Celebrating 70 Years of Technological Excellence
### About the Catalog

**Searching for product pages and notes ...**

Products in this catalog are grouped according to functions so you can easily find the right instrument for your application by referring to the list of product groups in the table of contents on the first page, and moving directly to the indicated section.

Dimensions and mass:
- Exterior dimensions exclude protrusions, and are given in order of width(W), height(H), and depth(D), in mm units. Indicated weight represents an approximation of the mass of the main unit only, not including case, accessories, etc.

**Measurement categories (Overvoltage categories)**

To ensure safe operation of measurement products, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

- **CAT I**: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
- **CAT II**: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)
- **CAT III**: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.
- **CAT IV**: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement product designed for CAT III environments can endure greater momentary energy than one designed for CAT II. Using a measurement product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided.

- **Never use a CAT I measuring product in CAT II, III, or IV environments.**

The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

**Notes on accuracy ...**

The specifications in this catalog include figures for "measurement accuracy" when referring to digital measuring instruments, and for "measurement tolerance" when referring to analog instruments. The accuracy and tolerance figures in the product specifications are defined in terms of full scale (f.s.) value and displayed reading (rdg.) or digit resolution (dgt.) as described below.

- **rdg.** (displayed or indicated value, ... Reading value)
  - This signifies the value actually being measured, i.e., the value that is currently indicated or displayed by the measuring instrument.

- **f.s.** (maximum display, or length of scale, ... Full-Scale)
  - Signifies the maximum display (scale) value or the length of the scale (in cases where the scale consists of unequal increments or where the maximum value cannot be defined). In general, this is the range value (the value written on the range selector, or equivalent) currently in use. However, be aware that in cases where the maximum display value is 2800V but the range value is only 600V, the maximum display value (scale value) is still used as the f.s. value.

- **dgt.** (digital resolution, ... Digit value)
  - Signifies the smallest display unit on a digital measuring instrument, i.e., the value displayed when the last digit on the digital display is "1". Essentially, this indicates an error of 1 digit (based on decimal processing in analog-to-digital conversion), but in actuality this is the digit error combined with the f.s. error converted to a fraction of a digit unit. The accuracy associated with a particular measured value as shown in the product specifications is derived from these values.

---

**WARNING**

1. To avoid short circuits and electric shock accidents when using a clamp-on sensor, use only with power lines carrying voltages within the rating limit of the sensor.
2. To avoid short circuits and electric shock accidents when the clamp-on sensor is open, do not use on bare conductors.

---

**WARNING**

In some cases, power lines may carry voltage spikes of several times the normal supply voltage. For reasons of safety, ordinary testers should not be used to measure power lines carrying more than 250V. When measuring such power lines, always use a tester with built-in overcurrent protection to guard against short circuits, such as Model 3008 and CAT III marked products.

**Note**

- An industrial power line refers to a high-capacity supply circuit to equipment in factories or offices. A high-capacity supply circuit refers generally to a line carrying 20 A or more. This does not therefore include supply lines protected by overcurrent protection (fuses) or distribution breakers.

---

**What is the CE Mark?**

The CE mark certifies that a product complies with electrical safety standards established by European Community directives (EC directives). These EC directives require conformance of a product to EN/IEC standards for electrical safety.

- **HIOKI's products bearing the CE Mark are designed to confirm to the Low Voltage and EMC directives based on the EC directives.**
- The Low Voltage directive is applicable to products operating from 50 to 1000V AC and 75 to 1500V DC, and require protection from electrical hazards such as electric shock.
- The EMC directive requires suppression of emissions of harmful electromagnetic radiation, and the ability to withstand exposure to external electromagnetic radiation without malfunction.

---

**About the Catalog**

New products in the 2004 Electrical Measuring Instruments PRODUCT CATALOG.

- **LAN**
- **GP-IB**
- **RS-232C**
- **SCSI**
- **USB**

Models are available with interfaces compatible with LAN, GP-IB, RS-232C, SCSI, FAX/modem and USB standards.

**ISO 14001**

HIOKI is certified under the international standard ISO 14001 for environmental management systems.

**ISO 9001**

HIOKI product has been manufactured in conformity with the ISO9001 quality standard as Quality Control and Quality Assurance.

---

**Measurement categories (Overvoltage categories)**

- **CAT I**: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
- **CAT II**: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)
- **CAT III**: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.
- **CAT IV**: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement product designed for CAT III environments can endure greater momentary energy than one designed for CAT II. Using a measurement product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided.

- **Never use a CAT I measuring product in CAT II, III, or IV environments.**

The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

---

**Notes on accuracy ...**

The specifications in this catalog include figures for "measurement accuracy" when referring to digital measuring instruments, and for "measurement tolerance" when referring to analog instruments. The accuracy and tolerance figures in the product specifications are defined in terms of full scale (f.s.) value and displayed reading (rdg.) or digit resolution (dgt.) as described below.

- **rdg.** (displayed or indicated value, ... Reading value)
  - This signifies the value actually being measured, i.e., the value that is currently indicated or displayed by the measuring instrument.

- **f.s.** (maximum display, or length of scale, ... Full-Scale)
  - Signifies the maximum display (scale) value or the length of the scale (in cases where the scale consists of unequal increments or where the maximum value cannot be defined). In general, this is the range value (the value written on the range selector, or equivalent) currently in use. However, be aware that in cases where the maximum display value is 2800V but the range value is only 600V, the maximum display value (scale value) is still used as the f.s. value.

- **dgt.** (digital resolution, ... Digit value)
  - Signifies the smallest display unit on a digital measuring instrument, i.e., the value displayed when the last digit on the digital display is "1". Essentially, this indicates an error of 1 digit (based on decimal processing in analog-to-digital conversion), but in actuality this is the digit error combined with the f.s. error converted to a fraction of a digit unit. The accuracy associated with a particular measured value as shown in the product specifications is derived from these values.

---

**WARNING**

1. To avoid short circuits and electric shock accidents when using a clamp-on sensor, use only with power lines carrying voltages within the rating limit of the sensor.
2. To avoid short circuits and electric shock accidents when the clamp-on sensor is open, do not use on bare conductors.

---

**WARNING**

In some cases, power lines may carry voltage spikes of several times the normal supply voltage. For reasons of safety, ordinary testers should not be used to measure power lines carrying more than 250V. When measuring such power lines, always use a tester with built-in overcurrent protection to guard against short circuits, such as Model 3008 and CAT III marked products.

**Note**

- An industrial power line refers to a high-capacity supply circuit to equipment in factories or offices. A high-capacity supply circuit refers generally to a line carrying 20 A or more. This does not therefore include supply lines protected by overcurrent protection (fuses) or distribution breakers.
Contents

About the Catalog ........................................... P.1
Model Index .................................................... P.3

Recorders, Memory Recorders  P.4 to 15

Electronic Measuring Instruments  P.16 to 26

Environmental Measuring Instruments  P.27 to 31

Clamp Sensors  P.32 to 34

Power Measuring Instruments  P.35 to 39

Clamp Testers  P.40 to 45

Field Measuring Instruments  P.46 to 53

Options & Peripherals  P.54 to 60

- Meter Relays ............................................. P.54
- Test Leads, Test Probes .............................. P.55 to P.56
- Recording Paper, Temperature Sensors .... P.57
- All Accessories ........................................... P.58 to P.60

Service, Traceability, Calibration ....................... P.61
Company Guide & Internet Website .................. P.62
Recorders, Memory Recorders

Handy units for service and maintenance recording

**8205-10**  
Recorder (1 ch)  
100 sampling/sec.  
No memory  
. . . . . . . . . . . . . . . . . . p.13

**8807-01**  
400 kS/sec (2 ch)  
256 kW (1 ch) memory  
12 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.10

**8808-01**  
400 kS/sec (4 ch)  
256 kW (1 ch) memory  
12 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.6

**8835-01**  
1 MS/sec (8 ch)  
4 MW (1 ch) memory  
12 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.12

**8420-51/8421-51**  
Data logger (8 ch, 16 ch)  
100 ms to 1 h interval  
16 MW internal memory  
16 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.12

**8422-51**  
Data logger (32 ch)  
100 ms to 1 h interval  
16 MW internal memory  
16 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.12

For simultaneous recording of multiple signals

**8826**  
1 MS/sec (32 ch)  
4 MW (1 ch) memory  
(expandable up to four)  
12 bits A/D resolution  
. . . . . . . . . . . . . . . . . . p.6

**8860**  
20 MS/sec (12 bits 8 ch)  
2 MS/sec (16 bits 8 ch)  
50 ms/all ch (16 bits 64 ch)  
32 MW up to 1 GW memory  
. . . . . . . . . . . . . . . . . . p.5

**8861**  
20 MS/sec (12 bits 16 ch)  
2 MS/sec (16 bits 16 ch)  
50 ms/all ch (16 bits 128 ch)  
32 MW up to 20 DW memory  
. . . . . . . . . . . . . . . . . . p.5

For waveform capture of high-speed signals

**8855**  
8 channels  
20 MS/sec (8 ch)  
Max. 512 MW memory  
12 bits A/D resolution  
(16 bits A/D 1 MS/sec.)  
. . . . . . . . . . . . . . . . . . p.9

Options for MEMORY HiCORDER series

**8910**  
CAN ADAPTER  
. . . . . . . . . . . . . . . . . . p.13

For power line fault monitoring

**8206-10**  
Recorder for power lines  
100 sampling/sec (2 ch)  
AC voltage and current  
No memory  
. . . . . . . . . . . . . . . . . . p.13

**8715-01**  
Recorder for power lines  
400 kS/sec (4 ch)  
64 kW/ch memory  
12 bits A/D resolution  
Battery operation  
. . . . . . . . . . . . . . . . . . p.5

**8807-51**  
Harmonic analysis  
400 kS/sec (2 ch)  
256 kW (1 ch) memory  
12 bits A/D resolution  
. . . . . . . . . . . . . . . . . . p.10

**8808-51**  
Harmonic analysis  
400 kS/sec (4 ch)  
256 kW (1 ch) memory  
12 bits A/D resolution  
. . . . . . . . . . . . . . . . . . p.10

