the capacitor.



DROP PROOF

Taut-Band  
Tension Spring

## Drop shock proof meter



## SP21

## Continuity check buzzer

- Drop shock proof taut-band meter
- ±DCV zero center meter
- Fuse and diode protection
- Battery check
- Tilt stand

Bandwidth : 40~100kHz (AC12V)

## Optional accessories

HV probe : HV-20  
Carrying case : C-SPH or C-SP  
Clip adapter : CL-13a, CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-21M, TLF-120



## SP20

## DC high voltage &amp; temperature measurable

- 20ch measurement ranges
- Capacitance measurement 500 μF
- Tilt stand
- DC high voltage and temperature measurement (with optional accessories)

Bandwidth : 40~100kHz (AC10V)

## Optional accessories

HV probe : HV-10  
Temperature probe : T-THP  
Carrying case : C-SPH or C-SP  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-91M, TLF-120



## SP-18D

## Protective body cover

- Low power ohm (3V) measurement upto 200MΩ
- Capacitance measurement 0.01 μF~1000 μF
- LED check by 3V terminal voltage at resistance range
- Battery check
- Protective body cover

Bandwidth : 30~80kHz (AC12V), 30~20kHz (AC30V)

## Optional accessories

Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC



## TA55

## 30A range for automotive

- High level panel visibility
- Continuity check buzzer
- Tilt-stand
- Measurable upto DC30A / DC300A with optinal clamp probe

Bandwidth : 40~5kHz

## Optional accessories

Clamp probe : CL33DC  
Carrying case : C-SPH or C-SP  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC  
Test lead : TL-91M, TLF-120



| SP21        | Measuring range  | Accuracy                               |
|-------------|--|--|
| DCV (NULL)  | 0.3 (5kΩ)/3/12/30/120/600V (20kΩ/V)<br>±6/30V (20kΩ/V)   | ±3% of full scale<br>±5% of full scale |
| ACV         | 12/30/120/300/600V                                       | ±3% of full scale                      |
| DCA         | 60 μ/30m/0.3A  | ±3% of full scale                      |
| Resistance  | 2k/20k/2MΩ   | ±3% of arc                             |
| Capacitance | 500 μF   | *1                                     |
| Continuity  | Buzzer sounds at less than approx. 10Ω. Open voltage: 3V |  |

|                               |  |
|-------------------------------|--|
| Bandwidth                     | 40~100kHz (AC12V)                      |
| Battery                       | R6P×2                                  |
| Fuse                          | φ5×20mm (250V/0.5A)                    |
| Size / Mass                   | H144×W99×D41mm/approx. 270g            |
| Standard accessories included | Test lead (TL-21a), Instruction manual |

The value in ( ) at DCV and ACV is input resistance.  
\*1 Pointer indication of the maximum move by charged current in the capacitor.



| SP20            | Measuring range                                    | Accuracy          |
|-----------------|--|-------------------|
| DCV             | 0.25/2.5/10/50/100V (20kΩ/V)/500V (9kΩ/V)          | ±3% of full scale |
| ACV             | 10/50/250/500V (9kΩ/V)                             | ±3% of full scale |
| DCA             | 50 μ/2.5m/25m/0.25A                                | ±3% of full scale |
| Resistance      | 2k/20k/200k/2MΩ                                    | ±3% of arc        |
| Capacitance     | 500 μF   | *1                |
| DC high voltage | DC25kV (Optional probe "HV-10" is necessary)       | —                 |
| Temperature     | -20 ~ +200°C (Optional probe "T-THP" is necessary) | ±3% (T-THP)       |

|                               |                                       |
|-------------------------------|---------------------------------------|
| Bandwidth                     | 40~100kHz (AC10V)                     |
| Battery                       | R6P×2                                 |
| Fuse                          | φ6.3×30mm (250V/0.5A)                 |
| Size / Mass                   | H144×W99×D41mm/approx. 270g           |
| Standard accessories included | Test lead (TL-61), Instruction manual |

The value in ( ) at DCV and ACV is input resistance.  
\*1 Pointer indication of the maximum move by charged current in the capacitor.



| SP-18D        | Measuring range               | Accuracy          |
|---------------|-------------------------------|-------------------|
| DCV           | 0.3/3/12/30/120/600V (20kΩ/V) | ±3% of full scale |
| ACV           | 12/30/120/300/600V (9kΩ/V)    | ±3% of full scale |
| DCA           | 60 μ/30m/0.3A                 | ±3% of full scale |
| Resistance    | 2k/20k/2M/200MΩ               | ±3% of arc        |
| Battery check | 1.5V/1.5V Coin battery        | —                 |
| Capacitance   | 1000 μF                       | *1                |

|                               |                                     |
|-------------------------------|-------------------------------------|
| Bandwidth                     | 30~70kHz (AC 12V) 30~20kHz (AC 30V) |
| Battery                       | R6P×2                               |
| Fuse                          | φ5.2×20mm (250V/0.5A)               |
| Size / Mass                   | H159.5×W129×D41.5mm / approx. 320g  |
| Standard accessories included | Instruction manual                  |

The value in ( ) at DCV and ACV is input resistance.  
\*1 Pointer indication of the maximum move by charged current in the capacitor.



| TA55       | Measuring range   | Accuracy          |
|------------|---|-------------------|
| DCV        | 0.3/3/16/30/60V (20kΩ/V)                                  | ±3% of full scale |
| ACV        | 30/120/300V (9kΩ/V)                                       | ±4% of full scale |
| DCA        | 0.5/3/30A   | ±5% of full scale |
| Resistance | 2k/20k/200k/2MΩ   | ±3% of arc        |
| Continuity | Buzzer sounds at less than approx. 70Ω. Open voltage : 3V |                   |

|                               |                                       |
|-------------------------------|---------------------------------------|
| Bandwidth                     | 40~5kHz                               |
| Battery                       | R6P×2                                 |
| Fuse                          | φ6.3×30mm (250V/3A)                   |
| Size / Mass                   | H142×W97×D38mm/approx. 300g           |
| Standard accessories included | Test lead (TL-91), Instruction manual |

The value in ( ) at DCV and ACV is input resistance.

## Slim compact AMT



## CP-7D

## 23mm thick small size

- Wide scale panel with mirror
- Affixed test leads providing better safety
- High-precision, non-flammable, smokeless metal-oxide film resistor
- Battery check
- Fuse and diode circuit protection

Bandwidth : 30~100kHz (AC10V), 30~20kHz (AC50V)

## Optional accessories

Carrying case : C-CP  
Clip adapter : CL-14, CL-15a, CL-DG3a, TL-9IC



| CP-7D             | Measuring range                 | Accuracy          |
|-------------------|---------------------------------|-------------------|
| DCV               | 0.25/2.5/10/50/250/500V (4kΩ/V) | ±3% of full scale |
| ACV               | 10/50/250/500V (4kΩ/V)          | ±4% of full scale |
| DCA               | 0.25m/25m/500mA                 | ±3% of full scale |
| Resistance        | 2k/20k/1MΩ                      | ±3% arc           |
| Load current (LI) | 0~74mA/7.4mA/150 μA             | —                 |
| Battery check     | 0.9~1.5V                        | —                 |
| dB                | -20~36dB                        | —                 |

|                               |                                       |
|-------------------------------|---------------------------------------|
| Bandwidth                     | 30~100kHz (AC10V) 30~20kHz (AC50V)    |
| Battery                       | R6P×1                                 |
| Fuse                          | φ5.2×20mm (250V/0.5A)                 |
| Size / Mass                   | H119×W85×D23mm/approx. 140g           |
| Standard accessories included | Test lead (TL-84), Instruction manual |

The value in ( ) at DCV and ACV is input resistance.



| AP33          | Measuring range        | Accuracy          |
|---------------|------------------------|-------------------|
| DCV           | 10/50/250/500V (2kΩ/V) | ±5% of full scale |
| ACV           | 50/250/500V (2kΩ/V)    | ±5% of full scale |
| Battery check | 1.5V/9V                | —                 |
| DCA           | 25m/250mA              | ±5% of full scale |
| Resistance    | 5k/500kΩ               | ±3% arc           |

|                               |                             |
|-------------------------------|-----------------------------|
| Bandwidth                     | 40~10kHz (less than 50V)    |
| Battery                       | R03×1                       |
| Fuse                          | φ5×20mm (250V/0.5A)         |
| Size / Mass                   | H126×W87×D30mm/approx. 185g |
| Standard accessories included | Instruction manual          |

The value in ( ) at DCV and ACV is input resistance.

## For power line



## VS-100 (with case)

## Current-limiting fuse, 100kA breaking capacity, is installed.

- For lower voltage circuit (500V and below) with large capacitance
- Current-limiting fuse that can interrupt 100kA, is installed.
- All ranges are protected from input voltage upto 500V
- Carrying case

Bandwidth : 40~10kHz (50V and below)



| VS-100     | Measuring range        | Accuracy          |
|------------|------------------------|-------------------|
| DCV        | 10/50/250/500V (4kΩ/V) | ±3% of full scale |
| ACV        | 10/50/250/500V (4kΩ/V) | ±3% of full scale |
| Resistance | 2k/20k/2MΩ             | ±3% arc           |

|                               |  |
|-------------------------------|--|
| Bandwidth                     | 40~10kHz (less than AC50V)   |
| Battery                       | R6P×2  |
| Fuse                          | Current-limiting fuse 600V/3A, Breaking capacity 100kA<br>Glass-tube fuse φ6.3×30mm 0.25A/250V, Breaking capacity 100A |
| Size / Mass                   | H144×W96×D56mm/approx. 395g  |
| Standard accessories included | Test lead (TL-100-0M), Carrying case (C-VS), Instruction manual  |

The value in ( ) at DCV and ACV is input resistance.

# Lux Meters

Various environments need appropriate illumination, whether it be ordinary homes, offices, or factories. Inadequate illumination or too much illumination can lead to false recognition, reduced work efficiency, and loss of vision caused by fatigue. Since appropriate illumination helps to improve work efficiency and assure work safety, the control

of illumination is regarded as a very important element. The illuminance meter indicates, by values in the unit of LUX, how much light shines on each place. It is used for the purpose of assuring appropriate illumination suitable for every environment. JIS (Japanese Industrial Standards) has a standard given below as recommended values for each environment.

| Type                   | LUX                        | 1500   | 700  | 300  | 150  | 70   | 30                          | 15   | -LUX- |
|------------------------|----------------------------|--|--|--|--|--|-----------------------------|--|-------|
| Housing                |                            | * Sewing (Dark material)   | * Studying, Sewing<br>* Reading (Long time or small letters)   | * Reading * Makeup<br>* Eating meal                                | Living room, child room, reception room, dining room, kitchen                                  | Hall, stairway, corridor, escape stairway, garage          |                             |  |       |
| School                 |                            | * Precision drawing<br>* Machine-sewing<br>* Precision experiment    | Drafting room * Blackboard<br>* Sewing * Library reading room<br>* Precision machining                     | Ordinary classroom, special classroom, library reading room        | Auditorium, meeting room, hallway, stairway  | Escape stairway  |                             |  |       |
| Office                 |                            | * Designing * Drawing<br>* Typing * Calculation<br>* Key-punching    | Office, drafting room, gage board, telephone exchange room, distribution board                             | Executive room, conference room, reception room, hall, elevator    | Work room, change room, stairway, warehouse  | Escape stairway  |                             |  |       |
| Road, park             |                            |  |  |  | Tunnel of expressway (illumination at the entrance and exit should be higher than this value.) | 70~15 Tunnel   | 15~3 Road with busy traffic | 1.5~0.3 Road with scarce traffic, road in residential areas, park, other open spaces |       |
| Hospital               | Surgical table 10,000 over | * Autopsy<br>* First-aid treatment<br>* Drug formulation             | Surgical room, first-aid station, ocular inspection, drug preparation * Technological research * Injection | Clinic, examination room, dispensary, waiting room, medical office | Doctor's room, hospital room, X-ray room, medicine room  |  |                             |  |       |
| Theater, movie theater |                            |  |  | * Ticket counter, doorway, back stage                              | Projection booth, corridor, stairway   | Spectators' seat (during a break), escape stairway, garden |                             | 3~1.5 Spectators' seats (while showing)  |       |
| Inn, hotel             |                            |  | Accounting office  | Front desk, dining room  | Guest room, amusement hall, corridor, lobby  |  |                             |  |       |
| Diner, restaurant      |                            |  | * Sample case  | * Register, kitchen, * dining table                                | Guest room, waiting room hallway   |  |                             |  |       |
| Beauty parlor, barber  |                            |  | * Hairdo * Hair setting * Makeup   | * Hairdo, * dressing   | In shop  |  |                             |  |       |
| Shop                   |                            | * Highlighted display in show window<br>* Highlighted show case      | * Highlighted display in shop<br>* Show window, ordinary show case   | Ordinary display of shop<br>Overall shop                           |  |  |                             |  |       |
| Department store       |                            | * Show window, main part on the 1st floor<br>* Highlighted show case | Ordinary display<br>Ordinary show case   | Atmospheric display  |  |  |                             |  |       |

The combined use of local illumination is allowed in places marked with \*. In these cases, it is desirable that the overall illumination should be 1 / 10 or more of the illumination by the local illumination.  
\* Reference: Illumination level JIS Z9110  
· Each country has its own standard. Please check the standards for your own country.

## Pocket Size



### LX2

#### Easy to use lux meter

- Small stick shape sensor probe (sensor diameter φ9mm)
- 3999 count with analog bar graph
- Silicon photodiode
- Measuring range 0.1lx~399.9lx
- Data hold
- Auto power save (30min.)
- Cord length 900mm

**mobiken** Series **CE**

Pocket size meter but with high accuracy and wide ranges. Sensor / Probes can be all neatly contained and protected within the folding case. Easy to carry in a shirt pocket.

APS DATA HOLD

| LX2                                     |   |
|---|---|
| Optical sensor                          | Si photodiode with approximated relative luminous efficiency (φ9mm)                                     |
| Display                                 | Numeric : 3999 full scale, Bargraph:42-segment  |
| Sampling rate                           | Approx. 2 times/sec. for numeral display.<br>Approx. 20 times/sec. for bar graph.                       |
| Measuring range                         | 400.0/4000/40.00k/400.0kx   |
| Accuracy                                | ± (5%+1) below 3000 lx<br>± (7.5%+1) 3000 lx or higher<br>Compatible JIS standard A class<br>23°C ± 2°C |
| Temperature Characteristics             | ± 5% at 23°C within operating temperature/humidity range  |
| Relative spectral sensitivity           | Approximation of spectral luminous efficiency of the standard photometric observer                      |
| Grazing-incidence light characteristics | Cosine curve approximation  |
| Battery                                 | LR44×2  |
| Power consumption                       | Approx. 10mW  |
| Operating temperature                   | 0°C ~ 40°C max. 80% RH no condensation  |
| Storage temperature                     | -10°C ~ 50°C max. 80% RH no condensation  |
| Size / Mass                             | Main body : H117×W76×D18mm/approx. 120g<br>Sensor probe : H84×W16×D10mm                                 |
| Standard accessories included           | Instruction manual  |

## Analog Type



### LX3132

#### Max 10000 lux measurable

- Various light source can be measured such as filament lamp, fluorescent lamp, and mercury lamp.
- Silicon photodiode
- Taut-band drop shock proof meter

#### Optional accessories

Carrying case : C-01

| LX3132                        |  |
|-------------------------------|--|
| Range                         | 100/300/1000/3000/10000LUX   |
| Accuracy                      | ±10% of full scale Receiver angle 30° (less than -3%)<br>Receiver angle 60° (less than -10%) |
| Optical sensor                | Si photodiode with approximated relative luminous efficiency                                 |
| Indicator                     | Analog pointer Taut-band   |
| Battery                       | R6P×2  |
| Size / Mass                   | H163×W100×D47mm/300g   |
| Standard accessories included | Instruction manual   |

# Optical / Laser Power Meters

## Laser power meters

Laser power meters are measuring instruments that let a laser beam emitted from a laser light source enter the sensor light receiver and indicate the value by converting light energy into electric signals. The unit used for this purpose is W (watt). The laser power meter is used for checking the light power of and maintaining laser-operating equipment. Since silicon photo diode used at the receiver of the laser power meter has different photoelectric conversion ratios according to the wavelength of the light received, it needs to be calibrated by the measuring wavelength.