Recorders, Memory Recorders Index
HIGH SPEED DUAL SAMPLING - HIGH SPEED AT 20MS/s (WITH 8956 INPUT UNIT)

MAXIMUM 128 CHANNELS (8861) OR 64 CHANNELS (8860) OF DATA LOGGING

LARGE CAPACITY MEMORY, LAN/USB AND OTHER POPULAR PC INTERFACES STANDARD

INTUITIVE OPERATION USING GUI/MOUSE/KEYBOARD

HIOKI’S NEXT GENERATION RECORDER
HIGH PERFORMANCE ISOLATED OSCILLOSCOPE AND DATA LOGGER
ALL IN ONE COMPLETE INSTRUMENT

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement ranges and ANALOG UNIT input</td>
<td>5 mV to 20 V/division, 12 ranges (20 division f.s.), resolution: 1/100 of range</td>
</tr>
<tr>
<td>Frequency band</td>
<td>DC to 10 MHz ±3 dB (using 8956 ANALOG UNIT (option))</td>
</tr>
<tr>
<td>Time axis at memory function</td>
<td>1 sec to 5 minutes/division, 25 settings, external sampling (100 samples/division, desired setting)</td>
</tr>
<tr>
<td>Measurement functions</td>
<td>Memory, Recorder, Recorder &amp; Memory (Version 2.0 or later), FFT (Version 2.0 or later)</td>
</tr>
</tbody>
</table>
| Number of input channels                    | 8860: Analog (up to 8 channels) + logic (16 channels standard) or Logger Input (up to 64 channels)
8861: Analog (up to 16 channels) + logic (16 channels standard) or Logger Input (up to 128 channels) |
| Memory capacity                             | 8860: 32 M words/9715×1 (Total 1 GW, 9715-03 (+1))
8861: 64 M words/9715×2 (Total 2 GW, 9715-03 (+2)) |
| Data storage                                 | Floppy disk drive (optional), USB, Type II PC card slot, MO drive (optional), Hard disk drive (optional) |
| Interfaces                                   | USB1.1, LAN                                  |
| Recording and display                       | 10.4-inch TFT color LCD, 216 mm × 30 m, thermal paper roll |
| Other functions                              | Scaling, Vernier function, cursor measurement, comment insertion, other functions |
| Power supply                                 | 100 to 240 V AC (50/60 Hz)                   |
| Dimensions, mass (base unit only)           | 8860: 330 mmW×250 mmH×184.5 mmD, 8.0 kg
8861: 330 mmW×250 mmH×284.5 mmD, 10.5 kg |
| Accessories                                  | Power cord (1), input cord label (1), Application disk (1) |

*One MEMORY BOARD is required in Model 8860, and two MEMORY BOARDS of the same capacity is required in Model 8861

OPTIONS

(The 8860 or 8861 cannot be used alone. Measurement requires optional input unit or similar peripheral.)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8995 A4 PRINTER UNIT</td>
<td>9717 MO UNIT</td>
</tr>
<tr>
<td>9715 MEMORY BOARD</td>
<td>9718 HD MEMORY BACK UP UNIT</td>
</tr>
<tr>
<td>9716 FD UNIT</td>
<td>9719 MO UNIT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9197 CONNECTION CORD (500V Max.)</td>
<td>9724 CARRYING CASE (for 8863)</td>
</tr>
<tr>
<td>9198 CONNECTION CORD (300V Max.)</td>
<td>9642 LAN CABLE</td>
</tr>
<tr>
<td>9217 CONNECTION CORD (BNC-BNC)</td>
<td>9626 PC CARD 32MB</td>
</tr>
<tr>
<td>9231 RECORDING PAPER (50m, sleeve/setting)</td>
<td>9627 PC CARD 64MB</td>
</tr>
<tr>
<td>9322 DIFFERENTIAL PROBE</td>
<td>9726 PC CARD 128MB</td>
</tr>
<tr>
<td>9327 LOGIC PROBE</td>
<td>9727 PC CARD 256MB</td>
</tr>
<tr>
<td>9320-01 LOGIC PROBE</td>
<td>9728 PC CARD 512MB</td>
</tr>
<tr>
<td>9321-01 LOGIC PROBE</td>
<td>CLAMP ON SENSORS (refer to p.32-34)</td>
</tr>
<tr>
<td>9723 CARRYING CASE (for 8860)</td>
<td>Other common options (refer to p.8)</td>
</tr>
</tbody>
</table>

INPUT MODULES

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8956 ANALOG UNIT</td>
<td>8957 HIGH RESOLUTION UNIT</td>
</tr>
<tr>
<td>8958 16ch SCANNER UNIT</td>
<td>8959 DCRMS UNIT</td>
</tr>
<tr>
<td>8960 ANALOG UNIT</td>
<td>8961 ANALOG UNIT</td>
</tr>
<tr>
<td>8962 VOLTS/TEMP UNIT</td>
<td>8963 FFT ANALOG UNIT</td>
</tr>
<tr>
<td>8964 STRAIN UNIT</td>
<td>8965 STRAIN UNIT</td>
</tr>
<tr>
<td>8966 PH UNIT</td>
<td>8967 CHARGE UNIT</td>
</tr>
</tbody>
</table>

*COMMON OPTIONS (REFER TO P.8)

- CONNECTION CORD (BNC-BNC)
- RECORDING PAPER (50m, sleeve/setting)
- DIFFERENTIAL PROBE
- LOGIC PROBE
- CARRYING CASE (for 8860)
- CLAMP ON SENSORS (refer to p.32-34)
### 8835-01 MEMORY HICORDER

**High-visibility, Compact, Multi-channeled Field measurement has never been easier**

- Compact 4/8 ch recorder saves space with slim profile
- 110mm-width recording paper and a large color display (6.4-inch)
- Maximum 8 analog channels and 16 logic
- Network Recording Instrument for LAN

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Measurement ranges</th>
<th>10mV to 500V/division, 12 ranges (10 division f.s.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency band</td>
<td>DC to 40kHz, 50/60 Hz</td>
</tr>
<tr>
<td>Time axis at memory function</td>
<td>100µs to 5 minutes/division, 20 ranges (1 division =100 samples)</td>
</tr>
<tr>
<td>Functions</td>
<td>Memory recorder, Recorder, RMS recorder (50/60Hz or DC only), *Recorder and Memory, *FFT</td>
</tr>
<tr>
<td>Number of input channels</td>
<td>4 analog channels + 16 logic channels (using 8936)</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>12 bits × 32M words/channel (using 1 channel)</td>
</tr>
<tr>
<td>Data storage</td>
<td>Type-II PC card, 9626/9627/9726/9727/9728 PC CARD</td>
</tr>
<tr>
<td>Interfaces</td>
<td>LAN, GP-IB, or RS-232C (option, using PC card)</td>
</tr>
<tr>
<td>Recording and display</td>
<td>110mm/30m roll type thermal paper, 25mm/s, 6.4-inch color TFT LCD</td>
</tr>
<tr>
<td>Other functions</td>
<td>Scaling, Waveform parameter calculations, Memory segmentation, Cursor readout, etc.</td>
</tr>
<tr>
<td>Power supply</td>
<td>100 to 240V AC, 50/60 Hz</td>
</tr>
<tr>
<td>Dimensions, mass</td>
<td>285W×220H×132D mm, 4.5kg</td>
</tr>
<tr>
<td>Accessories</td>
<td>Power cord (1), Recording paper (1 roll), Dust cover (1), PC card protector (1), Application disk (1)</td>
</tr>
</tbody>
</table>

*Note: An input cord is not supplied with the input unit. Requires the 9197 or 9198

### OPTIONS

- Options: 9221 RECORDING PAPER, 9333 LAN COMMUNICATOR, 9335 WAVE PROCESSOR, 9338 CARRYING CASE, 9439 DC POWER ADAPTER

### 8826 MEMORY HICORDER

**32-channel recorder with all isolated inputs**

- Simultaneous sampling, display and recording of all 32 analog and 32 logic channels
- Large capacity memory of max. 16M-word
- Memory expandable four times (option)
- High resolution of 12-bit, 1 M-sampling/second
- B4-size (paper width 264 mm) wide printer
- High-visibility waveforms displayed on a 10.4-inch color TFT liquid crystal display

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Measurement ranges</th>
<th>5 mV to 20 V/division, 12 ranges (normal f.s.; 20 division, wide f.s.; 24 division), resolution: 1/80 of range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency band</td>
<td>DC to 40 kHz, 50/60 Hz</td>
</tr>
<tr>
<td>Time axis at memory function</td>
<td>100µs to 5 minutes/division, 20 ranges (1 division =100 samples)</td>
</tr>
<tr>
<td>Functions</td>
<td>Memory recorder, Recorder (included X-Y), RMS recorder, Recorder and Memory, FFT</td>
</tr>
<tr>
<td>Number of input channels</td>
<td>32 analog channels + 32 logic channels (using 8946)</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>12 bits × 4M words/channel (using 1 channel)</td>
</tr>
<tr>
<td>Data storage</td>
<td>Type-II PC card, 9626/9627/9726/9727/9728 PC CARD</td>
</tr>
<tr>
<td>Interfaces</td>
<td>LAN, GP-IB, or RS-232C (option, using PC card)</td>
</tr>
<tr>
<td>Recording and display</td>
<td>264 mm/30m roll type thermal paper, Recording speed: 25mm/s, 10.4-inch color TFT LCD</td>
</tr>
<tr>
<td>Other functions</td>
<td>Scaling, Waveform parameter calculations, Memory segmentation, Logging print, Clock, Cursor readout, Comment entry, etc.</td>
</tr>
<tr>
<td>Power supply</td>
<td>100 to 240V AC, 50/60 Hz</td>
</tr>
<tr>
<td>Dimensions, mass</td>
<td>401W×350H×225D mm, 11 kg (excluding input units)</td>
</tr>
<tr>
<td>Accessories</td>
<td>Power cord (1), Recording paper (1 roll), Dust cover (1), PC card protector (1), Application disk (1)</td>
</tr>
</tbody>
</table>

*Note: An input cord is not supplied with the input unit. Requires the 9197 or 9198
### INPUT Units

#### 8936 ANALOG UNIT

**Input**
- Number of channels: 2
- Connector: Insulated BNC
- *Input isolated from output, inter-channel isolation*
- Measurement range: 5mV to 20V DC, 12 settings, full-scale (f.s.) = 20 divisions
- AC voltage for possible measurement display using the memory feature
- Maximum sampling rate: 1 MS/s (simultaneous sampling of two channels)
- Accuracy: DC amplitude: ±0.04% f.s., Zero-position: ±0.1% f.s.
- Zero-position: ±50% to 150%, 1% step *With zero-adjustment function*
- Frequency characteristics:
  - DC: 40kHz, ±4 dB (AC coupling) 7kHz to 40kHz ±2dB
  - Input reference capacitance: 1MD, 30pF approx. (at 100kHz)
- Input coupling: DC, GND, AC

**Max. allowable input**
- 40V DC (voltage which when applied between input pins does not damage them)

**Max. grounding voltage**
- 30V AC, DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- None * Input cord optional

---

#### 8938 FFT ANALOG UNIT

**Anti-aliasing filter**
- Cutoff frequency: 20, 40, 80, 200, 400, 800, 2k, 4k, 8k, 20k kHz auto-select (linked to frequency range)
**Other functions**
- Same as the 8936 ANALOG UNIT
**Accessories**
- None * Input cord optional

---

#### 8937 VOLTAGE/TEMPERATURE UNIT

**Inputs**
- Number of channels: 2 each for voltage and temperature
- *Input isolated from output, inter-channel isolation*
- Voltage input: isolated BNC, Thermocouple input: plug-in terminal
- Measurement range:
  - 50mV to 2V DC, 12 settings, full-scale (f.s.) = 20 divisions
- Temperature measurement range: 10°C to 100°C, 4 settings, full-scale (f.s.) = 20 divisions
- Thermocouple range: K: -200 to 1350°C, E: -200 to 800°C, J: -200 to 1100°C, T: -200 to 400°C
- DC amplitude accuracy:
  - Zero-position: ±0.1% of f.s., Temperature measurement: ±0.3°C, ±3.0% of ±2°C (to 200°C), ±3% (B): ±0.1% of ±4°C (to 100°C)
- Temperature measurement compensation accuracy: ±0.1% ±1.5°C (internal compensation)
- DC to 400kHz ±1/ -3 dB, Low-pass filter: 5/500/5kHz, 100kHz
- Reference junction compensation: internal/external (switchable)

**Max. sampling rate**
- Voltage input: 1 MS/s, Temperature measurement: ±45°C (2-channel simultaneous sampling)

**Accuracy**
- Voltage input: DC amplitude: ±0.04% f.s. Zero-position: ±0.1% of f.s.
- Temperature measurement: ±0.3°C (to 200°C), ±3% (B): ±0.1% of ±4°C (to 100°C)
- Reference junction compensation: ± ±0.1% of f.s.

**Frequency characteristics**
- DC to 100kHz ±3 dB
- Input reference and capacitance:
  - DC to 150kHz ±4% (at 100kHz)

**Input coupling**
- DC, GND, AC

**Max. allowable input**
- 30V rms or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Max. grounding voltage**
- 30V AC, DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- None * Input cord optional

---

#### 8939 STRAIN UNIT

**Inputs**
- Number of channels: 2, Connector: Adapter cable connector
- *Input isolated from output, inter-channel isolation*
- Converter connector: Via adapter cable, TADMS PRC03-32A-10M-5.0/8
- Suitable converter: Strain gage bridge, Strain gage bridge: 125Ω to 1mA
- Measurement range:
  - 2µA to 10mA, 6 settings, full-scale (f.s.) = 20 divisions, low-pass filter: 10Hz, 30Hz, 300Hz, 3kHz, OFF
  - The measurement resolution is 1/60 of range *When used with 8841, 8842*

**Maximum sampling rate**
- 1 MS/s (simultaneous sampling of two channels)

**Accuracy**
- DC amplitude: ±0.04% f.s., Zero-position: ±0.1% f.s.

**Balancing**
- Electronic auto-balancing, max. adjustment range: ±1000.00µV

**Zero position**
- ±50% to 150%, 1% step *With auto-balancing

**Frequency characteristics**
- DC to 20kHz ±1/3 dB

**Max. allowable input**
- 10V DC + AC peak (upper voltage which when applied to between input pins does not damage them)

**Max. grounding voltage**
- 30V rms or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- Conversion cable (2), PRC03-12A-10M-5.0/8

---

### 8936 F/ U/V UNIT

**Input**
- Number of channels: 2, Voltage input: BNC terminal
- *Input isolated from output, inter-channel isolation*

**Sensor connector terminal**
- Number of channels: 2
- (For current measurement): *Models that allow unit insertion up to a total of 4 channels: 8841, 8842, 8720

**Compatible current sensors**
- 9270, 9271, 9272, 9278, 9297, 3273, 3273-50

**Measurement range**
- Frequency: 0.05Hz to 1kHz divided, 11 ranges, (f.s/mim)/ (division), 5 ranges, 50Hz (0 to 60Hz), 90Hz (50 to 70Hz)
- Integration: 5 counts to 500 counts divided, Pulse duty ratio: 100% f.s.
- Current: 5mA to 100A divided, 10 ranges, linked to use with type of the clamp-on sensor: Voltage: 0.5mV to 2V DC, 12 ranges, Max. allowable input: ±20 V ms or 60 V DC, Full-scale (f.s.) = 20 divisions, low-pass filter: 100/50kHz, OFF (the measurement resolution is 1/60 of range): *When used with 8841, 8842, and when used with 9279 CLAMP ON SENSOR, the resolution is 1/64 of range*

**Max. sampling period**
- 1µs (voltage, current)

**Other functions**
- Voltage input pull-up: ON (10kΩ)/ OFF
- Input coupling: DC, GND, AC (voltage, current), DC (others)

**Max. grounding voltage**
- 30V or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- None * Input cord and conversion cable optional

---

### 8946 4ch ANALOG UNIT

**Inputs**
- Number of channels: 4, Terminal: Metallic BNC
- *Input isolated from output, inter-channel isolation*
- Measurement range:
  - 10mV to 2V DC, 8 ranges, full-scale (f.s.) = 20 divisions
  - Voltage: 0.5mV to 2V DC, 15 pF approx. (at C 100kHz)

**Input coupling**
- DC, GND

**Max. allowable input**
- 30V rms or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Max. grounding voltage**
- 30V rms or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- None * Input cord optional

---

### 8947 CHARGE UNIT

**Input**
- Number of channels: 2
- Measurement charge can be selected individually for each channel.
- Full isolation between inputs, and between inputs and recorder.
- Common GND for voltage input and charge input.
- Voltage and pre-amplifier internal inputs: BNC terminals
  - Voltage input: input internal resistance: 1MΩ, With input charge: (10±2% F)

**Suitable converters**
- Charge input: piezoelectric charge output acceleration pickup sensors, Internal pre-amplifier input: acceleration pickup sensors with built-in pre-amplifier

**Measurement ranges**
- Charge input (miniature connector)
  - Pre-amplifier internal input: BNC terminal (10±2% F)

**Measurement range**
- Voltage input (BNC terminal)
  - 90mV (DC) to 10µV to 10mV (DC)/ 10µV to 100mV (DC), 12 ranges*6, the measurement resolution is 1/32 of range (changes according to measurement sensitivity)
  - Measurement sensitivity: 0.1 to 10pC (DC)/ (DC), Pre-amplifier internal input measurement sensitivity: 0.1 to 10mV (DC/S), Amplitude accuracy: ±±2% f.s., Frequency characteristics: 1 to 50kHz ±1/ -3 dB, Low-pass filter: 50/15kHz, Pre-amplifier driving power supply: 2mA ±20%, +15% ±5%, Highest input charge: ±500pC (high sensitivity side 6 ranges), 250000 pc (low sensitivity side 6 ranges)

**Measurement ranges**
- Voltage input (BNC terminal)
  - 900pV to 2DIV/12, 12 ranges, the measurement resolution is 1/32 of range (changes according to measurement sensitivity)
  - Measurement sensitivity: 0.1 to 10 pC (DC)/ (DC), Pre-amplifier internal input measurement sensitivity: 0.1 to 10mV (DC/S), Amplitude accuracy: ±±2% f.s., Frequency characteristics: DC to 400kHz ±1/ -3 dB, Low-pass filter: 5/ 500/ 5kHz, 100kHz

**Max. allowable input**
- 30V rms or 60V DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

**Accessories**
- None * Input cord optional

---

### Dimensions and mass:
- Approx. 170 x 201 x 148D mm, approx. 290g

---

### Dimensions and mass:
- Approx. 170 x 201 x 148D mm, approx. 310g
Common options for 8800 series MEMORY HiCORDER

*Designated products are not CE-Mark compliant
Note: Product names appearing herein are trademarks or registered trademarks of the various companies.

### Logic Signal Measurement
- **9321/9321-ct** LOGIC PROBE 6-channel isolated, on/off detection of AC/DC voltage
- **9320/9320-ct** LOGIC PROBE 4-channels, on/off detection of voltage/contact signal

### Input Modules
- **9270 CLAMP ON SENSOR** Enables observation of distorted AC current waveforms. Input up to 20 A, DC to 50 kHz for 2 V AC out
- **9271 CLAMP ON SENSOR** Enables observation of distorted AC current waveforms. Input up to 200 A, 5 to 50 kHz for 2 V AC out
- **9272 CLAMP ON SENSOR** Enables observation of distorted AC current waveforms. Input observable: 20/200 A, 5 to 10 kHz for 2 V AC out
  - Note: Can only be used in combination with the 9555 SENSOR UNIT or 8940 FV UNIT.
- **9318 CONVERSION CABLE** Used together with 9270 to 9272, 9277 to 9279 clamp-on sensors. Power supply unit.
- **9277 UNIVERSAL CLAMP ON CT** Observes waveforms from DC to distorted AC. Input up to 20 A, DC to 100 kHz for 2 V AC out
- **9278 UNIVERSAL CLAMP ON CT** Observes waveforms from DC to distorted AC. Input up to 200 A, DC to 100 kHz for 2 V AC out
- **9279 UNIVERSAL CLAMP ON CT** Observes waveforms from DC to distorted AC. Input up to 500 A, DC to 20 kHz for 2 V AC out
  - Note: Can only be used in combination with the 9555 SENSOR UNIT or 8940 FV UNIT.