\* It is possible to obtain approximate value for the measuring wavelength based on a spectral sensitivity characteristic graph of the silicon photo diode.

### Reference: Main laser wavelength

- 830nm Infrared semiconductor laser
- 780nm Infrared semiconductor laser (e.g. Used for CD player, MD recorder, etc.)
- 670nm Visible semiconductor laser
- 633nm He-Ne laser, red semiconductor laser (e.g. Used for DVD player, bar-code reader, etc.)
- 532nm Green laser
- 488nm Argon ion laser
- 405nm Purple-blue laser

## Optical power meters

Optical power meters are measuring instruments that indicate the power of an outgoing beam from an optical fiber connector by converting it into electric signals. It is mainly used for installation and maintenance of optical fiber and optical LAN. The unit of fiber light is generally expressed in W (watt) and dBm related to 1mW expressed in logarithm.

### Conversion of dBm into mW $[dBm] = 10 \log_{10} [mW]$

10dBm=10mW 0dBm=1mW -10dBm=100  $\mu$ W -20dBm=10  $\mu$ W  
-30dBm=1  $\mu$ W -40dBm=100nW -50dBm=10nW -60dBm=1nW

### Wavelength for each model

For long wave and long wavelength (1310nm,1550nm)  
For short wave and long wavelength (650nm,780nm,800nm,850nm,880nm)  
\* Please contact us for products handling wavelengths other than the ones given above.

## Optical Power Meter



### OPM-360

For fiber light (long wavelength 2 ranges)  
Optical SC type fiber connector

- Direct reading 2 wavelength ranges (1310/1550nm)
  - 2 types power supply (AC adapter or inner rechargeable battery)
  - 4 digits digital display (-60.00~0.00dBm/1nW~1mW)
- \*Consult us regarding FC type connector.



|                               |  |
|-------------------------------|--|
| OPM-360                       |  |
| Display                       | 4-digit digital                                    |
| Measurable wavelengths        | 1310/1550nm (2 ranges)                             |
| Optical power measuring range | -60.00~0.00dBm/1.00nW~1.000mW                      |
| Ranges                        | Automatic  |
| Accuracy                      | ±5% (@ reference wavelength of -23dBm/5 $\mu$ W)   |
| Photosensor                   | InGaAs-Pin photodiode $\phi$ 1mm                   |
| Battery                       | Inner rechargeable battery or AC adapter (AD-30-2) |
| Size / Mass                   | H164 X W85 X D35mm/400g                            |
| Standard accessories included | AC adapter (AD-30-2), Instruction manual           |

Accuracy : 18°C~25°C max. 80% RH no condensation



### OPM37LAN

For fiber light (short wavelength 5 ranges)  
Optical FC type fiber connector

- dBm and W measurement
- Relative value
- Offsetting, data averaging (20-data sequential averaging)
- Direct reading wavelength (650, 780, 800, 850, 880nm)
- RS-232C interface
- Various connectors can be equipped by changing optical connector adapter.
- 2m long sensor extension cord

### Optional accessories

RS232C cable : KB-RS-OPM  
SC-type optical connector adapter : OPA-F04  
Simplex TOSLINK type optical connector adapter : OPA-F05  
Duplex TOSLINK type optical connector adapter : OPA-F07  
\*Consult us regarding other type of connector.



|                               |   |
|-------------------------------|---|
| OPM37LAN                      |   |
| Display                       | 4-digit digital   |
| Ranges                        | Automatic, 8 ranges   |
| Optical sensor                | Si photodiode (sensor surface area 5.8X5.8mm)   |
| Optical power measuring range | -60.00dBm~+13.00dBm<br>1.000nW~20.00mW  |
| Optical input type            | Direct to photodiode  |
| Reference wavelengths         | 650nm, 780nm, 800nm, 850nm, 880nm   |
| Accuracy                      | ±5% (@ reference wavelength of -20dBm/10 $\mu$ W)   |
| Resolution                    | dBm/dB (REL) mode : 0.01dB<br>W/W (REL) mode : 0.01%  |
| Measuring cycle               | 3.33 times/sec.   |
| Battery                       | 006P type Alkaline battery or AC adapter (AD-30-2)  |
| Size / Mass                   | Main body : H164 X W85 X D35mm/300g<br>Sensor head : $\phi$ 25 X 26mm/25g                                   |
| Standard accessories included | Optical sensor, Extension cord, AC adapter (AD-30-2)<br>FC-type (F01) connector adapter, Instruction manual |

Accuracy : 18°C~25°C max. 80% RH no condensation



Sensor extension cord (2m)

## Laser Power Meter (Pocket Size)



### LP1

Optical power up to max. 40mW measurable  
Direct reading wavelength customization

- Wide optical power measurement range
- Silicon photodiode
- Sensor can be all neatly contained and protected within the folding case.
- Max / Min hold
- Auto power save (30min.)
- 500mm sensor cord

Wavelength customization  
The standard LP1 is calibrated at 633 nm but can also read any other wavelength in the 400~1100 nm range using a chart inside the case cover.  
We can calibrate directly to any other 400~1100 nm wavelength for special orders, with a 4 month lead time, so please contact our authorized agent if necessary.



Pocket size meter but with high accuracy and wide ranges. Sensor / Probes can be all neatly contained and protected within the folding case. Easy to carry in a shirt pocket.



|                               |  |
|-------------------------------|--|
| LP1                           |  |
| Optical sensor                | Si photodiode ( $\phi$ 9mm)  |
| Wavelength range              | 400nm~1100nm   |
| Wavelength                    | 633nm (He-Ne laser) reference wavelength<br>Convert by a table of spectral sensitivity characteristic (representing value) |
| Display                       | Numeric:3999 full scale, Bargraph : 42-segment   |
| Sampling rate                 | Approx. 2 times/sec. for numeral display.<br>Approx. 20 times/sec. for bargraph.   |
| Measuring range               | 40.00u/400.0u/4.000m/40.00mW   |
| Accuracy                      | ±5% (1mW : 4mW range, 633nm)<br>23°C±2°C   |
| Battery                       | LR44X2   |
| Power consumption             | Approx. 6mW  |
| Operating temperature         | 0°C~40°C max. 80% RH no condensation   |
| Storage temperature           | -10°C~50°C max. 80% RH no condensation   |
| Size / Mass                   | H117 X W76 X D18mm/Approx. 120g<br>Sensor probe : H84 X W16 X D10mm  |
| Standard accessories included | Instruction manual   |

## Laser Power Meter (Digital Type)



### OPM35S

For space light measurement

- Silicon photodiode
- Measurable up to 50.00mW
- Relative value
- Max hold, data averaging (20-data sequential averaging)
- Direct reading wavelength (488, 633, 670, 780, 830nm)
- RS-232C interface

### Optional accessories

RS232C cable : KB-RS-OPM



|                               |  |
|-------------------------------|--|
| OPM35S                        |  |
| Display                       | 4-digit digital  |
| Ranges                        | Automatic, 5 ranges  |
| Optical sensor                | Si photodiode (sensor surface area 10x10mm)                    |
| Optical power measuring range | 0.001 $\mu$ W~50.00mW  |
| Optical input type            | Direct to photodiode   |
| Reference wavelengths         | 488nm, 633nm, 670nm, 780nm, 830nm                              |
| Accuracy                      | ±5% (@ reference wavelength of 100 $\mu$ W)                    |
| Resolution                    | W/REL mode : 0.01%   |
| Measuring cycle               | 3.33 times/sec.  |
| Battery                       | 006P type Alkaline battery or AC adapter (AD-30-2)             |
| Size / Mass                   | H164 X W85 X D35mm/300g<br>Sensor head : H126 X W15 X D4mm/40g |
| Standard accessories included | Optical sensor, AC adapter (AD-30-2),<br>Instruction manual    |

Accuracy : 18°C~25°C max. 80% RH no condensation

# Thermo Meter

There are two types of Thermo meters used in general : mercury thermo meter and alcohol thermo meter. For industrial use, an electric thermo meter with separate temperature detection element and display element is often used.

| Sensor Type   | Thermistor type  | Thermocouple  | Resistance thermometer  |
|---------------|--|---|---|
| Feature       | Measurements are made by using changes in electric resistance (inverse proportion). This type is low-priced but not suitable for measurements of high temperature (300 degrees or more). | Measurements are made by using temperature difference of contacts when two types of metal wires are electrically connected. It responds quickly, is easy to be processed and operates easily. | Its element is made from typically platinum, nickel or copper. It is higher accuracy and repeatability. |
| Sanwa Product | Use T-THP.   | Use K-8 series.   | TH3<br>T-300PC (for PC7 series, and PC20)   |

## Thermo Meter (Pocket Size)



### TH3

High accuracy & resolution

- Easy to carry in a shirt pocket
- Sensor probe can be snapped into a fixed position atop the case
- Data hold, Max / Min hold
- Relative value
- Nonslip sensor holder
- Auto power save (30min.)



Pocket size meter but with high accuracy and wide ranges. Sensor / Probes can be all neatly contained and protected within the folding case. Easy to carry in a shirt pocket.



|                               |  |
|-------------------------------|--|
| TH3                           |  |
| Measuring range               | -50.0°C~200.0°C  |
| Resolution                    | 0.1°C  |
| Accuracy                      | ± (0.5%+0.5°C)   |
| Sampling rate                 | Approx. 2 times/sec.   |
| Display                       | 3999   |
| Sensor                        | Platinum foil thermometric resistor (100 $\Omega$ at 0°C)<br>Sheath type Pt 100 $\Omega$ $\phi$ 2 x 64 JIS B class |
| Response                      | Approx. 7 sec. interval<br>(speed of sensor's response to achieve the level of 90%)                                |
| Battery                       | LR44X2   |
| Power consumption             | Approx. 18mW   |
| Accuracy assure temperature   | 23°C±7°C max. 80% RH No condensation   |
| Operating temperature         | 5°C~40°C max. 80% RH No condensation   |
| Storage temperature           | 0°C~50°C max. 80% RH No condensation   |
| Size / Mass                   | H117 X W76 X D18mm/Approx. 120g  |
| Standard accessories included | Instruction manual   |

# Tachometers/Speed Meters

## Thermo&Hygrometer (Analog type)

### TH1



| TH1                           | Measuring range          |
|-------------------------------|--------------------------|
| Temperature(Bimetallic strip) | -30~50°C                 |
| Humidity(Bimetallic strip)    | 35~85%                   |
| Size / Mass                   | H28×W48×D14mm/approx.10g |

### TH10



| TH10                          | Measuring range          |
|-------------------------------|--------------------------|
| Temperature(Bimetallic strip) | -10~40°C                 |
| Humidity(Bimetallic strip)    | 35~85%                   |
| Size / Mass                   | φ115×D37mm / approx.187g |

## Thermo&Hygrometer (Digital type)

### TH20



| TH20                       | Measuring range             |
|----------------------------|-----------------------------|
| Temperature(Thermistor)    | -9.9~50.0°C                 |
| Humidity(Polymer resistor) | 20~95%                      |
| Measurement interval       | Approx.10 sec.              |
| Battery                    | R03/LR3X1                   |
| Size / Mass                | H125×W60×D19mm / approx.80g |

### TH21



| TH21                       | Measuring range               |
|----------------------------|-------------------------------|
| Temperature(Thermistor)    | -10~50.0°C                    |
| Humidity(Polymer resistor) | 20~90%                        |
| Measurement interval       | Approx.10 sec.                |
| Battery                    | R6P/LR6X1                     |
| Size / Mass                | H100×W114×D20mm / approx.135g |

## Tachometer

### SE300

Non-contact type digital tachometer



CE

- Designed for ease of holding to enable stable measurement
- Max/Min value hold
- Auto power off (2min.) (cancelable)
- Fixed installation possible using a commercially available camera tripod
- Contact measurement (optional ENC-3)

DATA HOLD AP OFF MAX MIN AVG BACK LIGHT

| SE300                | Non-contact   | Contact (optional ENC-3) | Best accuracy |
|----------------------|---|--------------------------|---------------|
| rpm                  | 30.0~99999  | 30.0~19999               | ±(0.03%+1)    |
| rps                  | 0.50~1600.0   | 0.50~333.00              |               |
| ms                   | 0.600~1999.0  | 3.000~1999.0             |               |
| count                | 0~99999   | 0~99999                  |               |
| m/min                | -   | 3.0~1999.0               |               |
| m/s                  | -   | 0.05~33.00               |               |
| Detection distance   | Approx. 50~500mm  |                          |               |
| Battery              | R6P/LR6X2   |                          |               |
| Size / Mass          | H210×W60×D55mm/approx. 218g   |                          |               |
| Standard             | Reflective sticker(SE-T3), Carrying case(C-SE300), accessories included |                          |               |
| accessories included | Instruction manual  |                          |               |

### Optional accessories

Reflective sticker(50stickersX2sheets) : SE-T3  
 Contact measurement attachment : ENC-3 (contact adapter, contact marker and rim speed ring)  
 Contact marker : SE-A30  
 Rim speed ring : SE-A31



## Speed Meter

### SE-9000 SE-9000M (with external encoder)

For elevator maintenance, 2ch display

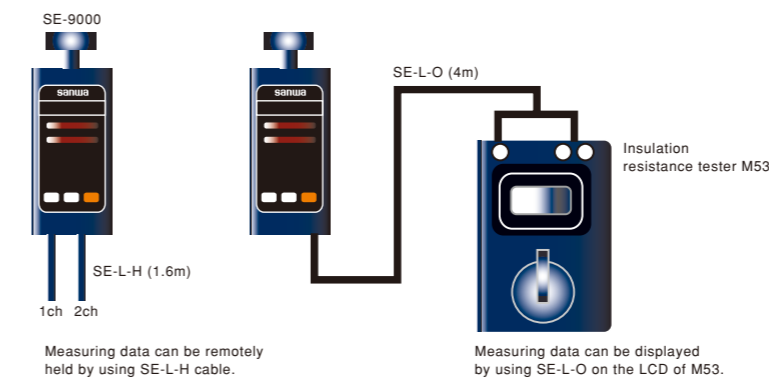


- Suitable for elevator speed measurement of high building
- 2 independent display
- Analog output terminal to record measuring data
- 2 external hold terminals for remote control
- Remote control by external encoder
- Easy to read LED display
- Auto power off
- Low battery power alarm