### Current Measurement, other options
- **9018-10 CLAMP ON PROBE** 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal
- **9132-10 CLAMP ON PROBE** 40 Hz to 3 kHz for 0.2 V AC output. BNC terminal
- **9199 CONVERSION ADAPTER** Banana-to-BNC, use to connect to BNC terminal on Input Module
- **9217 CONNECTION CORD** BNC-to-insulation BNC, use to connect to insulation-insulation terminal on Input Module
- **9165 CONNECTION CORD** Metal BNC terminal BNC, use to connect to metal-metal terminal on Input Module

### PC Communication
- **9557 RS-232C CARD** (compliance with the PCMCIA Standard) 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal
- **9558 GB-IB CARD** (compliance with the PCMCIA Standard) *With a CB-IB cable, cord length: 2m (~8 feet)
- **9333 LAN COMMUNICATOR** software required to use LAN connection with Windows 95/98/Me, Windows NT 4.0/XP

### Storage Media
- **9626 PC CARD** 32 MB
- **9627 PC CARD** 64 MB
- **9723 PC CARD** 128 MB
- **9727 PC CARD** 256 MB
- **9729 PC CARD** 512 MB
- **9931 RECORDING PAPER** 30 m/98.43 feet, 6 rolls / 1 set

### DC Power Supply
- **9374 DC POWER ADAPTER** Supplies operating power in the range 10 to 20 V DC. (8841 and 8842)
- **9333 DC POWER ADAPTER** for logic terminal
- **9324 POWER CORD** for logic terminal
- **9325 POWER CORD** for 8940 sensor terminal

### High-voltage input
- **9198 CONNECTION CORD** for high voltage (up to 500V)
- **220H PAPER WINDER** Paper width (2.75") – 220

### Instrument
- **9608 MEMORY BOARD** Expands instrument memory by 4x. Most specify when ordering. Not user installable. (8841, 42 only)
- **9607 MO UNIT** Installs on the bottom of the instrument. Must specify when ordering. (8841, 42 only)

### Logic Signal Measurement
- **9018-10 CLAMP ON PROBE** 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal

### Input Modules
- **9557 RS-232C CARD** (compliance with the PCMCIA Standard) 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal
- **9558 GB-IB CARD** (compliance with the PCMCIA Standard) *With a CB-IB cable, cord length: 2m (~8 feet)

### Storage Media
- **9626 PC CARD** 32 MB
- **9627 PC CARD** 64 MB
- **9723 PC CARD** 128 MB
- **9727 PC CARD** 256 MB
- **9729 PC CARD** 512 MB
- **9931 RECORDING PAPER** 30 m/98.43 feet, 6 rolls / 1 set

### DC Power Supply
- **9374 DC POWER ADAPTER** Supplies operating power in the range 10 to 20 V DC. (8841 and 8842)
- **9333 DC POWER ADAPTER** for logic terminal
- **9324 POWER CORD** for logic terminal
- **9325 POWER CORD** for 8940 sensor terminal

### High-voltage input
- **9198 CONNECTION CORD** for high voltage (up to 500V)
- **220H PAPER WINDER** Paper width (2.75") – 220

### Instrument
- **9608 MEMORY BOARD** Expands instrument memory by 4x. Most specify when ordering. Not user installable. (8841, 42 only)
- **9607 MO UNIT** Installs on the bottom of the instrument. Must specify when ordering. (8841, 42 only)
8855 MEMORY HiCORDER

8ch high-speed isolated inputs of 20MS/s, Max. 512 M words long storage memory

- Maximum 8 analog channels and 16 logic channels
- 20MS/s, 8ch 12-bit high-speed isolated Input (8950/8951/8952)
- 1MS/s, 8ch 16-bit HIGH RESOLUTION Input (8953-10)
- Max. 512 M words long storage memory
- Zoom and scroll functions providing enlarged and compressed displays
- Standard LAN/SCSI interface

**SPECIFICATIONS**

- **Measurement ranges:**
  - Easy 950 ANALOG UNIT: input 5 mV to 20 V/division, 12 ranges (20 division f.s.) resolution: 1/100 of range
- **Frequency band:**
  - DC to 10 MHz 125 kHz Sampling speed max.20MS/s
- **Time axis or memory function:**
  - 5μs to 5 minutes/division, 24 ranges (1 division=100 samples)
- **Functions:** Memory, Recorder (Rec & Memory, FFT/function in version 2.00 or later)
- **Number of input channels:** 8 analog channels plus 16 logic channels (analogue inputs are isolated up to 370V)
- **Memory capacity:**
  - 4M words/channel (Total 32MW)
  - 4M words/channel (Option) (Total 32MW/64MB)
- **Data storage:**
  - FDD×1, Type-II PC card×1: 9626-9728 PC CARD (MO or HDD×1/option)
- **Interfaces:**
  - LAN, SCSI, GP-IB or RS-232C (Option, use PC card)
- **Display and recording:**
  - 10.4 inch TFT color LCD (option; 216mm×30mm, roll type thermal paper)
- **Other functions:**
  - Scaling, Waveform judgment, Waveform processing calculations, Waveform parameter calculations, Memory segmentation, Waveform zoom display, Cursor, Cursor readout, Comment entry, etc.
- **Power supply:**
  - 100 to 240V AC 50/60 Hz Max. 180VA
- **Dimensions, mass:**
  - 275W×285H×170D mm, 6.3kg
- **Accessories:**
  - Power cord(1), PC card protector(1), Input cord label(1), Application disk(1)

**OPTIONS**

(The 8855 cannot be used alone. Measurement requires optional input unit or similar peripheral.)

**Options (Factory fitted)**
- 9994 PRINTER UNIT
- 9645 MEMORY BOARD (96MW)
- 9645-01 MEMORY BOARD (512MW)
- 9646 MO UNIT (1.3GB/640MB~128MB)
- 9663 HD UNIT (20GB)

**Options**
- 8950 ANALOG UNIT
- 8951 Voltage/Current UNIT
- 8952 DCRMS UNIT
- 8953-10 HIGH RESOLUTION UNIT
- 8954 VOLTAGE/TEMP UNIT
- 8955 F/V UNIT
- 9197 CONNECTION CORD (300V Max.)
- 9198 CONNECTION CORD (500V Max.)
- 9322 DIFFERENTIAL PROBE
- 9326 PC CARD (64 MB)
- 9327 PC CARD (256 MB)
- 9333 LAN COMMUNICATOR
- 9335 WAVE PROCESSOR
- 9397-01 CARRYING CASE
- 9399 BS-232C CARD
- 9538 OP-IB CARD
- 9549 FUNCTION UP DISK
- 9624 LAN CABLE
- 9626 PC CARD 32 MB
- 9627 PC CARD 64 MB
- 9726 PC CARD 128 MB
- 9727 PC CARD 256 MB
- 9728 PC CARD 512 MB
- CLAMP ON SENSORS (refer to p.32-34)
- Other common options (refer to p.8)

**Input modules**

- Install or replace simply by inserting the module into the base unit
- Note: Input cords are not provided. Please purchase the appropriate input cord for the probe type and application separately.

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8950 ANALOG UNIT</td>
<td>9646 MO UNIT (1.3GB/640MB~128MB)</td>
</tr>
<tr>
<td>8951 Voltage/Current UNIT</td>
<td>9645 MEMORY BOARD (96MW)</td>
</tr>
<tr>
<td>8952 DCRMS UNIT</td>
<td>9645-01 MEMORY BOARD (512MW)</td>
</tr>
<tr>
<td>8953-10 HIGH RESOLUTION UNIT</td>
<td>9663 HD UNIT (20GB)</td>
</tr>
<tr>
<td>8954 VOLTAGE/TEMP UNIT</td>
<td>9549 FUNCTION UP DISK</td>
</tr>
<tr>
<td>8955 F/V UNIT</td>
<td>9624 LAN CABLE</td>
</tr>
<tr>
<td>9197 CONNECTION CORD (300V Max.)</td>
<td>9626 PC CARD 32 MB</td>
</tr>
<tr>
<td>9198 CONNECTION CORD (500V Max.)</td>
<td>9627 PC CARD 64 MB</td>
</tr>
<tr>
<td>9322 DIFFERENTIAL PROBE</td>
<td>9726 PC CARD 128 MB</td>
</tr>
<tr>
<td>9326 PC CARD (64 MB)</td>
<td>9727 PC CARD 256 MB</td>
</tr>
<tr>
<td>9327 PC CARD (256 MB)</td>
<td>9728 PC CARD 512 MB</td>
</tr>
<tr>
<td>9333 LAN COMMUNICATOR</td>
<td>CLAMP ON SENSORS (refer to p.32-34)</td>
</tr>
<tr>
<td>9335 WAVE PROCESSOR</td>
<td>Other common options (refer to p.8)</td>
</tr>
</tbody>
</table>

**Logic input**

- 9327 LOGIC PROBE
- 4 channels, ON/OFF detection of voltage/contact signals (high-speed type for use with the 8855)
New concept incorporating detachable printer, B5-sized handy recorder

- B5 book-sized, compact, and handy high-speed recorders
- 2 analog channels (8807-01) 4 analog channels (8808-01) isolated inputs (with 8 logic)
- PC card slot, 3-way power supply, and powerful trigger functions
- Fax/modem communication function (9332)