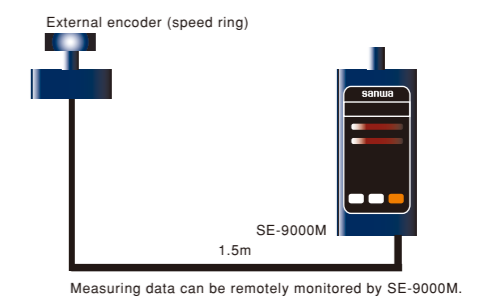
AP OFF DATA HOLD

| SE-9000 / SE-9000M            |  |
|-------------------------------|--|
| Measuring range               | 0~1999.9m/min.<br>4-digit Red LED display (2 ch.) (Max 999.9)<br>(LED at upper left in the display will blink when the measured value exceeds 999.9m/min.)   |
| Measuring time                | 0.2 sec. (sampling time)   |
| Accuracy                      | ±2dgt  |
| Analog output                 | DC0~1999.9mV (at 0m/min.~1999.9m/min.)<br>Analog output accuracy : ± (0.5%±1mV)  |
| Data hold                     | Ch.1, Ch.2 isolated<br>Operation by main switch or external hold switch  |
| Auto power off                | After 3 minutes of no operation except for during measurement  |
| Battery                       | R6P×4 (with battery alarm)   |
| Size / Mass                   | H174×W50×D50MM/Approx. 480g  |
| Standard accessories included | Speed ring thickness 10mm (SE-10)×1<br>Speed ring thickness 0.9mm (SE-0.9)×1<br>Cord for hold input (SE-L-H)×2<br>Cord for analog output (SE-L-O)×1<br>Hex wrench×1, Carrying case (C-SE)×1<br>External encoder (speed ring)×1 (SE-9000M only)<br>Instruction manual |

### Remote control by SE-9000 / SE-9000M



### Remote control by external encoder (SE-9000M only)



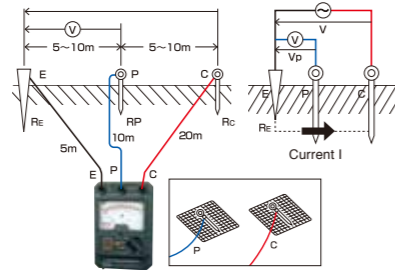
# Earth Tester

## Purpose of earth resistance

When some extraordinary cases occur, fault current and overcurrent may cause damages to equipment or a risk to humans because the equipment is not grounded. To prevent such risks, grounding plays an important role to assure safety. Grounding provides an escape way to electricity from an electric appliance through metal rod driven into the ground. After grounding works are performed to prevent hazards and assure safety, the earth resistance is measured. To measure the earth resistance, two grounding rods are stuck into the ground. Assuming that two rods are E and C, AC current I is applied between E and C. The earth resistance can be measured from the voltage generated between E and C. The relation between the current I and voltage V is expressed as follows. From this the earth resistance can be obtained. However, the earth resistance R

obtained this way includes not only the earth resistance at the grounding electrode E but also the earth resistance at the grounding electrode C. If a third grounding electrode P is provided between the grounding electrodes E and C, the earth resistance RE at the grounding electrode E alone can be obtained from the current I and voltage Vp between E and C.

\* Although the grounding electrode P, too, has a resistance zone, it hardly affects the measurement because the impedance of the power supply of AC constant current is high.



## Arrangement of grounding rods

### Three-electrode method

Arrange the earth E and auxiliary grounding rods P and C in a straight line at intervals of about 5 to 10m.

\* If they cannot be arranged in a straight line because of the presence of an obstacle, arrange E-P and E-C at angles of about 30 degrees or less.

### Two-electrode method

If an earth E whose grounding resistance is known is present nearby, the unknown grounding resistance can be measured by using it. Connect the terminal E of the earth resistance meter and the earth E by a cord. Measurements are taken between E and P / C assuming P and C terminals as one terminal.

\* The indicated value includes the known resistance value of the earth E. Subtract the grounding resistance of E to obtain the true value.

△ Sand, gravel and frozen soil → Expose soil.  
 △ Concrete → Use a net. Flush enough water on the net to let it have a close contact with the ground.  
 × Asphalt → Cannot be measured.

# Detectors

## Voltage Detector



### KD2

- Beeping and LED lighting upon detection
- Switchable to measure cord or bare wire

| KD2                   |   |
|-----------------------|---|
| Measurement           | Voltage Detection                             |
| Voltage range         | AC80 to 600V, 50/60Hz                         |
| Compatible conductor  | Cord and bare wire                            |
| Withstand voltage     | AC2000V for 1 minute<br>Beep sound and LED    |
| Indicator             | Beep: Over 50dB from 50cm away<br>LED: 8000Lx |
| Battery               | Alkaline button cell LR44 (1.5V) X 2          |
| Size / Mass           | H133XW19XD19.5mm/Approx.17g                   |
| Operating temperature | -10°C~45°C                                    |

## 3phase Detector



### KS1

- Phase sequence and open phase check
  - Large size alligator clips
- Safety : IEC61010 CAT. III 600V



| KS1                             |  |
|---------------------------------|--|
| Measurement                     | Open phase and phase sequence  |
| Voltage range                   | 3 phase AC 100V - 600V   |
| Frequency                       | 45Hz~70Hz  |
| Time limit                      | AC110V: Continuous, AC220V: 3 hours, AC480V: 12 minutes                          |
| Fuse                            | 0.2A/250V  |
| Environment condition           | Altitude 2000m or below, pollution degree II                                     |
| Operating temperature /humidity | 0°C~40°C, 80%RH max. no condensation   |
| Size                            | Main unit H102×W78×D32.5mm<br>Alligator clips Approx. 0.8m (Red, White and Blue) |
| Mass                            | Approx.212g (Alligator clips included)   |
| Standard accessories included   | Carrying case (C-KS)×1, Instruction manual                                       |

CE



### KS3

#### Motor rotation direction testable

- Phase sequence and open phase checking of three-phase lines
- Rotation direction check by turning three-phase motor shaft manually
- Bright LED indication

Safety : IEC61010-1 CAT.III 500V, IEC61557-1,7, IEC61010-2-030, IEC61010-031, IEC61326-1

| KS3                           |  |
|-------------------------------|--|
| Measurement                   | Motor rotation direction, open phase and phase sequence                            |
| Voltage range                 | 3 phase, line voltage: AC75~500V (sine wave, continuous)                           |
| Frequency                     | 40Hz~400Hz   |
| Motor rotation direction      | Determined at rotation speeds from 2Hz (2 rotations/sec.) to 400Hz                 |
| Battery                       | 6LR61(9V)×1  |
| Size / Mass                   | H128×W72×D38mm/approx. 210g  |
| Standard accessories included | Alligator clips(CL-KS), Test lead(TL-KS), Instruction manual, Carrying case(C-KS2) |

CE

## Earth Tester



### PDR302

#### Analog type display

- Phase detection system circuit for stable measurement
- Easy self calibration
- AC 30V range to avoid indication errors caused by leak current
- Power saving design with push switch
- Auxiliary grounding value excess indicator lamp



| PDR302                               |   |
|--------------------------------------|---|
| Earth resistance measuring range     | 10/100/1000Ω<br>Accuracy : X1 range ±5% of full scale<br>: X10, X100 range ±2.5% of full scale  |
| ACV(leakage voltage) measuring range | 0~30V<br>Accuracy ±2.5% of full scale   |
| Display                              | Analog  |
| Operation                            | Constant current system (tripolar or bipolar)   |
| Battery                              | R6P(1.5V) X 6   |
| Size / Mass                          | W175×H118×D55mm/Approx. 500g  |
| Standard accessories included        | Measurement cord (TL-66), Clip adapter (CL-302), Earth bars (CL-ER), Carrying case (C-PDR302), Storage case (C-302CB), Instruction manual |

# LCR Meter

## LCR Meter



### LCR700

#### Useful for sorting device value

- Measuring Frequency DC~100kHz
- Ls/Lp/Cs/Cp measurement with sub parameters(D/Q/θ/ESR)
- Automatically selectable L/C/R measurement
- Device sorting mode
- Optical link USB interface (optional)
- Data hold, Back light

Sampling rate : 1.2 times / sec. (LCR mode)  
 0.5 times / sec. (DCR mode)

#### Optional accessories

Optical link cable unit : LCR-USB  
 SMD clip lead : CL-700SMD  
 AC adapter : AD-30-2



| LCR700                        |  | Best accuracy |
|-------------------------------|--|---------------|
| Ls/Lp                         | 20.000 μ / 200.00 μ / 2000.0 μ / 20.000m / 200.00mH<br>2000.0m / 20.000 / 200.00 / 2000.0 / 20.000kH | ±(0.3%+3)     |
| Cs/Cp                         | 200.00p / 2000.0p / 20.000n / 200.00n / 2000.0nF<br>20.000 μ / 200.00 μ / 2000.0 μ / 20.00mF         | ±(0.3%+3)     |
| Rs/Rp                         | 20.000 / 200.00 / 2.0000k / 20.000k Ω<br>200.00k / 2.0000M / 20.000M / 200.0M Ω                      | ±(0.3%+3)     |
| Ω                             | 200.00 / 2.0000k / 20.000k / 200.00k Ω<br>2.0000M / 20.000M / 200.0M Ω                               | ±(0.3%+3)     |
| Battery                       | 6LF22 (9V) X1  |               |
| Size / Mass                   | H184×W87×D45/approx. 400g  |               |
| Standard accessories included | Clip lead (CL-700), Holster (H-701), Instruction manual  |               |

CE

# Assembly Training Kit

# Calibrator

Sanwa assembly training kits have been developed for educational uses. These assembly training kits are available for purchase from our agents only.

## Analog type

### KIT-8D

Learning kit designed for measurement of small capacity electric circuits

- Drop shock proof taut-band meter
- Battery check
- Meter zero adjuster
- Zero Ω adjuster
- Protective body cover



Complete image



| KIT-8D                        | Measuring range                   | Accuracy          |
|-------------------------------|-----------------------------------|-------------------|
| DCV                           | 0.3/3/12/30/120/300/600V (20kΩ/V) | ±3% of full scale |
| ACV                           | 12/30/120/300/600V (9kΩ/V)        | ±4% of full scale |
| DCA                           | 60μ/3m/30m/0.3A                   | ±3% of full scale |
| Resistance                    | 20/200/20kΩ                       | ±3% of arc        |
| Battery check                 | 1.5V                              |                   |
| Bandwidth                     | 50 or 60Hz (sine wave)            |                   |
| Battery                       | UM-3(1.5V)×2                      |                   |
| Fuse                          | φ 5.2×20mm (250V/0.5A)            |                   |
| Size / Mass                   | H159.5×W129×D41.5mm/approx.320g   |                   |
| Standard accessories included | Instruction manuals               |                   |

## Digital type

### PC20TK

General-purpose DMM kit

- 3-3/4 digits 4000 count
- Capacitance measurement (40nF~100μF)
- Data hold / Range hold
- Safety cover for the μA·mA
- Tilt stand
- Optical link RS232C / USB interface(optional)

Display : numeral display 4000  
Sampling rate : 3 times / sec.



Complete image  
※Holster is optional accessory.



| PC20TK                        | Measuring range   | Best accuracy   | Resolution | Input impedance |
|-------------------------------|---|-----------------|------------|-----------------|
| DCV                           | 400m/4/40/400/750V  | ±(1.0%rdg+2dgt) | 0.1mV      | DCV:            |
| ACV                           | 4/40/400/750V   | ±(1.5%rdg+5dgt) | 0.001V     | 10M~            |
| DCA                           | 400μ/4000μ/40m/400m   | ±(1.5%rdg+2dgt) | 0.1μA      | 100MΩ           |
| ACA                           | 400μ/4000μ/40m/400m   | ±(2.0%rdg+5dgt) | 0.1μA      | ACV:10M         |
| Resistance                    | 400/4k/40k/400k/4M/40M  | ±(1.5%rdg+5dgt) | 0.1Ω       |                 |
| Capacitance                   | 40n/400n/4μ/40μ/100μF   | ±(7%rdg+6dgt)   | 0.01nF     |                 |
| Continuity                    | Buzzer sounds at between 10Ω and 120Ω. Open voltage: approx. 0.4V |                 |            |                 |
| Diode test                    | Open voltage: approx. 1.5V  |                 |            |                 |
| Bandwidth                     | 40~400Hz (sine wave)  |                 |            |                 |
| Fuse / Battery                | 0.5A/250V IR300A φ6.3×30mm R6×2                                   |                 |            |                 |
| Size / Mass                   | H158×W70×D41mm/230g   |                 |            |                 |
| Standard accessories included | Test lead (TL-21a), Instruction manual                            |                 |            |                 |

#### Optional accessories

Software : PC Link7 Optical PC Link cable : KB-USB20  
Clamp probe : CL-20D, CL-22AD, CL33DC  
Temperature probe : T-300PC(PC Link software is necessary.)  
Clip adapter : CL-11, CL-13a, CL-15a, CL-DG3a, TL-8IC  
Holster : H-70

## Calibrator

### STD5000M (Order production)



#### Overview

The STD5000M is a calibrator with soft touch buttons that can generate a desired DC voltage / current, AC voltage / current, resistance, frequency, etc. with a high degree of accuracy and stability.

The STD5000M is with a memory function allowing a broad range of uses for the device.

#### Ranges

- Voltage(DC-AC) : 0~1000V(6 ranges)
- Current(DC-AC) : 0~2000mA(6 ranges)
- Resistance1 : 0~500kΩ (10Ω steps)
- Resistance2 : 24 steps fixed resistance value(4 kinds 6 ranges)
- Hz : 40Hz~999kHz(5 ranges)
















#### Features











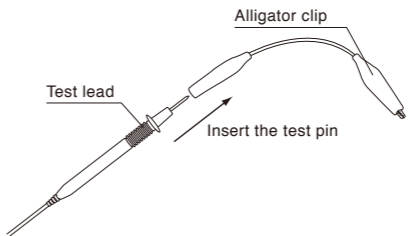




- High accuracy 0.03% (DCV DC mA)**  
Reliable accuracy is achieved by using the standard voltage IC with a constant-temperature bath for the reference voltage and wire wound resistor and metal film resistor with high tolerance and low temperature coefficient for the resistance element.
- Calibrates 6 types of functions**  
With the calibration elements of 6 functions(DCV, ACV, DCA, ACA, OHM, Hz) incorporated, it can be used for calibrating and maintaining the DMM, DPM (digital power meter), circuit tester and industrial instruments.
- Installs 90 (6x15) output memories**  
With 90 (6x15) output memories installed, it is possible to save desired setting.
- User-friendly speedy operability**  
Use of soft-touch push button switches for operation on the panel(except the power switch). Use of semiconductor switches with greater heat resistance and durability for change switches of the circuit, and latch-type relays requiring less electro motive force.
- With overload protection device**  
To enhance security, overload protection in case of low voltage and current generation is performed on the semiconductor circuit, and overload protection in case of medium and high voltage generation(50V or more) is achieved by releasing the output terminal and circuit.