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement ranges</strong></td>
<td>10 mV to 100 V/division, 13 ranges (10 division f.s.), resolution: 1/160 of range, RMS of range, 100 V/division excludes the RMS &amp; memory recorder functions</td>
</tr>
<tr>
<td><strong>Frequency band</strong></td>
<td>DC to 50 kHz, ±3 dB</td>
</tr>
<tr>
<td><strong>Time axis at memory function</strong></td>
<td>20µs to 5 minutes/division, 19 ranges (1 division =40 samples)</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td>Memory recorder, Recorder, RMS &amp; memory recorder (50/60 Hz or DC-only)</td>
</tr>
<tr>
<td><strong>Number of input channels</strong></td>
<td>8807-01: fixed input section, 2 analog +8 logic</td>
</tr>
<tr>
<td></td>
<td>8808-01: fixed input section, 4 analog +8 logic</td>
</tr>
<tr>
<td><strong>Memory capacity</strong></td>
<td>(analog 12 bits + logic 4 bits to 256 k words/channel, *using CH1</td>
</tr>
<tr>
<td><strong>Data storage</strong></td>
<td>PCMCIA Type-II PC card ×1</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>RS-232C, Printer (9992 PRINTER UNIT can be connected)</td>
</tr>
<tr>
<td><strong>Recording and display</strong></td>
<td>112 mm × 18 m, roll type thermal paper, Recording speed: 10 mm/s (using AC adapter), 5 mm/s (using batteries), 5.7-inch STN color LCD</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>9418-15 AC ADAPTER, LR6 (AA) (Continuous use 1 hour, LR6 batteries cannot be used with 8992 PRINTER UNIT), 9447 BATTERY PACK (Continuous use 3 hours)</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>203W × 170H × 52D mm (printer detached)</td>
</tr>
<tr>
<td></td>
<td>280W × 170H × 52D mm (printer attached)</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>LR6 (AA) Alkaline batteries(6), Alkaline battery box (1), Shoulder belt (1), Application disk (1)</td>
</tr>
</tbody>
</table>

**OPTIONS**

(The 8807-01 & 8808-01 cannot be used alone. Measurement requires optional INPUT CORD or similar peripheral.)

- 8992 PRINTER UNIT (print size 100 mm width)
- 9224 RECORDING PAPER (5mm, 10 rolls /1 set)
- 9320-01 LOGIC PROBE (refer to p.8)
- 9321-01 LOGIC PROBE (refer to p.8)
- 9323 CONVERSION CABLE
- 9391 CARRYING CASE
- 9418-15 AC ADAPTER (universal 100 to 240VAC, 12VDC/2.5A output)
- 9447 BATTERY PACK (7.2V, 2400 mAh, recharging with the 9418-15)
- 9612 RS-232C CABLE (mini DIN 9-pin to Dsub 9-pin, 1.5 m)
- CLAMP ON SENSORS (refer to p.32–34)
- 9332 WAVE COMMUNICATOR
- 9335 WAVE PROCESSOR
- 9643 CHARGE STAND
- Other common options (refer to p.8)

*Note: An input cord is not supplied with the 8807-01 & 8808-01. Requires the 9197 or 9198

**MEMORY HiCORDER**

Instantaneous Analysis and Long-term Recording of Harmonic Waves for Maintenance of Commercial Power Systems

**Instantaneous harmonic analysis**

- Measure harmonics up to 40 orders from the fundamental wave
- Analysis display includes RMS value, content factor, phase angle, active power, and power phase angle for each order of harmonics (numeric and graphic display)
- Analysis display of total RMS value, total distortion, active/reactive/apparent power, and power factor (numeric display)
- Bar graph and numeric data display
- Power phase angle can be displayed as a vector

**Memory HiCORDER**

New concept incorporating detachable printer, B5-sized handy recorder

- B5 book-sized, compact, and handy high-speed recorders
- 2 analog channels (8807-01) 4 analog channels (8808-01) isolated inputs (with 8 logic)
- PC card slot, 3-way power supply, and powerful trigger functions
- Fax/modem communication function (9332)

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement ranges</strong></td>
<td>10 mV to 100 V/division, 13 ranges (10 division f.s.), resolution: 1/160 of range, RMS of range, 100 V/division excludes the RMS &amp; memory recorder functions</td>
</tr>
<tr>
<td><strong>Frequency band</strong></td>
<td>DC to 50 kHz, ±3 dB</td>
</tr>
<tr>
<td><strong>Time axis at memory function</strong></td>
<td>20µs to 5 minutes/division, 19 ranges (1 division =40 samples)</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
<td>Memory recorder, Recorder, RMS &amp; memory recorder (50/60 Hz or DC-only)</td>
</tr>
<tr>
<td><strong>Number of input channels</strong></td>
<td>8807-01: fixed input section, 2 analog +8 logic</td>
</tr>
<tr>
<td></td>
<td>8808-01: fixed input section, 4 analog +8 logic</td>
</tr>
<tr>
<td><strong>Memory capacity</strong></td>
<td>(analog 12 bits + logic 4 bits to 256 k words/channel, *using CH1</td>
</tr>
<tr>
<td><strong>Data storage</strong></td>
<td>PCMCIA Type-II PC card ×1</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>RS-232C, Printer (9992 PRINTER UNIT can be connected)</td>
</tr>
<tr>
<td><strong>Recording and display</strong></td>
<td>112 mm × 18 m, roll type thermal paper, Recording speed: 10 mm/s (using AC adapter), 5 mm/s (using batteries), 5.7-inch STN color LCD</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>9418-15 AC ADAPTER, LR6 (AA) (Continuous use 1 hour, LR6 batteries cannot be used with 8992 PRINTER UNIT), 9447 BATTERY PACK (Continuous use 3 hours)</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>203W × 170H × 52D mm (printer detached)</td>
</tr>
<tr>
<td></td>
<td>280W × 170H × 52D mm (printer attached)</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>LR6 (AA) Alkaline batteries(6), Alkaline battery box (1), Shoulder belt (1), Application disk (1)</td>
</tr>
</tbody>
</table>

**OPTIONS**

(The 8807-01 & 8808-01 cannot be used alone. Measurement requires optional INPUT CORD or similar peripheral.)

- 8992 PRINTER UNIT (print size 100 mm width)
- 9224 RECORDING PAPER (5mm, 10 rolls /1 set)
- 9320-01 LOGIC PROBE (refer to p.8)
- 9321-01 LOGIC PROBE (refer to p.8)
- 9323 CONVERSION CABLE
- 9391 CARRYING CASE
- 9418-15 AC ADAPTER (universal 100 to 240VAC, 12VDC/2.5A output)
- 9447 BATTERY PACK (7.2V, 2400 mAh, recharging with the 9418-15)
- 9612 RS-232C CABLE (mini DIN 9-pin to Dsub 9-pin, 1.5 m)
- CLAMP ON SENSORS (refer to p.32–34)
- 9332 WAVE COMMUNICATOR
- 9335 WAVE PROCESSOR
- 9643 CHARGE STAND
- Other common options (refer to p.8)

*Note: An input cord is not supplied with the 8807-01 & 8808-01. Requires the 9197 or 9198

**MEMORY HiCORDER**

Instantaneous Analysis and Long-term Recording of Harmonic Waves for Maintenance of Commercial Power Systems

**Instantaneous harmonic analysis**

- Measure harmonics up to 40 orders from the fundamental wave
- Analysis display includes RMS value, content factor, phase angle, active power, and power phase angle for each order of harmonics (numeric and graphic display)
- Analysis display of total RMS value, total distortion, active/reactive/apparent power, and power factor (numeric display)
- Bar graph and numeric data display
- Power phase angle can be displayed as a vector
8730-10 8731-10

A MEMORY HiCORDER geared for the production line

- Easy installation into production lines for high speed measurement and assessment
- Compare the signals of manufactured components and devices with a memorized reference signal to conduct PASS/FAIL evaluations on a waveform level
- 8730-10: 1ch input/comparison  8731-10: 2ch input/2ch simultaneous comparison
- Connect to a PC via LAN for networking capabilities

**SPECIFICATIONS**
- **Measurement ranges**: 100 mV to 5 V/division, 6 ranges (10 division f.s.)
  resolution: 1/160 of range
- **Frequency characteristic**: DC to 400 kHz ±3 dB
- **Number of input channels**: 8730-10: Analog 1 channel  8731-10: Analog 2 channels
- **Memory capacity**: 128x64k words/ch
- **Time axis**: 10µs to 5 minutes/division, 20 settings (1 division =100 samples)
  external sampling (up to 1 kHz, minimum sampling period 1 ms)
- **Measurement functions**: Memory recorder with Wave Comparator
- **Data storage**: PC card  Type II slot
- **Interfaces**: RS-232C  LAN (10 BASE-T)  External I/O
- **Display**: 7.2-inch STN color LCD
- **Power supply**: 100 to 240 V AC (50/60 Hz)
- **Dimensions, mass**: 8730-10: 288W x 144H x 190D mm, 3.6kg
  8731-10: 288W x 144H x 190D mm, 3.7kg
- **Accessories**: Power cord(1), Application disk(1)

**OPTIONS**
- 9333 LAN COMMUNICATOR
- 9335 WAVE PROCESSOR
- 9626 PC CARD 32M
- 9627 PC CARD 64M
- 9726 PC CARD 128M
- 9727 PC CARD 256M
- 9728 PC CARD 512M