| STD5000M | Measuring range | Generation range   | Resolution | Set accuracy   | Maximum load                  |
|----------|-----------------|--------------------|------------|----------------|-------------------------------|
| DCV      | 50mV            | 0~50mV             | 1μV        | ±(0.05%+30μV)  | 10mA                          |
|          | 500mV           | 0~500mV            | 10μV       | ±(0.03%+30μV)  |                               |
|          | 5V              | 0~5V               | 100μV      | ±(0.03%+200μV) |                               |
|          | 50V             | 0~50V              | 1mV        | ±(0.03%+2mV)   |                               |
|          | 500V            | 0~500V             | 10mV       | ±(0.03%+20mV)  |                               |
|          | 1000V           | 0~1000V            | 100mV      | ±(0.05%+0.3V)  |                               |
| ACV      | 50mV            | 0~50mV             | 1μV        | ±(0.1%+50μV)   | 10mA                          |
|          | 500mV           | 0~500mV            | 10μV       | ±(0.06%+100μV) |                               |
|          | 5V              | 0~5V               | 100μV      | ±(0.06%+0.4mV) |                               |
|          | 50V             | 0~50V              | 1mV        | ±(0.06%+4mV)   |                               |
|          | 500V            | 0~500V             | 10mV       | ±(0.06%+40mV)  |                               |
|          | 1000V           | 0~1000V            | 100mV      | ±(0.1%+0.4V)   |                               |
| DCA      | 50μA            | 0~50μA             | 1nA        | ±(0.05%+30nA)  | 13V<br>(Open circuit voltage) |
|          | 500μA           | 0~500μA            | 10nA       | ±(0.05%+30nA)  |                               |
|          | 5mA             | 0~5mA              | 100nA      | ±(0.05%+0.2μA) |                               |
|          | 50mA            | 0~50mA             | 1μA        | ±(0.05%+2μA)   |                               |
|          | 500mA           | 0~500mA            | 10μA       | ±(0.05%+20μA)  |                               |
|          | 2000mA          | 0~2000mA           | 100μA      | ±(0.1%+300μA)  |                               |
| ACA      | 50μA            | 0~50μA             | 1nA        | ±(0.12%+60nA)  | 13V<br>(Open circuit voltage) |
|          | 500μA           | 0~500μA            | 10nA       | ±(0.12%+80nA)  |                               |
|          | 5mA             | 0~5mA              | 100nA      | ±(0.1%+0.5μA)  |                               |
|          | 50mA            | 0~50mA             | 1μA        | ±(0.1%+5μA)    |                               |
|          | 500mA           | 0~500mA            | 10μA       | ±(0.1%+50μA)   |                               |
|          | 2000mA          | 0~2000mA           | 100μA      | ±(0.15%+0.5mA) |                               |
| OHM1     | —               | 0~500kΩ            | 10Ω        | —              | —                             |
|          | 40~99.9Hz       | 0.1Hz              | —          | ±(0.1%+0.1Hz)  |                               |
|          | 40~999Hz        | 1Hz                | —          | ±(0.1%+1Hz)    |                               |
|          | 40~9.99kHz      | 10Hz               | —          | ±(0.1%+10Hz)   |                               |
|          | 100~99.9kHz     | 100Hz              | —          | ±(0.1%+100Hz)  |                               |
|          | 1k~999kHz       | 1kHz(Regular wave) | —          | ±(0.1%+1kHz)   |                               |
| 0~7V     | 0.1V            | —                  | ±(2%+0.2V) |                |                               |

| STD5000M         | Measuring range              | Accuracy       |
|------------------|------------------------------|----------------|
| OHM2             | 160/260/360/460Ω             | ±(0.05%+0.1Ω)  |
|                  | 1.6k/2.6k/3.6k/4.6kΩ         | ±(0.05%)       |
|                  | 16k/26k/36k/46kΩ             | ±(0.05%)       |
|                  | 160k/260k/360k/460kΩ         | ±(0.05%)       |
|                  | 1.600k/2.600k/3.600k/4.600kΩ | ±(0.05%~0.08%) |
| 16M/26M/36M/46MΩ | ±(0.05%~0.2%)                |                |
| Memory           | 6×15(90)                     |                |

|                               |  |
|-------------------------------|--|
| 50mV adjust digit             | 4-1/2 digit(except for 1000V, 2000mA, OHM2)  |
| Max. display                  | 50099  |
| Output adjust                 | LOCAL(surface panel)   |
| Operating range               | 23°C±3°C below 70%RH   |
| Preheating time               | 30~60m.  |
| Power supply                  | AC100V±10%, 50Hz, 60Hz   |
| Power consumption             | 30VA   |
| Protection                    | DC and 50 V or higher AC ranges: Overload protection device with reset switch. DC and 5 V or lower AC ranges: Overload protection circuitry. |
| Size / Mass                   | H180×W480×D580mm/25kg  |
| Standard accessories included | Instruction manual   |

|  |  |   |
|--|--|---|
| <p><b>Test lead</b></p> <p><b>TL-11Ta</b></p>  <p>Length 0.56m<br/>Applicable model See P.49</p>  | <p><b>TL-21a</b></p>  <p>IEC61010<br/>CAT.III 600V<br/>CAT.III1000V<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a, CL-DG3a<br/>TL-9IC, TL-A7M, TL-A7M2</p>            | <p><b>TL-21M</b></p>  <p>φ 0.7mm shape-memory alloy test pin<br/>Exchangeable φ 2mm pin<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a<br/>CL-DG3a, TL-9IC</p>  |
| <p><b>TL-23a</b></p>  <p>IEC61010-031<br/>CAT.III1000V<br/>CAT.III600V<br/>10A<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a, CL-DG3a<br/>TL-9IC, TL-A7M, TL-A7M2</p> | <p><b>TL-25a</b></p>  <p>IEC61010-031<br/>CAT.III1000V<br/>CAT.III600V<br/>20A<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a, CL-DG3a<br/>TL-9IC, TL-A7M, TL-A7M2</p> | <p><b>TL-29</b></p>  <p>IEC61010<br/>CAT.IV1000V<br/>Length 1m<br/>Applicable model See P.49</p>   |
| <p><b>TL-61</b><br/><b>TL-91</b></p>  <p>Length 0.9m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a, CL-DG3a, TL-9IC</p>  | <p><b>TL-61Ta</b><br/><b>TL-61Tb</b><br/><b>TL-61Tc</b></p>  <p>Length 0.85m<br/>Applicable model See P.49</p>   | <p><b>TL-91M</b></p>  <p>φ 0.7mm shape-memory alloy test pin<br/>Exchangeable φ 2mm pin<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-14, CL-15a<br/>CL-DG3a, TL-9IC</p> |
| <p><b>TL-112a</b></p>  <p>IEC61010-031<br/>CAT.III1000V<br/>CAT.IV600V 10A<br/>Length 1m<br/>Applicable model See P.49<br/>Adapter<br/>CL-16</p>  | <p><b>TL-508Sa</b></p>  <p>IEC61010<br/>CAT.III600V<br/>Length 1m<br/>Applicable model See P.49</p>   | <p><b>TLF-120</b></p>  <p>IEC61010<br/>CAT.III600V<br/>Built-in fuse<br/>500mA/1000V 30kA<br/>φ 6.35X32mm<br/>Length 1.4m<br/>Applicable model See P.49</p>                              |
| <p><b>TL-M54</b></p>  <p>Length 1m<br/>Applicable model See P.49</p>  | <p><b>TL-PM3</b></p>  <p>Length 0.55m<br/>Applicable model See P.49</p>   | <p><b>TL-36</b></p>  <p>IEC61010 CAT.IV600V<br/>Length 1.5m<br/>Applicable model KP1</p>   |

|  |  |   |
|--|--|---|
| <p><b>HV probe</b></p> <p><b>HV-10 / HV-20</b></p>  <p>480MΩ resistor measurement for 0~30kV or 25kV<br/>Length 1m<br/>Applicable model See P.50</p>                          | <p><b>HV-50 / HV-60</b></p>  <p>1000MΩ resistor measurement for 0~30kV or 25kV<br/>Length 1.2m<br/>Applicable model See P.50</p>  | <p><b>Adapter</b></p> <p><b>CL-13a</b></p>  <p>IEC61010 CAT.III 1000V<br/>Alligator clip<br/>(use with test leads by inserting pins into socket)<br/>Length 70mm<br/>Applicable model See P.50</p> |
| <p><b>CL-14</b></p>  <p>Alligator clip<br/>(use with test leads by inserting pins into socket)<br/>Length 0.23m<br/>Applicable model See P.50</p>                             | <p><b>CL-15a</b></p>  <p>IEC61010<br/>CAT.III1000V<br/>Alligator clip<br/>(use with test leads by inserting pins into socket)<br/>Length 0.2m<br/>Applicable model See P.50</p> | <p><b>CL-16</b></p>  <p>Alligator clip<br/>(use with test leads by inserting pins into socket)<br/>Length 70mm<br/>Applicable model MG500<br/>MG1000</p>   |
| <p><b>CL-DG3a</b></p>  <p>IEC61010 CAT.III600V<br/>Alligator clip<br/>(use with test leads by inserting pins into socket)<br/>Length 0.33m<br/>Applicable model See P.50</p> | <p><b>TL-9IC</b></p>  <p>IC clip<br/>(use with test leads by inserting pins into socket)<br/>Length 0.2m<br/>Applicable model See P.50</p>                                     | <p><b>TL-A7M</b></p>  <p>φ 0.7mm shape-memory alloy test pin<br/>Exchangeable φ 2mm pin (optional)<br/>Length 231mm<br/>Applicable model See P.50</p>   |
| <p><b>TL-A7M2</b></p>  <p>φ 0.7mm shape-memory alloy test pin<br/>Exchangeable φ 2mm pin (optional)<br/>Length 57mm<br/>Applicable model See P.50</p>                       | <p><b>How to use :</b><br/><b>CL-13a, CL-14, CL-15a, CL-16, CL-DG3a, TL-9IC TL-A7M, TL-A7M2</b></p>   | <p><b>CL-561</b></p>  <p>Length 0.13m<br/>Applicable model HG561H</p>  |
| <p><b>TL-A01</b></p>  <p>IEC61010 CAT.IV600V<br/>Length 51mm<br/>Applicable model KP1</p>   | <p><b>Clip lead</b></p> <p><b>CL-700</b></p>  <p>Length 0.16m<br/>Applicable model HG561H</p>   | <p><b>CL-700SMD</b></p>  <p>Length 0.55m<br/>Applicable model HG561H</p>   |



|  |  |   |  |  |   |
|--|--|---|--|--|---|
| <p><b>Clip lead for hFE measurement</b> </p> <p><b>CL-506a</b></p>  <p>Length 0.3m<br/>Applicable model<br/>See P.50</p>                                   | <p><b>HFE probe</b></p> <p><b>HFE-6T</b></p>  <p>hFE 0 ~ 1000<br/>Length 0.3m<br/>Applicable model<br/>See P.50</p>   | <p><b>Test probe</b> </p> <p><b>TL-35</b></p>  <p>IEC61010 CAT.IV600V<br/>Length 0.11m<br/>Applicable model<br/>KP1</p>   | <p><b>Temperature sensor</b></p> <p><b>K-8-250</b></p>  <p>-50°C~250°C<br/>Surface shape thermocouple K type<br/>Sensor : 15 × 16mm<br/>Length 1m<br/>Applicable model<br/>See P.51</p> | <p><b>K-8-300</b></p>  <p>-50°C~300°C<br/>Sheath shape thermocouple K type<br/>Sensor : φ 3.1 × 150mm<br/>Length 1.2m<br/>Applicable model<br/>See P.51</p>                                 | <p><b>K-8-500</b></p>  <p>-50°C~500°C<br/>Surface shape thermocouple K type<br/>Sensor : 15 × 16mm<br/>Length 1m<br/>Applicable model<br/>See P.51</p>                 |
| <p><b>TL-561</b></p>  <p>Length 0.11m<br/>Applicable model<br/>HG561H</p>   | <p><b>AC adapter</b> </p> <p><b>AD-30-2</b></p>  <p>Length 2.1m<br/>Applicable model<br/>LCR700, OPM-360,<br/>OPM37LAN, OPM35S</p> | <p><b>AD-71AC (100V)<br/>AD-72AC (220V)</b> </p>  <p>Length 1.9m<br/>Applicable model<br/>PC20</p>                        | <p><b>K-8-650</b></p>  <p>-50°C~650°C<br/>flexible thermocouple K type<br/>Sensor : φ 1 × 300mm<br/>Length 1.4m<br/>Applicable model<br/>See P.51</p>                                   | <p><b>K-8-800</b></p>  <p>-50°C~800°C<br/>Sheath shape thermocouple K type<br/>Sensor : φ 3.1 × 150mm<br/>Length 1.2m<br/>Applicable model<br/>See P.51</p>                                 | <p><b>To use K-8 series,<br/>K-AD adaptor is required.</b></p>  <p>K-AD (optional)</p> <p>K type temperature probe<br/>with international<br/>miniature connector</p> |
| <p><b>Optical link</b> </p> <p><b>KB-USB20</b></p>  <p>Optical link USB<br/>PC connection cable<br/>Length 1.3m<br/>Applicable model<br/>PC20, PC20TK</p> | <p><b>KB-USB7</b> </p>  <p>Optical link USB<br/>PC connection cable<br/>Length 1.3m<br/>Applicable model<br/>See P.51</p>         | <p><b>KB-USB773</b> </p>  <p>Optical link USB<br/>PC connection cable<br/>Length 1.3m<br/>Applicable model<br/>PC773</p> | <p><b>Notice :</b><br/>RD700 / 701 and CD772 can only<br/>measure -20°C~300°C (max) regardless<br/>of the specification of temperature probe.<br/>Accuracy of K-8-XXX<br/>-40°C~330°C : ±2.5°C<br/>330°C~1200°C : ±0.75% of measured<br/>temperature</p>                   | <p><b>K-AD</b></p>  <p>Thermocouple K type adaptor<br/>for connecting to K-8-250~K-8-800<br/>Length 50mm<br/>Applicable model<br/>PC7000, PC720M, PC710, PC20, CD772,<br/>RD700, RD701</p> | <p>K-AD (optional)</p>  <p>K type temperature probe<br/>with international<br/>miniature connector</p>  |
| <p><b>LCR-USB</b><br/>(with LCR Link Software)</p>  <p>Optical link USB<br/>PC connection cable<br/>Length 1.3m<br/>Applicable model<br/>LCR700</p>   | <p><b>PC Link</b></p> <p><b>PC Link 7</b></p>  <p>CD-ROM<br/>Applicable model<br/>PC7000, PC720M,<br/>PC710, PC700, PC773<br/>PC20, PC20TK</p>  | <p><b>PC Communication Set</b></p> <p><b>G: KB-USB773+PC Link7</b><br/>Applicable model<br/>PC773<br/><b>H: KB-USB7+PC Link7</b><br/>Applicable model<br/>PC7000, PC720M, PC710, PC700<br/><b>I: KB-USB20+PC Link7</b><br/>Applicable model<br/>PC20, PC20TK</p>                                | <p><b>Carrying case</b></p> <p><b>C-08S</b></p>  <p>160 × 144 × 54mm<br/>Applicable model<br/>PDM1529S, PDM5219S,<br/>DM1008S, DM508S,<br/>PDM508S</p>                                | <p><b>C-77</b></p>  <p>Soft case<br/>195 × 130 × 75mm<br/>Applicable model<br/>PC773, CD770,<br/>CD771, CD772</p>   | <p><b>C-77H</b></p>  <p>190 × 140 × 70mm<br/>Applicable model<br/>PC773, CD770<br/>CD771, CD772</p>  |
| <p><b>Temperature sensor</b></p> <p><b>T-THP</b></p>  <p>-20°C~200°C<br/>Thermistor probe<br/>Sensor : φ 2.5 × 31mm<br/>Length 0.9m<br/>Applicable model<br/>See P.51</p>   | <p><b>T-300PC</b></p>  <p>-50°C~300°C<br/>Platinic thin film<br/>Sensor : φ 3.2 × 135mm<br/>Length 2.2m<br/>Accuracy : ± 1.9°C<br/>Applicable model<br/>See P.51</p>  | <p><b>K-250CD<br/>K-250PC</b></p>  <p>-50°C~250°C<br/>Linear thermocouple K type<br/>Length 1m<br/>Applicable model<br/>See P.51</p>   | <p><b>C-CA</b></p>  <p>180 × 150 × 50mm<br/>Applicable model<br/>CX506a, EM7000</p>   | <p><b>C-CD</b></p>  <p>190 × 145 × 70mm<br/>Applicable model<br/>RD700, RD701</p>   | <p><b>C-CL</b></p>  <p>Soft case<br/>190 × 90 × 45mm<br/>Applicable model<br/>DCM-22AD,<br/>CL33DC, CL-22AD</p>  |