Rack-mount the 8730-10 or 8731-10 on existing facilities.
Set up the instruments on the Control Box.
Bring the unit to the local testing site for ultimate portability and convenience.
### 8420-51/8421-51 SPECIFICATIONS

| Input Channels | 8420-51: Analog 8 channels isolated by Photo-MOS relays  
8421-51: Analog 16 channels isolated by Photo-MOS relays  
Pulse Inputs: 4ch. Logic Inputs: 16ch (using the 8993) |
|----------------|--------------------------------------------------------------------------------------------------|
| Measurement objects | Thermocouple: K,E,J,T,N,W(Re5-26),R,S,and B  
Pt-100 JPt-100  
Analog voltage input: 100mV, 1V, 10V, 100V and 1-5V f.s. |
| Recording interval | 100ms to 1 hour (5 sec. to 1 hour for humidity measurement) |
| A/D resolution | 16 bits |
| Memory capacity | Internal: 16MW DRAM (32MB)  
External: 9626-9728 SD CARDS |
| Interfaces | RS-232C, LAN (10Base-T Ethernet connectors)  
Printer: 8992, DIGITAL I/O UNIT (8993) |
| Display and Recording | 5.7-inch STN color LCD, 8992 Printer (Option)  
Recording speed: 2 mm/s |
| Function | Waveform compression and magnification, Event search,  
Waveform scroll, cursor measurement, scaling,  
automatic save, start condition retention, setting save,  
comment entry, automatic set up, numerical calculation |
| Power supply | 9418-15 AC ADAPTER, 9447 BATTERY PACK |
| Dimensions, mass | 234W×170H×52D mm 1.4kg (instrument only)  
310W×170H×52D mm 1.7kg (with printer)  
302W×170H×52D mm 1.7kg (with Digital I/O Unit) |
| Accessories | 9418-15 AC ADAPTER(1),  
Terminal Cover(1), Screwdriver(1), Application disk(1) |

### 8422-51 SPECIFICATIONS

| Input Channels | 8422-51: Analog 32 channels isolated by Photo-MOS relays  
Pulse Inputs: 4ch. Logic Inputs: 16ch (using the 8993) |
|----------------|--------------------------------------------------------------------------------------------------|
| Measurement objects | Thermocouple: K,E,J,T,N,W(Re5-26),R,S,and B  
Analog voltage input: 100mV, 1V, 10V, 100V and 1-5V f.s. |
| Recording interval | 100ms to 1 hour (16ch) (200 ms to 1 hour) |
| A/D resolution | 16 bits |
| Memory capacity | Internal: 16MW DRAM (32MB)  
External: 9626-9728 SD CARDS |
| Interfaces | RS-232C, LAN (10Base-T Ethernet connectors)  
Printer: 8992, DIGITAL I/O UNIT (8993) |
| Display and Recording | 5.7-inch STN color LCD, 8992 Printer (Option)  
Recording speed: 2 mm/s |
| Function | Waveform compression and magnification, Event search,  
Waveform scroll, cursor measurement, scaling,  
automatic save, start condition retention, setting save,  
comment entry, automatic set up, numerical calculation |
| Power supply | 9418-15 AC ADAPTER, 9447 BATTERY PACK |
| Dimensions, mass | 234W×170H×52D mm 1.4kg (instrument only)  
310W×170H×52D mm 1.7kg (with printer)  
302W×170H×52D mm 1.7kg (with Digital I/O Unit) |
| Accessories | 9418-15 AC ADAPTER(1),  
Terminal Cover(1), Screwdriver(1), Application disk(1) |

### OPTIONS

- 8992 PRINTER UNIT (print size 100 mm width)  
- 9643 CHARGE STAND  
- 9612 RS-232C CABLE(mini DIN 9-pin to Db9-pin, 1.5 m)  
- 9681 HUMIDITY SENSOR  
- 9641 CONNECTION CORD  
- 9642 LAN CABLE  
- 9644 CARRYING CASE  
- 9649 PROTECTIVE CASE (Basic water-resistance)  
- 9652-01 FIXED STAND  
- 9685 TERMINAL UNIT

*Note: An input cord is not supplied with the 8420-51, 8421-51 & 8422-51.*
## 8910 CAN ADAPTER

**Record and Analyze CAN-Bus Signals**

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Function</th>
<th>Setting Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN-Bus interface 2-channel (Receive only)</td>
<td>(1) From the 8910 Setting Software (standedly equipped), Items (1), (2) and (3) above can be set.</td>
</tr>
<tr>
<td>Number of output channels</td>
<td>(2) From Memory HiCORDERs (Models 8826, 8841 and 8942) and the 8910 Main Unit, Item (3) above can be set via the RS-232C interface or external recording media (FD, PC card and MO).</td>
</tr>
<tr>
<td>Output resolution 16bit</td>
<td></td>
</tr>
<tr>
<td>Output voltage -5 to 5V (Analog), 0 to 5V (Logic)</td>
<td></td>
</tr>
<tr>
<td>Response speed</td>
<td></td>
</tr>
<tr>
<td>RS-232C (For data selection settings only)</td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>(1) Settings of CAN-Bus defined data (Various parameter settings to capture required data from CAN-Bus)</td>
</tr>
<tr>
<td>Functions specifications</td>
<td>(2) CAN-Bus signal input port settings</td>
</tr>
<tr>
<td>Functions</td>
<td>(3) Output channel settings (Settings to determine output channels for captured data), etc.</td>
</tr>
</tbody>
</table>

### Recorders, Memory Recorders

- Select CAN-Bus information arbitrarily from recorder or data logger and convert them into analog/logic signals
- Up to 12ch analog output + 24bit logic output
- Record both CAN adapter analog output and actual analog data (i.e. sensor output) simultaneously
- Choose desired data from a PC or Memory HiCORDER

---

## 8205-10 8206-10 MICRO HiCORDER

**Easy data recording as convenient as a simple tester, yet with broad functionality**

- Record voltage and current variations simply with full line-up of optional clamp on sensors of up to 1000A
- Input levels can be monitored on the LCD like an analog display
- Built-in thermal printer for printing data such as time and amplitude axis

### 8205-10: SPECIFICATIONS

- **Measurement ranges**
  - DC / AC Voltage: 0.1V to 500V f.s. 12 ranges
  - AC Current: 10A to 100A f.s. 7 ranges (using CLAMP ON SENSOR / option)
- **Sampling period**
  - 10ms
- **Frequency band**
  - 20Hz to 30kHz, ±3 dB
- **Paper feed speed**
  - 20cm/minute to 2cm/hour, 5 ranges
- **Number of input channels**
  - Voltage or Current: 1 channel
- **Accuracy**
  - Voltage: ±2% f.s. Current: ±4% f.s. (using 9651 CLAMP ON SENSOR / option)
- **Power supply**
  - 100 to 240V AC (50/60 Hz) or 9.5 to 14V DC, 2 way
- **Dimensions, mass**
  - 250W × 122H × 93.5D mm, 1.2 kg
- **Accessories**
  - Power cord(1), Recording paper(1 roll), 9257 CONNECTION CORD(1), 9344 CARRYING CASE(1)

### 8206-10: SPECIFICATIONS

- **Measurement ranges**
  - AC Voltage: 100/ 200/ 500 V extended scale, 3 ranges
  - AC Current: 10A to 1000A f.s. 7 ranges (using CLAMP ON SENSOR / option)
- **Sampling period**
  - 10 ms
- **Frequency band**
  - 30Hz to 30kHz, ±3dB
- **Paper feed speed**
  - 60 cm/hour to 2 cm/hour, 5 ranges
- **Number of input channels**
  - Voltage and Current, 2 channels alternate recording
- **Accuracy**
  - Voltage: ±2% f.s. Current: ±4% f.s. (using 9651 CLAMP ON SENSOR / option)
- **Power supply**
  - 100 to 240V AC (50/60 Hz) or 9.5 to 14V DC, 2 way
- **Dimensions, mass**
  - 250W × 122H × 93.5D mm, 1.2 kg
- **Accessories**
  - Power cord(1), Recording paper(1 roll), 9257 CONNECTION CORD(1), 9344 CARRYING CASE(1)

### OPTIONS

- 9650 CLAMP ON SENSOR
  - for 8205-10, 8206-10, 100A f.s., 40Hz~1kHz, 3m length
- 9651 CLAMP ON SENSOR
  - for 8205-10, 8206-10, 500A f.s., 40Hz~1kHz, 3m length
- 9668 CLAMP ON SENSOR
  - for 8205-10, 8206-10, 1000A f.s., 40Hz~1kHz, 3m length
- 9235 RECORDING PAPER (15m, 10rolls / 1 set)
- 9236/01 RECORDING PAPER (Climate-resistant, 15m, 10rolls/1set)
- 9326 CONNECTION CORD (for 8205-10 only)
- 220H PAPER WINDER (refer to p.8)
**9332 WAVE COMMUNICATOR** (for 8807-01, 8808-01, 8807-51 and 8808-51)

Remotely measure and transfer measurement results through a telephone line and RS-232C

- RS-232C and telephone line connections
- Waveform data transfer and remote settings
- Transfer data files from remote locations
- Display waveforms on a PC
- Data conversion and importing into spreadsheet programs

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Compatible Recorders</th>
<th>8807-01, 8808-01, 8807-51, 8808-51 MEMORY HiCORDERs (Vers. 2.00 or later)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplied Media</td>
<td>One CD-ROM or one CD-R</td>
</tr>
<tr>
<td>PC Operating Environment</td>
<td>IBM PC/AT Compatible (with at least 800×600 display resolution)</td>
</tr>
<tr>
<td></td>
<td>Windows 95/SP1 or later, 98 or NT4.0/SP1 or later)</td>
</tr>
<tr>
<td>PC-Side Modem</td>
<td>Fax modem supported by Windows 95, 98, or NT4.0, 2000, XP</td>
</tr>
<tr>
<td>Recorder Compatible Modem</td>
<td>Fax modem card for analog public telephone lines (only specified models that have been pre-confirmed for operability)</td>
</tr>
<tr>
<td>Communication Methods</td>
<td>Standard telephone line or RS-232C (cannot be used at the same time)</td>
</tr>
<tr>
<td>PC Usage Limitations</td>
<td>While this application is running, other applications that use the modem or RS-232C cannot be used</td>
</tr>
<tr>
<td>Functions</td>
<td>Communications Functions / Trigger Acquisition Functions / Waveform Display Functions, Saving Converted Data / Connection Destination Registration / Setting File Creation Functions</td>
</tr>
</tbody>
</table>

Bottom left screen shows measured data displayed on a PC.
(Fore use with 8808-01 data)

Bottom right screen shows MEMORY HiCORDER connection settings and data file acquisition, displaying connection conditions and a list of measurement files.