**Carrying case****C-CL3000**

220 × 180 × 65mm  
Applicable model  
DCL3000R, CL3000

**C-DG3a**

Soft case  
with magnet sheets  
150 × 90 × 45mm  
Applicable model  
HG561H, DG34a, DG35a  
DG36a, KP1, PM33a

**C-M53**

Soft case  
130 × 190 × 70mm  
Applicable model  
M53

**C-PC7**

205 × 140 × 80mm  
Applicable model  
PC7000, PC720M,  
PC710, PC700,  
LCR700

**C-PC10/S**

240 × 155 × 65mm  
Applicable model  
PC20, CD732

**C-PM3**

119 × 78 × 16mm  
Applicable model  
PM3

**C-SP**

Soft case  
165 × 140 × 50mm  
Applicable model  
PC20, CD732,  
AU-32, AU-31  
SP21, SP20, TA55

**C-SPH**

160 × 150 × 55mm  
Applicable model  
SP21, SP20, TA55

**C-YS**

160 × 140 × 40mm  
Applicable model  
YX-361TR

**Holster****H-50**

Applicable model  
RD700, RD701

**H-70**

Applicable model  
PC20, CD732

**H-700**

Applicable model  
PC7000, PC720M  
PC710, PC700

**Accessory mapping**

| Model              | TEST LEAD |        |        |        |        |       |       |        |         |       |       |        |         |          |        |           |        |         |
|--------------------|-----------|--------|--------|--------|--------|-------|-------|--------|---------|-------|-------|--------|---------|----------|--------|-----------|--------|---------|
|                    | TL-11Ta   | TL-21a | TL-21M | TL-23a | TL-25a | TL-29 | TL-61 | TL-61T | TL-82   | TL-84 | TL-91 | TL-91M | TL-112a | TL-508Sa | TL-M54 | TL-100-OM | TL-PM3 | TLF-120 |
| Digital Multimeter | CD731a    | -      | ○      | ●      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | CD732     | -      | ●      | ●      | ●      | ○     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | CD770     | -      | ○      | ●      | ●      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | CD771     | -      | ●      | ●      | ○      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | CD772     | -      | -      | -      | -      | ○     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | CD800a    | -      | -      | -      | -      | -     | -     | -      | TL-61Ta | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | DA-50C    | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | -      | ●       |
|                    | PC20      | -      | ○      | ●      | ●      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC500a    | -      | ●      | ●      | ○      | ●     | -     | -      | -       | ●     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC5000a   | -      | ●      | ●      | ○      | ●     | -     | -      | -       | ●     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC510a    | -      | ●      | ●      | ○      | ●     | -     | -      | -       | ●     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC520M    | -      | ●      | ●      | ●      | ●     | -     | -      | -       | ○     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC700     | -      | ●      | ●      | ○      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC7000    | -      | ●      | ●      | ○      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
|                    | PC710     | -      | ●      | ●      | ○      | ●     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | -      | ●       |
| PC720M             | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PC773              | -         | ●      | ●      | ●      | ○      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PM3                | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ○      |         |
| PM33a              | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PM7a/PS8a          | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PM11               | ○         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| RD700/701          | -         | ●      | ●      | ○      | ●      | -     | -     | -      | ●       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| CAM600S            | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCL11R/31DR        | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCL1000/1200R      | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCL3000R           | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM-22AD           | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| DCM2000            | -         | ●      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM2000AD/R        | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM2000DR          | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM400/AD          | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM60L             | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM60R             | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM600DR           | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DCM660R            | -         | -      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DLC-330L           | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DLC-400A           | -         | ●      | ●      | ●      | ●      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| DLC460F            | -         | ●      | ●      | ○      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DG6/7/8/9/10       | ○         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DG251/525          | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | ○         | ●      |         |
| DM1008S            | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DM1528S            | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | ○         | ●      |         |
| DM5218S            | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| DM508S/PDM508S     | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PDM1529S           | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| PDM5219S           | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| HG561H             | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| M53                | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | ○         | ●      |         |
| MG1000             | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| MG500/125          | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| AP33               | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| AU-31/32           | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| CP-7D              | -         | -      | -      | -      | -      | -     | -     | -      | -       | ○     | -     | -      | -       | -        | -      | -         | ●      |         |
| CX506a             | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| EM7000             | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| SH-88TR            | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| SP-18D             | -         | -      | -      | -      | -      | -     | -     | -      | TL-61Tc | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| SP20               | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| SP21               | -         | ○      | ●      | ●      | ●      | -     | -     | -      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |
| TA55               | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | ○     | ●      | -       | -        | -      | -         | ●      |         |
| VS-100             | -         | -      | -      | -      | -      | -     | -     | -      | -       | -     | -     | -      | -       | -        | -      | -         | ○      |         |
| YX360TRF           | -         | -      | -      | -      | -      | -     | -     | -      | TL-61Tb | -     | -     | -      | -       | -        | -      | -         | ●      |         |
| YX-361TR           | -         | -      | -      | -      | -      | -     | -     | ○      | -       | -     | ●     | ●      | -       | -        | -      | -         | ●      |         |

● Optional ○ Standard



## Clamp Meter comparative chart

| Display Type        | AC                      | AC                                    | AC <sup>New</sup> | AC                | AC                          | AC          | AC           |
|---------------------|-------------------------|---------------------------------------|-------------------|-------------------|-----------------------------|-------------|--------------|
| Model               | DCL1200R                | DCL1000                               | DCL11R            | DCL3000R          | DCM660R                     | DCM60L      | DCM60R       |
| Digit               | 6000                    | 4000                                  | 6000              | 3150              | 6600                        | 1999        | 1999         |
| Category            | CAT.III 600V            | CAT.III 600V                          | CAT.III300V       | CAT.IV 600V       | CAT.III 600V                | CAT.III300V | CAT.III300V  |
| CE                  | ●                       | ●                                     | ●                 | ●                 | ●                           | ●           | ●            |
| Clamp diameter (mm) | 42                      | 42                                    | 22                | 150               | 30                          | 25          | 25           |
| Range               | A/M                     | A/M                                   | A                 | M                 | A                           | A           | A            |
| DCA (A)             | -                       | -                                     | -                 | -                 | -                           | -           | -            |
| ACA (A)             | 400<br>1200             | 400<br>1000                           | 60<br>300         | 30<br>300<br>3000 | 66<br>600                   | 200<br>600  | 199.9<br>600 |
| DCV (V)             | 6<br>60<br>600          | 400m<br>4<br>40                       | -                 | -                 | 600                         | -           | -            |
| ACV (V)             | 6<br>60<br>600          | 400m<br>4<br>40<br>600                | -                 | -                 | 600                         | 200<br>600  | 199.9<br>600 |
| Resistance (Ω)      | 6k<br>60k<br>600k<br>6M | 400<br>4k<br>40k<br>400k<br>4M<br>40M | -                 | -                 | 660                         | 200         | 199.9        |
| Frequency (Hz)      | 9.999                   | -                                     | -                 | -                 | 660~6.6k<br>(when clamping) | -           | -            |
| Backlight           | ●                       | -                                     | ●                 | ●                 | ●                           | -           | -            |
| True RMS            | ●                       | -                                     | ●                 | ●                 | ●                           | -           | ●            |
| Auto power save     | ●                       | ●                                     | ●                 | ●                 | ●                           | -           | -            |
| Peak hold           | -                       | -                                     | -                 | -                 | INRUSH                      | -           | -            |
| Data hold           | ●                       | ●                                     | ●                 | ●                 | ●                           | ●           | ●            |
| Range hold          | ●                       | -                                     | -                 | -                 | -                           | -           | -            |
| EF (NCV)            | ●                       | -                                     | -                 | -                 | -                           | -           | -            |
| LPF                 | -                       | -                                     | -                 | -                 | -                           | -           | -            |
| Bargraph            | -                       | -                                     | -                 | -                 | -                           | -           | ●            |
| Continuity          | BUZZER                  | BUZZER                                | -                 | -                 | BUZZER                      | BUZZER      | BUZZER       |
| Dimension (H) mm    | 238                     | 238                                   | 145               | 120               | 208                         | 187         | 187          |
| Dimension (W) mm    | 95                      | 95                                    | 54                | 70                | 69                          | 50          | 50           |
| Dimension (D) mm    | 45                      | 45                                    | 31                | 26                | 38                          | 29          | 29           |
| Mass (g)            | 290                     | 290                                   | 120               | 300               | 265                         | 210         | 210          |

## Clamp Meter comparative chart

| Display Type        | AC                       | AC (Analog)       | DC/AC       | DC/AC       | DC/AC                      | DC/AC                                 | DC/AC <sup>New</sup> | LEAK                     |
|---------------------|--------------------------|-------------------|-------------|-------------|----------------------------|---------------------------------------|----------------------|--------------------------|
| Model               | DCM400                   | CAM600S           | DCM600DR    | DCM400AD    | DCM-22AD                   | DCM2000DR                             | DCL31DR              | DLC460F                  |
| Digit               | 4000                     | -                 | 6000        | 4000        | 1999                       | 6000                                  | 6000                 | 6000/9999                |
| Category            | CAT. III300V             | -                 | CAT.III600V | CAT.III300V | -                          | CAT.IV 1000V                          | CAT.III300V          | CAT.III600V              |
| CE                  | ●                        | -                 | ●           | ●           | -                          | ●                                     | ●                    | ●                        |
| Clamp diameter (mm) | 25                       | 36                | 30          | 25          | 23                         | 55                                    | 25                   | 35                       |
| Range               | A                        | M                 | A           | A           | M                          | A/M                                   | A                    | A                        |
| DCA (A)             | -                        | -                 | 60<br>600   | 40<br>400   | 20<br>200                  | 200<br>2000                           | 60<br>400            | -                        |
| ACA (A)             | 40<br>400                | 6<br>15<br>60     | 60<br>600   | 40<br>400   | 2<br>20                    | 200<br>2000                           | 60<br>400            | 60m<br>600m<br>60<br>400 |
| DCV (V)             | 400<br>600               | 60                | 600         | 400         | 2<br>20                    | 6<br>60                               | -                    | 600                      |
| ACV (V)             | 400<br>600               | 150<br>300<br>600 | 600         | 400         | 2<br>20                    | 6<br>60                               | -                    | 600                      |
| Resistance (Ω)      | 400                      | 1k<br>100k        | 999.9       | 400         | 2k<br>20k<br>200k<br>2000k | 600<br>6k<br>60k<br>600k<br>6M<br>40M | -                    | 999.9                    |
| Frequency (Hz)      | 20~4k<br>(when clamping) | -                 | -           | -           | -                          | 10~1999                               | -                    | -                        |
| Backlight           | -                        | -                 | ●           | -           | -                          | ●                                     | ●                    | ●                        |
| True RMS            | -                        | -                 | ●           | -           | -                          | ●                                     | ●                    | -                        |
| Auto power save     | ●                        | -                 | ●           | ●           | -                          | ●                                     | ●                    | ●                        |
| Peak hold           | -                        | -                 | ●           | -           | -                          | ●                                     | ●                    | -                        |
| Data hold           | ●                        | POINTER LOCK      | ●           | ●           | ●                          | ●                                     | ●                    | ●                        |
| Range hold          | -                        | -                 | -           | ●           | -                          | ●                                     | -                    | -                        |
| EF (NCV)            | -                        | -                 | -           | -           | -                          | -                                     | -                    | -                        |
| LPF                 | -                        | -                 | -           | -           | -                          | ●                                     | -                    | ●                        |
| Bargraph            | ●                        | -                 | -           | ●           | -                          | -                                     | -                    | -                        |
| Continuity          | BUZZER                   | -                 | BUZZER      | BUZZER      | BUZZER                     | BUZZER                                | -                    | BUZZER                   |
| Dimension (H) mm    | 193                      | 221               | 208         | 193         | 179                        | 264                                   | 145                  | 206                      |
| Dimension (W) mm    | 50                       | 97                | 69          | 50          | 56                         | 97                                    | 54                   | 83                       |
| Dimension (D) mm    | 28                       | 43                | 38          | 28          | 26.5                       | 43                                    | 31                   | 38                       |
| Mass (g)            | 230                      | 420               | 260         | 230         | 140                        | 640                                   | 120                  | 320                      |

## Insulation Resistance Tester comparative chart

| Display Type  | DIGITAL                                    |   |                        |   |
|---|--|---|------------------------|---|
| Model   | MG1000                                     | MG500                                     | M53                    | HG561H  |
| Category  | CAT.III600V                                | CAT.III600V                               | -                      | CAT.III600V                                     |
| CE  | ●  | ●   | -                      | ●   |
| Test voltage range  | 3  | 3   | 2                      | 7   |
| Insulation resistance<br>(Test voltage/<br>Maximum scale value) | 1000V/4000MΩ<br>500V/4000MΩ<br>250V/4000MΩ | 500V/4000MΩ<br>250V/4000MΩ<br>125V/4000MΩ | 500V/200MΩ<br>15V/20MΩ | 15V/25V/50V/12.MΩ<br>100vV/125V/250V/500V/110MΩ |
| ACV (V)   | 600  | 600                                       | 750                    | 600   |
| DCV (V)   | 600  | 600                                       | 750                    | 600   |
| Resistance  | 400/4000                                   | 400/4000                                  | -                      | 999.9/99.99k/999.9k                             |
| Discharge   | ●  | ●   | -                      | ●   |
| Backlight   | ●  | ●   | -                      | ●   |
| Inner battery check   | ●  | ●   | -                      | ●   |
| Data hold   | ●  | ●   | -                      | ●   |
| Auto power save   | ●  | ●   | ●                      | ●   |
| Dimension (H) mm  | 170  | 170                                       | 175                    | 139   |
| Dimension (W) mm  | 142  | 142                                       | 115                    | 91  |
| Dimension (D) mm  | 57   | 57  | 55                     | 29  |
| Mass (g)  | 600  | 600                                       | 600                    | 230   |

| Display Type  | ANALOG                                   |  |   |   |                                  |                  |                 |
|---|--|--|---|---|----------------------------------|------------------|-----------------|
| Model   | PDM1529S                                 | PDM5219S                               | DM1528S                                   | DM5218S                                 | DM1008S                          | DM508S           | PDM508S         |
| Category  | CAT.III600V                              | CAT.III600V                            | CAT.III600V                               | CAT.III600V                             | -                                | -                | -               |
| CE  | ●  | ●                                      | ●   | ●                                       | -                                | -                | -               |
| Test voltage range  | 3  | 3                                      | 3   | 3                                       | 1                                | 1                | 1               |
| Insulation resistance<br>(Test voltage/<br>Maximum scale value) | 1000V/2000MΩ<br>500V/100MΩ<br>250V/100MΩ | 500V/100MΩ<br>250V/100MΩ<br>125V/100MΩ | 1000V/2000MΩ<br>500V/1000MΩ<br>250V/500MΩ | 500V/1000MΩ<br>250V/500MΩ<br>125V/200MΩ | 1000V/2000MΩ<br>500V/1000MΩ<br>- | 500V/1000MΩ<br>- | 500V/100MΩ<br>- |
| ACV (V)   | 600                                      | 600                                    | 600                                       | 600                                     | 600                              | 600              | 600             |
| DCV (V)   | 60                                       | 60                                     | 60  | 60                                      | 60                               | 60               | 60              |
| Discharge   | ●  | ●                                      | ●   | ●                                       | ●                                | ●                | ●               |
| Backlight   | -  | -                                      | -   | -                                       | -                                | -                | -               |
| Inner battery check   | ●  | ●                                      | ●   | ●                                       | ●                                | ●                | ●               |
| Meter structure   | BAND                                     | BAND                                   | BAND                                      | BAND                                    | BAND                             | BAND             | BAND            |
| Data hold   | -  | -                                      | -   | -                                       | -                                | -                | -               |
| Auto power save   | -  | -                                      | -   | -                                       | -                                | -                | -               |
| Dimension (H) mm  | 144                                      | 144                                    | 144                                       | 144                                     | 144                              | 144              | 144             |
| Dimension (W) mm  | 99                                       | 99                                     | 99  | 99                                      | 99                               | 99               | 99              |
| Dimension (D) mm  | 43                                       | 43                                     | 43  | 43                                      | 43                               | 43               | 43              |
| Mass (g)  | 310                                      | 310                                    | 310                                       | 310                                     | 310                              | 310              | 310             |

## MΩ Tester comparative chart

| Display Type  | DIGITAL                                |                                     |                                    |
|---|--|-------------------------------------|------------------------------------|
| Model   | DG34a                                  | DG35a                               | DG36a                              |
| Category  | -                                      | -                                   | -                                  |
| CE  | -                                      | -                                   | -                                  |
| Test voltage range  | 3                                      | 3                                   | 3                                  |
| Insulation resistance<br>(Test voltage/<br>Maximum scale value) | 500V/400MΩ<br>250V/400MΩ<br>125V/400MΩ | 500V/40MΩ<br>250V/40MΩ<br>125V/40MΩ | 250V/40MΩ<br>125V/40MΩ<br>50V/40MΩ |
| ACV (V)   | 600                                    | 600                                 | 600                                |
| DCV (V)   | 600                                    | 600                                 | 600                                |
| Resistance  | -                                      | -                                   | -                                  |
| Discharge   | -                                      | -                                   | -                                  |
| Backlight   | ●EL                                    | ●EL                                 | ●EL                                |
| Inner battery check   | -                                      | -                                   | -                                  |
| Data hold   | ●EL                                    | ●EL                                 | ●EL                                |
| Auto power save   | -                                      | -                                   | -                                  |
| Dimension (H) mm  | 130                                    | 130                                 | 130                                |
| Dimension (W) mm  | 75                                     | 75                                  | 75                                 |
| Dimension (D) mm  | 19.9                                   | 19.9                                | 19.9                               |
| Mass (g)  | 160                                    | 160                                 | 160                                |

## Digital Multimeter comparative chart

| Model                    | PC7000   | PC720M   | PC710  | PC700  | PC5000a  | PC520M   | PC510a   |  |
|--------------------------|--|--|--|--|--|--|--|--|
| Digit                    | 5000/500000                                      | 9999/6000  | 9999/6000  | 9999/6000  | 50000/500000                                       | 5000   | 5000   |  |
| Category                 | CAT.III600V                                      | CAT.III600V                                      | CAT.III600V                                      | CAT.III600V                                      | CAT.III600V  | CAT.III600V  | CAT.III600V  |  |
| CE                       | ●  | ●  | ●  | ●  | -  | -  | -  |  |
| Range                    | A/M  | A/M  | A/M  | A/M  | A/M  | A/M  | A/M  |  |
| DCV (V)                  | 500m<br>5<br>50<br>500<br>1000<br>-              | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 500m<br>5<br>50<br>500<br>1000<br>-                | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         |
| ACV (V)                  | 500m<br>5<br>50<br>500<br>1000<br>-              | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 60m<br>600m<br>9.999<br>99.99<br>999.9<br>-      | 500m<br>5<br>50<br>500<br>1000<br>-                | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         | 50m<br>500m<br>5<br>50<br>500<br>1000<br>-         |
| DCA (A)                  | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          |
| ACA (A)                  | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 600 μ<br>6000 μ<br>60m<br>600m<br>6<br>10        | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          | 500 μ<br>5000 μ<br>50m<br>500m<br>5<br>10          |
| Resistance (Ω)           | 500<br>5k<br>50k<br>500k<br>5M<br>50M<br>-       | 600<br>6k<br>60k<br>600k<br>6M<br>60M<br>-       | 600<br>6k<br>60k<br>600k<br>6M<br>60M<br>-       | 600<br>6k<br>60k<br>600k<br>6M<br>60M<br>-       | 500<br>5k<br>50k<br>500k<br>5M<br>50M<br>-         | 50<br>500<br>5k<br>50k<br>500k<br>5M<br>50M<br>-   | 50<br>500<br>5k<br>50k<br>500k<br>5M<br>50M<br>-   | 50<br>500<br>5k<br>50k<br>500k<br>5M<br>50M<br>-   |
| Capacitance (F)          | 50n<br>500n<br>5 μ<br>50 μ<br>500 μ<br>5m<br>25m | 60n<br>600n<br>6 μ<br>60 μ<br>600 μ<br>6m<br>25m | 60n<br>600n<br>6 μ<br>60 μ<br>600 μ<br>6m<br>25m | 60n<br>600n<br>6 μ<br>60 μ<br>600 μ<br>6m<br>25m | 50n<br>500n<br>5 μ<br>50 μ<br>500 μ<br>9999 μ<br>- | 50n<br>500n<br>5 μ<br>50 μ<br>500 μ<br>9999 μ<br>- | 50n<br>500n<br>5 μ<br>50 μ<br>500 μ<br>9999 μ<br>- | 50n<br>500n<br>5 μ<br>50 μ<br>500 μ<br>9999 μ<br>- |
| Temperature (°C) min     | -50  | -50  | -50  | ○  | ○  | -50  | -50  |  |
| Temperature (°C) max     | 1000   | 1000   | 1000   | ○  | ○  | 1000   | 1000   |  |
| Frequency (Hz) min       | 10   | 15   | 15   | 15   | 10   | 10   | 10   |  |
| Frequency (Hz) max       | 200k   | 50k  | 50k  | 50k  | 200k   | 125k   | 125k   |  |
| Logic frequency (Hz) min | 5  | 5  | 5  | 5  | 5  | -  | -  |  |
| Logic frequency (Hz) max | 2M   | 1M   | 1M   | 1M   | 2M   | -  | -  |  |
| Continuity               | BUZZER   | BUZZER   | BUZZER   | BUZZER   | BUZZER   | BUZZER   | BUZZER   |  |
| Diode test               | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Duty cycle               | ●  | ●  | ●  | ●  | ●  | -  | -  |  |
| dBm                      | ●  | -  | -  | -  | -  | -  | -  |  |
| Conductance              | ●  | ●  | ●  | ●  | -  | -  | -  |  |
| Auto power save          | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Battery check            | -  | -  | -  | -  | -  | -  | -  |  |
| Data hold                | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Range hold               | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Peak hold                | ●  | ●  | ●  | -  | ●  | -  | ●  |  |
| Relative value           | ●  | ●  | ●  | ●  | ●  | -  | ●  |  |
| 4-20mA%                  | ●  | -  | -  | -  | ●  | -  | -  |  |
| True RMS (AC+DC)         | -  | -  | -  | -  | ●  | -  | -  |  |
| True RMS (AC)            | ●  | ●  | ●  | -  | ●  | ●  | ●  |  |
| Auto zero adjust         | -  | -  | -  | -  | -  | ●  | ●  |  |
| Bargraph                 | ●  | ●  | ●  | ●  | ●  | ●  | ZOOM   |  |
| Max/Min                  | ●  | ●  | ●  | -  | ●  | -  | -  |  |
| Backlight                | ●  | ●  | ●  | ●  | -  | -  | -  |  |
| PC link                  | ○  | ○  | ○  | ○  | ○  | ○  | ○  |  |
| Dimension (H) mm         | 184  | 184  | 184  | 184  | 179  | 179  | 179  |  |
| Dimension (W) mm         | 86   | 86   | 86   | 86   | 87   | 87   | 87   |  |
| Dimension (D) mm         | 52   | 52   | 52   | 52   | 55   | 55   | 55   |  |
| Mass (g)                 | 430  | 430  | 430  | 430  | 460  | 460  | 460  |  |

○ Optional accessory is necessary.

### Digital Multimeter comparative chart

| Model                    | PC500a   | PC773  | PC20                                    | CD770                                  | CD771                                   | CD772                                   | CD731a                                  |  |
|--------------------------|--|--|---|--|---|---|---|--|
| Digit                    | 5000   | 11000  | 4000                                    | 4000                                   | 4000                                    | 4000                                    | 4000                                    |  |
| Category                 | CAT.III600V                                    | CAT.III600V  | CAT.III600V                             | CAT.III600V                            | CAT.III600V                             | CAT.III600V                             | CAT.III600V                             |  |
| CE                       | -  | ●  | -                                       | -                                      | ●                                       | ●                                       | -                                       |  |
| Range                    | A/M  | A/M  | A/M                                     | A/M                                    | A/M                                     | A/M                                     | A/M                                     |  |
| DCV (V)                  | 50m<br>500m<br>5<br>50<br>500<br>1000          | 110m<br>1.1<br>11<br>110<br>1000<br>-                  | 400m<br>4<br>40<br>400<br>1000<br>-     | 400m<br>4<br>40<br>400<br>600<br>-     | 400m<br>4<br>40<br>400<br>1000<br>-     | 400m<br>4<br>40<br>400<br>1000<br>-     | 400m<br>4<br>40<br>400<br>1000<br>-     | 400m<br>4<br>40<br>400<br>1000<br>-    |
| ACV (V)                  | 50m<br>500m<br>5<br>50<br>500<br>1000          | 110m<br>1.1<br>11<br>110<br>1000<br>-                  | 4<br>40<br>400<br>750<br>-<br>-         | 4<br>40<br>400<br>600<br>-<br>-        | 4<br>40<br>400<br>1000<br>-<br>-        | 4<br>40<br>400<br>1000<br>-<br>-        | 4<br>40<br>400<br>750<br>-<br>-         | 4<br>40<br>400<br>-<br>-<br>-          |
| DCA (A)                  | 500μ<br>5000μ<br>50m<br>500m<br>5<br>10        | 110μ<br>1100μ<br>11m<br>110m<br>11<br>-                | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10 | 400μ<br>4000μ<br>40m<br>400m<br>-<br>- | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10 | 400μ<br>4000μ<br>40m<br>400m<br>4<br>15 | 400μ<br>4000μ<br>40m<br>400m<br>4<br>20 | 400μ<br>4000μ<br>40m<br>400m<br>-<br>- |
| ACA (A)                  | 500μ<br>5000μ<br>50m<br>500m<br>5<br>10        | 110μ<br>1100μ<br>11m<br>110m<br>11<br>-                | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10 | 400μ<br>4000μ<br>40m<br>400m<br>-<br>- | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10 | 400μ<br>4000μ<br>40m<br>400m<br>4<br>15 | 400μ<br>4000μ<br>40m<br>400m<br>4<br>20 | 400μ<br>4000μ<br>40m<br>400m<br>-<br>- |
| Resistance (Ω)           | 50<br>500<br>5k<br>50k<br>500k<br>5M<br>50M    | 110<br>1.1k<br>11k<br>110k<br>1.1M<br>11M<br>110M      | 400<br>4k<br>40k<br>400k<br>4M<br>-     | 400<br>4k<br>40k<br>400k<br>4M<br>-    | 400<br>4k<br>40k<br>400k<br>4M<br>-     | 400<br>4k<br>40k<br>400k<br>4M<br>-     | 400<br>4k<br>40k<br>400k<br>4M<br>-     | 400<br>4k<br>40k<br>400k<br>4M<br>-    |
| Capacitance (F)          | 50n<br>500n<br>5μ<br>50μ<br>500μ<br>9999μ<br>- | 11n<br>110n<br>1.1μ<br>11μ<br>110μ<br>1.1m<br>11m/110m | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-   | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-  | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-   | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-   | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-   | 40n<br>400n<br>4μ<br>40μ<br>400μ<br>-  |
| Temperature (°c) min     | ○  | ○  | ○                                       | -                                      | -                                       | -20                                     | -                                       |  |
| Temperature (°c) max     | ○  | ○  | ○                                       | -                                      | -                                       | 300                                     | -                                       |  |
| Frequency (Hz) min       | 10   | 11.1   | -                                       | 1                                      | 1                                       | 1                                       | -                                       |  |
| Frequency (Hz) max       | 125k   | 1.1M   | -                                       | 100k                                   | 100k                                    | 100k                                    | -                                       |  |
| Logic frequency (Hz) min | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Logic frequency (Hz) max | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Continuity               | BUZZER   | BUZZER/LED   | BUZZER                                  | BUZZER                                 | BUZZER/LED                              | BUZZER/LED                              | BUZZER                                  |  |
| Diode test               | ●  | ●  | ●                                       | ●                                      | ●                                       | ●                                       | ●                                       |  |
| Duty cycle               | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| dBm                      | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Conductance              | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Auto power save          | ●  | ●  | -                                       | ●                                      | ●                                       | ●                                       | ●                                       |  |
| Battery check            | -  | -  | -                                       | -                                      | ●                                       | -                                       | -                                       |  |
| Data hold                | ●  | ●  | ●                                       | ●                                      | ●                                       | ●                                       | ●                                       |  |
| Range hold               | ●  | ●  | ●                                       | ●                                      | ●                                       | ●                                       | ●                                       |  |
| Peak hold                | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Relative value           | -  | ●  | -                                       | -                                      | ●                                       | ●                                       | -                                       |  |
| 4-20mA%                  | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| True RMS (AC+DC)         | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| True RMS (AC)            | -  | ●  | -                                       | -                                      | -                                       | ●                                       | -                                       |  |
| Auto zero adjust         | ●  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Bargraph                 | ●  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Max/Min                  | -  | -  | -                                       | -                                      | -                                       | -                                       | -                                       |  |
| Backlight                | -  | ●  | -                                       | -                                      | ●                                       | ●                                       | -                                       |  |
| PC link                  | ○  | ○  | ○                                       | -                                      | -                                       | -                                       | -                                       |  |
| Dimension (H) mm         | 179  | 166  | 167                                     | 166                                    | 166                                     | 166                                     | 167                                     |  |
| Dimension (W) mm         | 87   | 82   | 90                                      | 82                                     | 82                                      | 92                                      | 90                                      |  |
| Dimension (D) mm         | 55   | 44   | 48                                      | 44                                     | 44                                      | 44                                      | 48                                      |  |
| Mass (g)                 | 460  | 360  | 330                                     | 340                                    | 360                                     | 360                                     | 315                                     |  |