---

**9333 LAN COMMUNICATOR** (for 8720, 8826, 8835-01, 8841, 8842 and 8855)

Connecting MEMORY HiCORDERs to LANs and high-speed transfer of waveform data to PCs

- High-speed communication with LAN connections
- Gathering and managing waveform data on PCs, and the waveform data collection function
- Remote and PC operations
- Data conversion and importing into spreadsheet programs

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Compatible Recorders</th>
<th>8826 MEMORY HiCORDER (Vers. 2.30 or later)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8835-01 MEMORY HiCORDER*1 (Vers. 1.10 or later)</td>
</tr>
<tr>
<td></td>
<td>8841, 8842 MEMORY HiCORDERs (Vers. 2.30 or later)</td>
</tr>
<tr>
<td></td>
<td>8855 MEMORY HiCORDER</td>
</tr>
<tr>
<td></td>
<td>8720 VISUAL HiCORDER</td>
</tr>
<tr>
<td></td>
<td>8730-10, 8731-10 WAVE COMPARATOR</td>
</tr>
<tr>
<td>(*1) 8835 not compatible with the 9333.</td>
<td></td>
</tr>
<tr>
<td>Compatible PC Card</td>
<td>9578 10BASE-T LAN CARD</td>
</tr>
<tr>
<td>Connector</td>
<td>10BASE-T</td>
</tr>
<tr>
<td>Supplied Media</td>
<td>CD-ROM or CD-R (1 pc.)</td>
</tr>
<tr>
<td>PC Operating Environment</td>
<td>1024×768 or higher screen resolution is recommended when using the remote control functions.</td>
</tr>
<tr>
<td>Environment</td>
<td>Windows 95/98R2 or later, 98, or NT4.0, 2000, XP (network functions installed with a TCP/IP environment)</td>
</tr>
<tr>
<td>Communication System</td>
<td>Ethernet, TCP/IP</td>
</tr>
<tr>
<td>Functions</td>
<td>Remote Control Applications / Waveform Data Acquisition Applications / Waveform Viewer / GP-IB Command Functions</td>
</tr>
</tbody>
</table>

Images on right show an 8841 screen during measurements on a PC in real-time. The waveform screen is on the left and the control panel is on the right. In addition to displaying measured waveforms in real time, you can also use the keys displayed on the panel in the same way as the keys on the MEMORY HiCORDER.
**LOGGER COMMUNICATOR** (for 8420-51, 8421-51 and 8422-51)

Program that enables data collection using Ethernet and data analysis in Windows

**SPECIFICATIONS**

- **Compatible devices**: 8420-51, 8421-51 and 8422-51 MEMORY HILOGGERS
- **Supplied Media**: One CD-R
- **Operating environment**: Computers running under Windows 95/95M or Windows NT/2000/XP, CPU1: Pentium (133 MHz) or later, 32-MB memory or more, OS: Windows 95/98/Me or Windows NT 4.0 SP1 or later or 2000/XP
- **Data transfer functions**: Interface: Ethernet, Number of units supported: 16, Location of memory data: data can be loaded into the unit's internal memory, Real-time transfer: data can be loaded in real time (maximum file size: up to 200 MB), real-time load settings can be made using the remote control
- **Display functions**: Waveform Display: displays acquired waveform data as images, Real-time Display: displays real-time transfer as images and allows the time axis to be split, Digital Value Display: displays waveform data as digital values, and allows images and digital values to be displayed simultaneously, Cursor function: allows you to display the time and potential differences between cursors A and B, the time and electrical potential between each cursor, and the absolute and relative times
- **Storage function**: Memory content: criteria settings and measurement data (binary and text formats)
- **Data conversion functions**: Target data: all data or data between cursors A and B, Data interval: simple interval, average value, absolute and maximum values, maximum and minimum values (can be selected when saving), Data conversion: can convert analog and pulse waveform data into numerical values and logic data into binary
- **Print functions**: Target data: all data or data between cursors A and B, Print format: waveform and numerical values
- **Other**: Marking function: inserts an event marker at the start of measurement

**WAVE PROCESSOR** (for MEMORY HiCORDER)

Display, Convert, Calculate and Print Waveforms on a PC

**SPECIFICATIONS**

- **Compatible devices**: MEMORY HILOGGERS 8807-101-51, 8808-101-51, 8825, 8835, 8911, 8841, 8842, 8855, POWER HILOGGERS 8714-401, 8715-401, VERSAL HiCORDER 8720 WAVE COMPARATOR 8703-10, 8731-10, 8732-10
- **Supplied Media**: One CD-R disc
- **Operating environment**: Computers running Windows 95, 98, Me, NT4.0, 2000 or XP, Pentium (133 MHz) or better, at least 32 MB of memory (Recommended: Pentium 200 MHz or better, at least 4MB of memory)
- **Display functions**: Waveform Display: Displays image of loaded waveform on screen, X Y display: Memory function format (MEM file) only, Digital Value Display: Displays waveform data as digital values, and allows images and digital values to be displayed simultaneously, Cursor function: Allows you to display the time and potential differences between cursors A and B, the time and electrical potential between each cursor, and the absolute and relative times
- **File loading**: Loading data format: Memory (MEM, except for data stored in real time), recorder (REC), effective value recorder (RMS), Maximum loadable file size: Maximum size that can be handled by hardware, The maximum size that can be handled may be smaller in some PC environments
- **Data conversion functions**: Target data: All data, data between cursors, Data interval: Simple interval (number of samples can be specified), Data conversion: Converts analog waveform data into numerical values, converts logic data into binary, Data conversion format: CSV format, tab delimited, space delimited (selectable when data is saved), Conversion channel: Can be selected when data is saved, Batch conversion: Multiple files can be specified for batch conversion
- **Printing functions**: Printing format: Can print no partitions, 2 to 16 partitions, 2 to 16 columns, X Y 1 to 4 partitions, gauges, channel comments, Print preview: Possible, Waveform screen hard copy: Possible, Compatible printers: Any printer supported by the OS (color or black and white)

**Note**: The use of MO discs, PC cards, and floppy disks and the availability of a LAN connection depend on the specifications of the recorder model in question.
# Electronic Measuring Instruments

## Electronic Measuring Instruments Index

### For low resistance measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Testing Source</th>
<th>Comparator</th>
<th>Measurement Range</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC</td>
<td>100 ms response</td>
<td>16 times/sec. sampling</td>
<td>Comparator (buzzer only)</td>
<td>p.17</td>
</tr>
<tr>
<td>3541</td>
<td>DC</td>
<td>Wide measurement range</td>
<td>0.1µΩ (20mΩ range) to 110MΩ</td>
<td>High speed and High precision</td>
<td>p.17</td>
</tr>
<tr>
<td>3560</td>
<td>AC 1kHz</td>
<td>50/60 times/sec. sampling</td>
<td>Comparator output, full remote control, RS-232C included</td>
<td>GP-IB or Printer interface option</td>
<td>p.18</td>
</tr>
</tbody>
</table>

### Battery Testers

<table>
<thead>
<tr>
<th>Model</th>
<th>Testing Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC</td>
<td>Printout on measurement data at fixed intervals for 3227, 3540, 3560, 3550, 3551</td>
<td>Check battery deterioration</td>
<td>p.18</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC 1kHz</td>
<td>50/60 times/sec. sampling</td>
<td>Comparator output, full remote control, RS-232C included</td>
<td>GP-IB or Printer interface option</td>
</tr>
</tbody>
</table>

### Inductance, Capacitance, or Impedance Meters

<table>
<thead>
<tr>
<th>Model</th>
<th>Testing Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>Wide measurement range</td>
<td>0.1µΩ (20mΩ range) to 110MΩ</td>
<td>High speed and High precision</td>
<td>p.19</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC 1kHz</td>
<td>50/60 times/sec. sampling</td>
<td>Comparator output, full remote control, RS-232C included</td>
<td>GP-IB or Printer interface option</td>
</tr>
</tbody>
</table>

### Signal Sources, Waveform Generators

<table>
<thead>
<tr>
<th>Model</th>
<th>DC Signal Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.18</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### DMMs

<table>
<thead>
<tr>
<th>Model</th>
<th>DC Signal Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Safety Standards Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Battery Testers

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Electronic Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>DC Signal Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Safety Standards Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Battery Testers

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Electronic Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>DC Signal Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Safety Standards Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Battery Testers

<table>
<thead>
<tr>
<th>Model</th>
<th>AC Withstand Voltage Test Equipment</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>AC Withstand Voltage Test Equipment</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>

### Electronic Measuring Instruments

<table>
<thead>
<tr>
<th>Model</th>
<th>DC Signal Source</th>
<th>Comparator</th>
<th>Features</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3540, -01, -02, -03</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>7 measurement items</td>
<td>p.20</td>
</tr>
<tr>
<td>3550, 3551</td>
<td>DC signal source</td>
<td>Comparator output, RS-232C included, GP-IB option</td>
<td>14 measurement items</td>
<td>p.20</td>
</tr>
</tbody>
</table>
Measure from very low ($\mu\Omega$) to very high (M$\Omega$) resistances with a single instrument

- **Wide Measurement Range**
  0.1$\mu\Omega$ (20 m$\Omega$ range) to 110.000 M$\Omega$

- **High Speed & High Precision Measurements**
  As fast as 0.6 ms with 70 ppm precision (in the 2 k$\Omega$ to 110 k$\Omega$ range)

- **Two Types of Temperature Correction**
  Correction by Pt sensor or Infrared Thermometer

- **Equipped with EXT I/O, GP-IB and RS-232C interfaces**
  Easily integrates into automated production lines

---

**3540 | RESISTANCE HiTESTER**

**SPECIFICATIONS**

- **Measurement**
  Four-terminal resistance measurement
  0 to 110.0 M$\Omega$
  Low power four-terminal resistance measurement
  10$\mu\Omega$ (25$\Omega$ range) to 0.0000 k$\Omega$
  Temperature measurement (Pt) -10.0 to 99.9°C
  Temperature measurement (analog) 0 to 2V

- **Accuracy**
  ±70ppm of rdg+15ppm of f.s. (2k$\Omega$-25$\Omega$ range slow)