### Digital Multimeter comparative chart

| Model                    | CD732  | RD700 / 701                                | CD800a                                     | PM11                                       | PM3  | PM7a/PS8a                                  | PM33/PM33a                                 |  |
|--------------------------|--|--|--|--|--|--|--|--|
| Digit                    | 6000   | 4000                                       | 4000                                       | 4000                                       | 4000                                       | 4000                                       | 6600                                       |  |
| Category                 | CAT.III600V                                    | CAT.III600V                                | CAT.III600V                                | CAT.III300V                                | CAT. II 500V                               | -  | CAT.II 600V                                |  |
| CE                       | ●  | -  | -  | ●  | ●  | -  | ●  |  |
| Range                    | A/M  | A/M  | A/M  | A  | A  | A/M  | A  |  |
| DCV (V)                  | 600m<br>6<br>60<br>600<br>1000<br>-            | 400m<br>4<br>40<br>400<br>1000<br>-        | 400m<br>4<br>40<br>400<br>600<br>-         | 400m<br>4<br>40<br>400<br>500<br>-         | 400m<br>4<br>40<br>400<br>500<br>-         | 400m<br>4<br>40<br>400<br>500<br>-         | 400m<br>4<br>40<br>400<br>500<br>-         | 660m<br>6.6<br>66<br>660<br>-                          |
| ACV (V)                  | 6<br>60<br>600<br>750<br>-                     | 400m<br>4<br>40<br>400<br>1000<br>-        | 4<br>40<br>400<br>600<br>-                 | 4<br>40<br>400<br>500<br>-                 | 4<br>40<br>400<br>500<br>-                 | 4<br>40<br>400<br>500<br>-                 | 4<br>40<br>400<br>500<br>-                 | 660m<br>6.6<br>66<br>660<br>-                          |
| DCA (A)                  | 600μ<br>6000μ<br>60m<br>600m<br>6<br>15        | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10    | 40m<br>400m<br>-<br>-<br>-                 | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | 100A<br>-  |
| ACA (A)                  | 600μ<br>6000μ<br>60m<br>600m<br>6<br>15        | 400μ<br>4000μ<br>40m<br>400m<br>4<br>10    | 40m<br>400m<br>-<br>-<br>-                 | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | -<br>-<br>-<br>-                           | 100A<br>-  |
| Resistance (Ω)           | 600<br>6k<br>60k<br>600k<br>6M<br>60M<br>-     | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 400<br>4k<br>40k<br>400k<br>4M<br>40M<br>- | 660<br>6.6k<br>66k<br>660k<br>6.6M<br>66M<br>-         |
| Capacitance (F)          | 40n<br>400n<br>4μ<br>40μ<br>400μ<br>4000μ<br>- | 500n<br>5μ<br>50μ<br>500μ<br>3000μ<br>-    | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-      | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-      | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-      | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-      | 50n<br>500n<br>5μ<br>50μ<br>100μ<br>-      | 6.6n<br>66n<br>660n<br>6.6μ<br>66μ<br>660μ<br>6.6m/66m |
| Temperature (°c) min     | -  | -20  | -  | -  | -  | -  | -  |  |
| Temperature (°c) max     | -  | 300  | -  | -  | -  | -  | -  |  |
| Frequency (Hz) min       | 5  | 10   | 1  | -  | 9.999                                      | -  | 20   |  |
| Frequency (Hz) max       | 99.99k   | 1M   | 100k                                       | -  | 60k  | -  | 66k  |  |
| Logic frequency (Hz) min | -  | -  | -  | -  | -  | -  | -  |  |
| Logic frequency (Hz) max | -  | -  | -  | -  | -  | -  | -  |  |
| Continuity               | BUZZER/LED                                     | BUZZER                                     | BUZZER                                     | BUZZER                                     | BUZZER                                     | BUZZER                                     | BUZZER                                     |  |
| Diode test               | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Duty cycle               | ●  | -  | ●  | -  | ●  | -  | ●  |  |
| dBm                      | -  | -  | -  | -  | -  | -  | -  |  |
| Conductance              | -  | -  | -  | -  | -  | -  | -  |  |
| Auto power save          | ●  | ●  | ●  | ●  | ●  | ●  | ●  |  |
| Battery check            | -  | -  | -  | -  | -  | -  | -  |  |
| Data hold                | ●  | ●  | ●  | -  | ●  | -  | ●  |  |
| Range hold               | ●  | ●  | ●  | -  | ●  | -  | ●  |  |
| Peak hold                | -  | -  | -  | -  | ●  | -  | -  |  |
| Relative value           | -  | ●  | ●  | -  | -  | -  | ●  |  |
| 4-20mA%                  | -  | -  | -  | -  | -  | -  | -  |  |
| True RMS (AC+DC)         | -  | -  | -  | -  | -  | -  | -  |  |
| True RMS (AC)            | -  | RD701 Only                                 | -  | -  | -  | -  | -  |  |
| Auto zero adjust         | -  | -  | -  | -  | -  | -  | -  |  |
| Bargraph                 | ●  | -  | -  | ●  | -  | -  | -  |  |
| Max/Min                  | -  | -  | -  | -  | -  | -  | ●  |  |
| Backlight                | -  | -  | -  | -  | -  | -  | -  |  |
| PC link                  | -  | -  | -  | -  | -  | -  | -  |  |
| Dimension (H) mm         | 167  | 179  | 176  | 117  | 108  | 115  | 130  |  |
| Dimension (W) mm         | 90   | 87   | 104  | 76   | 56   | 57   | 75   |  |
| Dimension (D) mm         | 48   | 55   | 46   | 18   | 11.5                                       | 18   | 19.9                                       |  |
| Mass (g)                 | 320  | 460  | 340  | 117  | 85   | 85   | 160  |  |

## Analog Multitester comparative chart

| Model                             | EM7000 | CX506a | YX-361TR | SH-88TR | AU-32 | AU-31 | YX360TRF |
|-----------------------------------|--------|--------|----------|---------|-------|-------|----------|
| DCV (V)                           | 0.3    | 120m   | 0.1      | 0.12    | 250m  | 300m  | 0.1      |
|                                   | 1.2    | 3      | 0.5      | 3       | 2.5   | 3     | 0.25     |
|                                   | 3      | 12     | 2.5      | 12      | 10    | 12    | 2.5      |
|                                   | 12     | 30     | 10       | 30      | 50    | 60    | 10       |
|                                   | 30     | 120    | 50       | 120     | 250   | 300   | 50       |
|                                   | 120    | 300    | 250      | 300     | 500   | 1000  | 250      |
|                                   | 300    | 1000   | 1000     | 1200    | -     | -     | 1000     |
|                                   | 1000   | -      | -        | -       | -     | -     | -        |
| ACV (V)                           | 3      | 3      | 2.5      | 3       | 250m  | 300m  | 10       |
|                                   | 12     | 12     | 10       | 12      | 2.5   | 3     | 50       |
|                                   | 30     | 30     | 50       | 30      | 10    | 12    | 250      |
|                                   | 120    | 120    | 250      | 120     | 50    | 60    | 750      |
|                                   | 300    | 300    | 1000     | 300     | 250   | 300   | -        |
|                                   | 750    | 750    | -        | 1200    | 500   | 1000  | -        |
| DCA (A)                           | 0.12 μ | 30 μ   | 50 μ     | 50 μ    | 250 μ | 300m  | 50 μ     |
|                                   | 0.3m   | 0.3m   | 2.5m     | 3m      | 2.5m  | 3     | 2.5m     |
|                                   | 3m     | 3m     | 25m      | 30m     | 25m   | -     | 25m      |
|                                   | 30m    | 30m    | 0.25     | 0.3     | 250m  | -     | 0.25     |
|                                   | 300m   | 0.3    | -        | -       | 2.5   | -     | -        |
|                                   | 6      | -      | -        | -       | -     | -     | -        |
| ACA (A)                           | 6      | -      | -        | -       | 250 μ | 300m  | -        |
|                                   | -      | -      | -        | -       | 2.5m  | 3     | -        |
|                                   | -      | -      | -        | -       | 25m   | -     | -        |
|                                   | -      | -      | -        | -       | 250m  | -     | -        |
|                                   | -      | -      | -        | -       | 2.5   | -     | -        |
| Resistance (Ω)                    | 2k     | 5k     | 2k       | 3k      | 20k   | 20k   | 2k       |
|                                   | 20k    | 50k    | 20k      | 30k     | 200k  | 200k  | 20k      |
|                                   | 200k   | 500k   | 200k     | 300k    | 2M    | 2M    | 200k     |
|                                   | 2M     | 5M     | 2M       | 3M      | 20M   | 20M   | 2M       |
|                                   | 20M    | 50M    | 20M      | 30M     | 200M  | 200M  | 200M     |
|                                   | 200M   | -      | -        | -       | -     | -     | -        |
| Capacitance (F)                   | -      | 0.2 μ  | -        | 1000 μ  | -     | -     | 10 μ     |
|                                   | -      | 20 μ   | -        | 0.01    | -     | -     | -        |
|                                   | -      | 2000 μ | -        | 0.1     | -     | -     | -        |
|                                   | -      | -      | -        | 1       | -     | -     | -        |
| Auto range                        | -      | -      | -        | -       | ●     | ●     | -        |
| Low frequency output measurement  | ●      | -      | ●        | ●       | ●     | ●     | ●        |
| Continuity                        | -      | -      | LED      | LED     | -     | -     | -        |
| Battery check                     | -      | -      | 1.5V     | -       | -     | -     | -        |
| Auto polarity                     | -      | -      | -        | -       | ●     | ●     | -        |
| Meter structure                   | BAND   | BAND   | BAND *   | PIVOT   | PIVOT | PIVOT | BAND     |
| Drop shock proof meter            | -      | -      | -        | -       | -     | -     | ●        |
| Zero center meter                 | ●      | -      | ●        | ●       | -     | -     | ●        |
| Temperature measurement           | -      | -      | -        | -       | -     | -     | -        |
| Protection circuit for power line | -      | -      | -        | -       | -     | -     | -        |
| hFE                               | -      | ●      | ○        | ○       | -     | -     | ○        |
| Dimension (H) mm                  | 165    | 165    | 150      | 150     | 48    | 48    | 159.50   |
| Dimension (W) mm                  | 106    | 106    | 100      | 100     | 110   | 110   | 129      |
| Dimension (D) mm                  | 46     | 46     | 37       | 36      | 124   | 124   | 41.50    |
| Mass (g)                          | 375    | 370    | 290      | 280     | 290   | 290   | 320      |

○ Optional accessory is necessary.

\* Serial Number ≥ 6064916

## Analog Multitester comparative chart

| Model                             | SP21   | SP20  | SP-18D | TA55   | CP-7D | AP33    | VS-100 |
|-----------------------------------|--------|-------|--------|--------|-------|---------|--------|
| DCV (V)                           | 0.3    | 0.25  | 0.3    | 0.3    | 0.25  | 10      | 10     |
|                                   | 3      | 2.5   | 3      | 3      | 2.5   | 50      | 50     |
|                                   | 12     | 5     | 12     | 16     | 10    | 250     | 250    |
|                                   | 30     | 10    | 30     | 30     | 50    | 500     | 500    |
|                                   | 120    | 50    | 120    | 60     | 250   | -       | -      |
|                                   | 600    | 100   | 600    | -      | 500   | -       | -      |
|                                   | -      | 500   | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| ACV (V)                           | 12     | 10    | 12     | 30     | 10    | 50      | 10     |
|                                   | 30     | 50    | 30     | 120    | 50    | 250     | 50     |
|                                   | 120    | 250   | 120    | 300    | 250   | 500     | 250    |
|                                   | 300    | 500   | 300    | -      | 500   | -       | 500    |
|                                   | 600    | -     | 600    | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| DCA (A)                           | 60 μ   | 50 μ  | 60 μ   | 0.5    | 0.25m | 25m     | -      |
|                                   | 30m    | 2.5m  | 30m    | 3      | 25m   | 250m    | -      |
|                                   | 0.3    | 25m   | 0.3    | 30     | 500m  | -       | -      |
|                                   | -      | 0.25  | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| ACA (A)                           | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| Resistance (Ω)                    | 2k     | 2k    | 2k     | 2k     | 2k    | 5k      | 2k     |
|                                   | 20k    | 20k   | 20k    | 20k    | 20k   | 500k    | 20k    |
|                                   | 2M     | 200k  | 2M     | 200k   | 1M    | -       | 2M     |
|                                   | -      | 2M    | 200M   | 2M     | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| Capacitance (F)                   | 500 μ  | 500 μ | 1000 μ | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
|                                   | -      | -     | -      | -      | -     | -       | -      |
| Auto range                        | -      | -     | -      | -      | -     | -       | -      |
| Low frequency output measurement  | -      | -     | -      | -      | ●     | -       | -      |
| Continuity                        | BUZZER | -     | -      | BUZZER | -     | -       | -      |
| Battery check                     | 1.5V   | 1.5V  | 1.5V   | 12V    | 1.5V  | 1.5V/9V | -      |
| Auto polarity                     | -      | -     | -      | -      | -     | -       | -      |
| Meter structure                   | BAND   | BAND  | BAND   | BAND   | PIVOT | PIVOT   | PIVOT  |
| Drop shock proof meter            | ●      | ●     | ●      | ●      | -     | -       | -      |
| Zero center meter                 | ●      | -     | -      | -      | -     | -       | -      |
| Temperature measurement           | -      | ○     | -      | -      | -     | -       | -      |
| Protection circuit for power line | -      | -     | -      | -      | -     | -       | ●      |
| hFE                               | -      | -     | -      | -      | -     | -       | -      |
| Dimension (H) mm                  | 144    | 144   | 159.5  | 142    | 119   | 126     | 144    |
| Dimension (W) mm                  | 99     | 99    | 129    | 97     | 85    | 87      | 96     |
| Dimension (D) mm                  | 41     | 41    | 41.5   | 38     | 23    | 30      | 56     |
| Mass(g)                           | 270    | 270   | 320    | 300    | 140   | 185     | 400    |

○ Optional accessory is necessary.

## ISO 9001

### Quality Management System

The manufacturing plant of Sanwa Tesmex Co., Ltd. obtained ISO9002 certification from the foundation "Japan Quality Assurance Organization (JQA)" in 1996. In October 2002, Sanwa Electric Instrument Co., Ltd. was organized as one company incorporating the manufacturing division and sales division. In November 2002, the company obtained ISO9001:2000 certification (JQA-1453). The scope of the registration covers the design, development, production and servicing of multi-meters, clamp meters, insulating-resistance testers, standard generators, light power meters, and laser power meters.



## ISO 14001

### Environmental Management System ISO 14001

We implemented activities aimed at acquiring certification under the ISO 14001 standard for environmental management systems, and were granted the certification by the Japan Quality Assurance Association in November 2007. (JQA-EM5956)

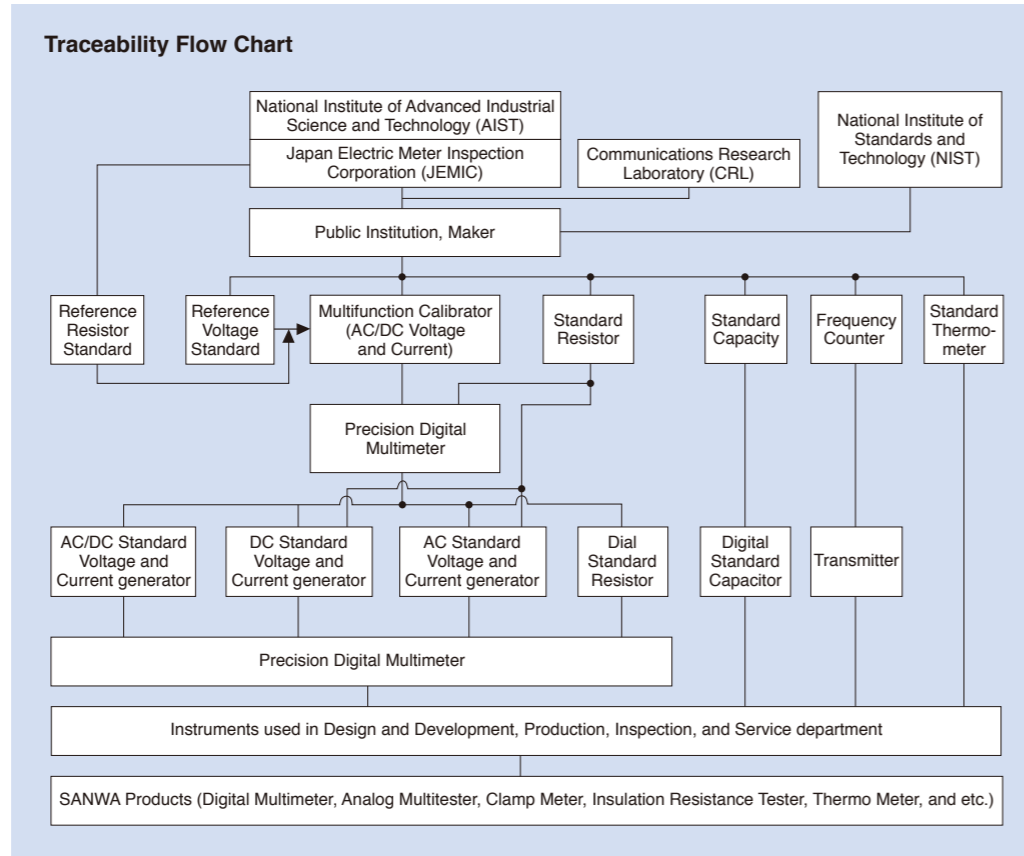


### Environmental Philosophy

We involve all employees in environmentally balanced activities throughout every stage of the process of delivering products and services to customers in order to achieve sound environmental management as a community and customer-oriented company. (Established on April 2nd, 2007)

## Traceability

Traceability to prove the compliance with national and international standards is an essential factor for measuring instruments used as test instruments associated with quality assurance. Products of Sanwa are calibrated by reference samples which is periodically checked for its compliance with national standards. A calibration certificate and test data report are available on your request (a fee applies).



## Repairs and servicing

Please contact an agent of Sanwa in your country for periodic calibration and repairs, which are offered on a chargeable basis. Please refer to the website of Sanwa for the authorized agents.

## Safety

### The International Safety Standard IEC61010

This Safety Standard which is established for protecting operators and environment stipulates safety requirements for measuring instruments and electric equipment. The IEC standard defines the degree of pollution, measurement classification, barrier, material, spatial distance and creepage distance to assure safety. The impulse withstand voltage as transitional energy is estimated from the measurement category and main power supply voltage to conduct tests for measuring instruments.

### Test voltage (impulse withstand voltage)

| Nominal AC or DC line of main power supply and neutral voltage | CAT. II | CAT. III | CAT. IV |
|--|---------|----------|---------|
| 300V   | 2500V   | 4000V    | 6000V   |
| 600V   | 4000V   | 6000V    | 8000V   |
| 1000V  | 6000V   | 8000V    | 12000V  |

The output impedance of an impulse generator is 12 Ω in the measurement category II, and 2 Ω in measurement categories III and IV.

### CE marking

**CE** CE marking is a safety mark which can be attached only on a product meeting the safety requirements of the Directive of Council of the European Union (EC Directive). A product attached with the CE mark is designed so as to meet the requirements of the "Low Voltage Directive" and "EMC Directive" of the EC Directive. Low Voltage Directive: This Directive covers products of power supply voltage of 50V-1000V (AC) and 75V-1500V (DC), and it defines electric safety requirements against shocks, burns, etc. The applicable standard is EN61010 corresponding to IEC1010 give on the left. EMC Directive: This Directive stipulates conditions so as not to give out strong electromagnetic waves from equipment to the outer environment and to protect equipment from the effect of electromagnetic waves from the outside.

### Measurement category (overvoltage category)

The IEC standard classifies measuring circuits according to measurement categories for the safe use of a measuring instrument in low voltage facilities. The measurement categories are classified into I to IV. A larger number of the category denotes a spot involving higher transient energy. For safe measurement, wear protective gears such as insulated gloves and dust-proof glasses in an environment of CAT. III.

### Measurement category IV (CAT. IV):

Equipment used for measurement in low voltage facilities. Temporary overcurrent preventer, and electric measurement on ripple control unit, etc.

### Measurement category III (CAT. III):

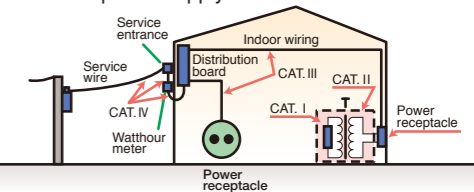
Equipment used for measurement in building facilities. Distribution board, circuit breaker, wiring including cables, busbar, junction box, switch, receptacle, and industrial equipment located in fixed facilities, and other equipment such as a fixed motor connected to fixed facilities in a permanent manner.

### Measurement category II (CAT. II):

Equipment used for measurement performed on a circuit directly connected to low voltage facilities. Measurement on electric household appliances, portable tools and similar tools.

### Measurement category I (CAT. I):

Equipment used for measurement on a circuit not directly connected to main power supply. Circuit not derived from the main power supply.



## For safe measurement

### Method for safe use of measuring instrument

#### Multimeter

##### Voltage measurement

Never use a measuring instrument for a measurement category higher than specified. A tester not conforming to the international safety standard is for use with weak current. Never use these testers on a high power circuit of 250V or more (excluding VS-100). Referring to measurement categories defined in the IEC standard, use a measuring instrument of equivalent or higher category. For instance, when a measuring instrument is used on a motor of facility of 200V main power supply, which corresponds to Category III, use a measuring instrument of CAT. III or higher.

##### Current measurement

Use special caution not to input voltage to the current measuring terminal in measurement. In current measurement, a meter is connected in series with the measuring circuit. For this reason, impedance inside the meter is low, thereby possibly causing a short-circuit fault. To prevent such a short-circuit fault and assure safe operation, fuses are installed for protection. Check the protection capability of the fuses. RD700 uses a quick-breaking ceramic fuse of rated voltage 250V and breaking current 1.5kA for the milliamp measuring circuit, which causes the fuse to blow out to prevent short-circuit when the main power supply is 250V or less and short circuit current is 1.5kA or less.

#### Clamp meter

- Use all clamp meters for measurement of low voltage circuit of 600V or less.
- In choosing an appropriate model, special attention should be paid to the current measurement range and diameter of a conductor to be clamped.

#### Insulation resistance tester

- The insulation resistance tester cannot be used on an measuring object in live-wire status.
- If the measuring voltage is specified, choose a model of the specified voltage. It is a general practice to choose the measuring voltage equivalent to or a little higher than voltage usually applied to the measuring object.
- Since the insulating-resistance tester measures resistance values by applying DC high voltage on a measuring object, the measurement may damage the measuring object if voltage is directly applied on the electronic circuit including the IC and LSI.
- The insulating-resistance tester generates DC high voltage during measurement. If an electric shock occurs, a falling accident from a high altitude may follow. Use special caution in operation at a high altitude.
- If your measuring instrument is provided with a voltage measuring function, use it at no higher than the maximum measuring voltage.

#### Thermo Meter (Temperature Probe)

- The temperature sensor cannot be used for measurement in direct contact with a live part.
- Use caution in handling a sharp-edged probe to avoid an injury.
- The grip is heated in high temperature measurement. Use an appropriate jig to secure the probe in high temperature measurement.

#### Tachometer · Speed Meter

- In measurement on a rotating motor (measurement of speed for elevator in operation), risks are involved due to the strong force of the measuring object. Use special caution in measurement to assure safety. Never touch the rotating part during measurement.

#### Laser Power Meter

- Infrared semiconductor laser light is invisible to the naked eye. It may occasionally emit high power of 30mW or more, which may threaten vision if eyes are exposed to the light. Use special caution to avoid gazing at the light directly or exposing eyes to reflected light.



**Function marks**

**RMS** **True RMS (True root-mean-square value)**  
True RMS value. AC current and voltage of a non-sine wave can be measured by true RMS values.

**2CH** **Dual Display**  
Allows simultaneous reading.

**DSP** **Drop shock proof**  
The meter element is furnished with a taut band and impact-resistant design enough to withstand a shock of drop.

**DCA ACA** **DC / AC measurable**  
Both ACA and DCA are measurable.

**LEAK** **Leakage current**  
A clamp meter that can make the measurement of leakage current have a range to allow measurements in milliamp.

**Hz** **Frequency**  
Expressed in the unit of Hz (hertz). Commercial frequency of 50Hz/60Hz can be measured.

**+** **Capacitor**  
Capacitor capacity (electrostatic capacity) is measured and expressed in the unit of F (farad),  $\mu$ F, etc.

**Duty** **Duty cycle**  
The duty cycle of repeating waveform is indicated on a percentage basis (%). It can be used for the analysis of control signals.

**CONT. LED** **Continuity check**  
The LED lights up when the measuring object is electrically conducting.

**Continuity buzzer**  
The buzzer sounds when the measuring object is electrically conducting.

**BATT CHECK** **Battery check**  
Battery voltage is measured and assessed by running a given current.

**°C** **Temperature measurement**  
Temperature can be measured using the optional probe.

**% 4-20** **4-20mA%**  
4-20mA for sending instrumentation signals. Expresses the current loop of 4mA as 0% and 20mA as 100%

**dBm** **dBm**  
Scaling of voltage values is performed according to the reference impedance into dBm. Convenient for use with audio equipment.

**hFE** **hFE**  
Provided with graduations for measuring the DC current amplification factor (hFE) of a transistor.

**EF (NCV)** **EF function**  
Non contact AC voltage detection function

**Capture PEAK**  
**Capture (peak hold)**  
The peak value like in-rush current is indicated. The minimum pulse width capturable differs according to models.

**LPF** **Low-pass filter**  
Low-pass filter cuts current value of high frequency.

**INRUSH** **Inrush**  
Inrush current can be measured

**+/-** **Zero-center meter (NULL)**  
Moves the indicator of the analog tester to the center of the scale (meter graduations) to make measurement of positive and negative voltage.

**AUTO V $\Omega$**  **Automatic Measurement for DCV/ACV/ $\Omega$**   
Measurement function of DCV/ACV/ $\Omega$  can be automatically selected.

**LOG GING** **Logging**  
The reading can be stored in the meter itself.

**AUTO POL** **Auto polarity**  
Puts the indicator at the center in the automatic standby status by the setting of the selector switch so as to allow measurement by positive and negative values.

**POL Switch** **Polarity switch**  
The positive and negative polarity of the measuring terminal can be changed by this switch.

**OUT** **Output terminal**  
Cancels the DC current portion of voltage mixed with DC and AC to measure the AC portion alone. It is used for the measurement of audio signals.

**AP OFF** **Auto power off**  
Power is automatically turned off when a certain time has elapsed after power-up. Some models have a function to cancel this function.

**APS** **Auto power save**  
The display disappears to bring the device into the power-save state when a certain time has passed after power-up. Some models have a function to cancel this function.

**DATA HOLD** **Data hold**  
A value indicated on the display is fixed. It is fixed even after the test lead is removed, and can be used as a record for reference purposes.

**RNG HOLD** **Range hold**  
The range is fixed in the measurement of varying voltage and current which is difficult to read in the auto range.

**REL** **Measurement of relative value**  
A certain measured value is assumed as 0 and measured values after that are expressed by positive or negative values relative to the value fixed as 0.

**MAX MIN AVG** **MAX / MIN / AVG**  
The maximum value, the minimum value and the average value are displayed or recorded. The recorded value can be seen later on the display.

**LP $\Omega$**  **Low power ohm**  
Resistance is measured by applying voltage of approximately 0.4V or less on a measuring object. It is characterized by the fact that the semiconductor does not conduct at approximately 0.4V or less even in forward direction.

**BACK LIGHT** **Backlight**  
Allows indicator reading in a dark place.

**AUTO** **Automatic live circuit detection**  
Live circuit detection prevents insulation test if the measured object is a live circuit.

**AD** **Auto discharge**  
When the measurement of insulating resistance is complete, voltage charged in the measuring object is discharged.

**USB** **USB connection**  
Data can be outputted by connection to the USB port of a PC.

**232c** **RS232C connection**  
The signal output terminal is provided to send data to a PC. RS232C is the name of the signal standard.

**POWER FUSE** **Fuse for power supply**  
Current-limiting fuse to break the conduction up to 100kA

**PC Link °C** **Temperature measurement with PC Link**  
Temperature can be measured using the optional probe and PC Link software. (T-300PC is necessary.)

**Zoom** **Zoom bar graph**  
The scale is changed so as to allow reading minute changes on the bar graph.

**TLR Cal** **Correction of resistance of test lead**  
This is a function to cancel the resistance portion of the internal circuit of the main body and test lead in the resistance measurement.

**0 $\Omega$  ADJ** **Zero-ohm adjuster**  
Cancels the contact resistance and internal resistance of the test lead to allow the measurement of the resistance value of a measuring object alone.

**INS  $\Omega$**  **Insulating resistance**  
Insulating resistance can be measured (e.g. 500V/1000M $\Omega$ )

**DCV** **DC voltage**  
Mark for clamp meters with DCV function.

**Glossary**

**Accuracy / Tolerance**  
Correctness. JIS defines the term "accuracy" to be used for digital testers and "tolerance" for analog testers. The accuracy / tolerance differs depending on the range.

**± (□%+□) = ± (□%rdg+□dgt)**  
rdg is an abbreviation of "Reading" meaning a read value on digital display. "dgt" is an abbreviation of "Digit" meaning the least unit of digital display. For instance, "±2dgt" refers to error of ±2 counts.

**Full-scale value (fs)**  
It is the indication of tolerance expressed by percentage values relative to the full-scale value of the range.

**Scale length**  
The tolerance in resistance measurement is expressed with reference to the scale length of the range.

**Frequency characteristic**  
Frequency range of measurable signals in the measurement of AC voltage and current.

**Input resistance (Impedance)**  
Internal resistance between measuring terminals. For instance, it is expressed as "M $\Omega$ " with the DMM and as "K $\Omega$ /V" with the AMT.

**Clamp diameter**  
It gives a guide for the thickness of a clampable wire.

**Clamp conductor size**  
Size of a maximum conductor shape.

**Withstand voltage**  
It refers to insulating withstand voltage of the measuring instrument itself.

**Range**  
The measuring range of a function is sub-divided and expressed as 2V/20V/200V, etc.

**Auto range**  
The range is automatically increased or decreased in steps such as 2V/20V/200V and moves to the optimum range for measuring voltage.

**Live-wire check**  
When a test lead is set at an insulating resistance measuring point on a measuring object, the ACV measuring status starts to check whether voltage is being supplied.

**Display digit**  
Maximum number of display digits of the digital display. 1999 is expressed as 2000. Three and a half digits and four and a half digits are also used.

**Function**  
Function for measuring voltage, current, resistance, electrostatic capacity and frequency.

**Resolution**  
Displayable minimum value of the last digit. For instance, the resolution of the 1.999V range is 0.001V.

**A**  
AD-30-2.....P46  
AD-71AC.....P46  
AD-72AC.....P46  
AP33.....P33  
AU-31.....P31  
AU-32.....P31

**C**  
C-08S.....P47  
C-77.....P47  
C-77H.....P47  
CAM600S.....P06  
C-CA.....P47  
C-CD.....P47  
C-CL.....P47  
C-CL3000.....P48  
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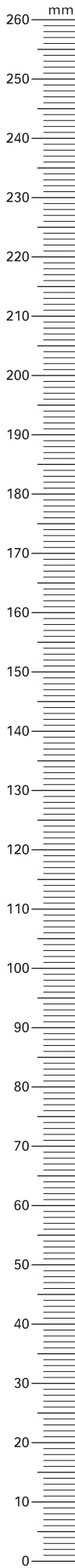
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# sanwa

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*Anniversary*

In celebration of our anniversary, we would like to take this opportunity to thank our loyal partners, distributors and customers.

Sanwa has developed countless measuring instruments since its founding in 1941 and, in doing so, has delivered countless solutions to customer needs.

Measurements only become meaningful when there is confidence in the accuracy and the quality of the instruments being used. Our quality control includes not only “products”, but also each and every operation, maintenance services, and sales and marketing activities, and is thoroughly implemented utilizing reliable systems and the intangible awareness of each of our employees.

Based on our confidence, Sanwa’s mission is to deliver unique measuring instruments to its customers. Placing customer trust and satisfaction first and foremost, we will keep working to contribute to global environmental conservation and energy management through the continuous evolution of electrical and on-site measuring instruments.

Keisuke SUZUKI  
Representative Director