- **Functions**
  Temperature correction, temperature conversion, self-calibration, measurement fault detection, overflow detection, offset voltage compensation, average, statistical calculation, key lock, save/load, comparator, BIN measurement

- **Interface**
  GP-IB, RS-232C, EXT-I/O

- **Power supply**
  100 to 240 VAC 50/60 Hz

- **Dimensions**
  Approx. 215W × 80H × 25D mm (excluding projections)

- **Mass**
  Approx. 2.6 kg

- **Accessories**
  9287-10 CLIP TYPE LEAD, 9451 TEMPERATURE PROBE, Power Cord, EXT I/O Male Connector

---

**3541**

**RESISTANCE HiTESTER**

**Offers selectable manual measurement or system application**

- **4-terminal method milli-ohmmeter** (Fast 100-ms Response)
- **Comparator function memorizes up to seven tables**
- **Temperature compensation function measures temperature and calculates value relative to copper at 20°C**

---

The 3540 is the low-price version without external control interfaces, for manual measurement. The 3540-01 adds BCD output and external control, the 3540-02 includes a printer interface and the 3540-03 includes an RS-232C interface.
**For measurement requirements from contact resistance to internal resistance and voltage of batteries**

- Fast response time approximately 84 ms (60 Hz)
- Low-power resistance measurement
- Battery measurement
- High-resolution (1µΩ in the 30mΩ range)

**3560 AC mΩ HiTESTER**

For measurement requirements from contact resistance to internal resistance and voltage of batteries.

- Fast response time approximately 84 ms (60 Hz)
- Low-power resistance measurement
- Battery measurement
- High-resolution (1µΩ in the 30mΩ range)

**Specifications**

- **Measurement ranges**: 30 mΩ to 3 kΩ, 6 ranges, ±0.5 % rdg. ± 18 dgt. (all ranges)
- **Accuracy**: 
  - In case of MEDIUM: Add 3 dgt. to the above dgt. error.
  - FAST: ±0.5 % rdg. ± 28 dgt. (30 mΩ), ±0.5 % rdg. ± 28 dgt. (other ranges).
- **Measurement current**: 7.4 mA (30 mΩ range) to 1.5 A (3 kΩ range)
- **Max. applied measurement voltage**: 60 V DC (AC input is not possible)
- **Sampling speed**: 50 times /s (FAST) to 1.56 times /s (SLOW) at 50 Hz mode
- **Display**: 7900 full digits (resistance), 50000 full digits (voltage), Fluorescent tube.
- **Measurement method**: 1 kHz AC four-terminal measurement
- **Open-circuit terminal voltage**: 20mV peak max. (30 mΩ to 3 kΩ all ranges)
- **Comparator functions**: Setting: Upper and lower limit, absolute value, Output: 3 levels (Hi, In, Lo), Display, beep sound
- **Interface**: RS-232C (standard), GP-IB or External printer (option)
- **Power supply**: 100 to 240 V AC, 50/60 Hz
- **Dimensions, mass**: 2150x80Hx320D mm, 2.1 kg
- **Accessories**: 9287-10 CLIP-TYPE LEAD(1), Power cord(1)

**Options**

- 9203 DIGITAL PRINTER
- 9233 RECORDING PAPER (40 m, 10 rolls /set)
- 9425 CONNECTION CORD (for 9203-3560, 2m)
- 9452 CLIP-TYPE LEAD
- 9453 FOUR-TERMINAL LEAD
- 9454 ZERO ADJUSTMENT BOARD (when 9461 or 9465 is used)
- 9455 PIN-TYPE LEAD
- 9467 LARGE CLIP-TYPE LEAD
- 9588 GP-IB INTERFACE
- 9589 PRINTER INTERFACE
- 9588 GP-IB INTERFACE
- 9151-02/04 GP-IB CONNECTION CABLE (2 m /4 m)
- *Note: The 9455 probe is a precision instrument. Exercise appropriate care when handling it.

**3511-50 LCR HiTESTER**

Compact & powerful dedicated LCR measurement in 5m second timeframes

- High speed measurement: 5ms (1 kHz) or 13ms (120 Hz)
- High precision accuracy: ±0.08 %
- Built-in comparator

**Specifications**

- **Measurement parameters**: Z, R, C, L, D, Q, R
- **Measurement method**: Source - open terminal voltage 50mV, 500mV, 1Vrms (AC)
- **Source frequency**: 120 Hz or 1 kHz
- **Measurement ranges**: 
  - Z: 10 mΩ to 200.00 MΩ (depending on condition)
  - R: 0.0001 to ±9999.99 dB
  - C: 0.940 pF to 999.99 mF
  - L: 1.600 µH to 200.00 kHz
  - D: 0.0001 to 1.9900
  - Q: 0.85 to 9999
- **Basic accuracy**: 
  - Z: ±0.08% rdg. ± 100 m°
  - R: ±0.08% rdg. ± 0.05°
- **Measurement times**: Fast: 5 msec. to Slow: 300 msec. (at 1 kHz)
- **Display**: 99999 full digits, LED
- **Comparator functions**: Setting: Upper and lower limit, absolute value, Output: 3 levels (Hi, In, Lo), Display, beep sound
- **External printer**: 9442 (use with the 9443-02 or -03/9444)
- **Power supply**: 100 to 240 V AC, 50/60Hz
- **Dimensions, mass**: 210Wx100Hx168D mm, 2.5 kg
- **Accessories**: Power cord(1), Fuse(1)

**Options**

- (The 3511-50 cannot be used alone. Measurement requires optional test fixture or probe.)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE/DC to 5 MHz
- 9261 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9268 DC BIAS VOLTAGE UNIT (± 40 V DC max.)
- 9269 DC BIAS CURRENT UNIT (± 2 A DC max.)
- 9165 CONNECTION CORD (for 9268/9269; BNC to BNC, 1.5 m)
- 9166 CONNECTION CORD (for 9268/9269; BNC to clip, 1.5 m)
- 9166 CONNECTION CORD (for 9268/9269; BNC to clip, 1.5 m)
- 9151-02/04 GP-IB CONNECTION CABLE (2 m /4 m)
- 9151-02/04 GP-IB CONNECTION CABLE (2 m /4 m)
- 9588 GP-IB INTERFACE
- 9442 PRINTER
- 9443-02 AC ADAPTER (for the 9442, EU), 9443-03 (USA)
- 9444 CONNECTION CABLE (for the 3511-50/9442)
- 1196 RECORDING PAPER (25 m, 10 rolls /1 set, for the 9442)
High-speed LCR meter with up to 120MHz sampling

- Wide range from 100kHz to 120MHz
- High speed LCR testing (6ms/sampling)
- Removable head amplifier
- "Load compensation function" for comparing standard component and providing compensation

3535

LCR HiTESTER

9700-10 HEAD AMP UNIT
9677 CONNECTION CABLE
9678 CONNECTION CABLE
9677 SMD TEST FIXTURE
9699 SMD TEST FIXTURE
9151-02/04 GP-IB CONNECTION CABLE (2m/4m)
9442 PRINTER
9443-02 AC ADAPTER (for the 9442, EU), 9443-03 (USA)
9444 CONNECTION CABLE (for the 3535/9442)
1196 RECORDING PAPER (25m, 10 rolls/1 set, for the 9442)

Options

(*Note: Non-CE mark product

Options (Model 3535 cannot be used alone. Measurement requires optional head amp unit and test fixture or Probe.)
9700-10 HEAD AMP UNIT
9677 SMD TEST FIXTURE
9699 SMD TEST FIXTURE
9678 CONNECTION CABLE
9151-02/04 GP-IB CONNECTION CABLE (2m/4m)
9442 PRINTER
9443-02 AC ADAPTER (for the 9442, EU), 9443-03 (USA)
9444 CONNECTION CABLE (for the 3535/9442)
1196 RECORDING PAPER (25m, 10 rolls/1 set, for the 9442)

Electronic Measuring Instruments

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Measurement parameters</th>
<th>Z/( \sqrt{Y} ), Q, R, Re(ESR), G, X, B, ( \theta ), L, Cp, Cs, D(undh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range: Reference Value</td>
<td>1kHz range</td>
</tr>
<tr>
<td>Z, R</td>
<td>0.01Ω to 36MΩ</td>
</tr>
<tr>
<td>C</td>
<td>0.06pF to 15.9pF</td>
</tr>
<tr>
<td>L</td>
<td>0.13μH to 5.7μH</td>
</tr>
<tr>
<td>G</td>
<td>±100Ω to ±10Ω</td>
</tr>
<tr>
<td>Measurement Frequency</td>
<td>1kHz steps</td>
</tr>
<tr>
<td>10kHz to 100kHz</td>
<td>1kHz steps</td>
</tr>
<tr>
<td>100kHz to 120MHz</td>
<td>1kHz steps</td>
</tr>
<tr>
<td>When using GP-IB or RS-232C interfaces, resolution is 1Hz.</td>
<td></td>
</tr>
<tr>
<td>Measurement Accuracy</td>
<td>±0.005% max. against set value</td>
</tr>
<tr>
<td>Measurement Levels</td>
<td>Open Terminal Voltage (V) and Constant Voltage (CV) Mode</td>
</tr>
<tr>
<td>5mV to 1V, max. 20mA (up to 100MHz)</td>
<td></td>
</tr>
<tr>
<td>5mV to 500mV, max. 10mA (from 10.01MHz)</td>
<td></td>
</tr>
<tr>
<td>1mV steps</td>
<td></td>
</tr>
<tr>
<td>±(5%+5mV)×(2+log f) (f in terms of MHz)</td>
<td></td>
</tr>
<tr>
<td>Constant Current (CC) Mode</td>
<td></td>
</tr>
<tr>
<td>20mA to 20mA, max. 1V (up to 100MHz)</td>
<td></td>
</tr>
<tr>
<td>0.2mA to 0.2mA, max. 0.5V (from 10.01MHz)</td>
<td></td>
</tr>
<tr>
<td>5mA steps</td>
<td></td>
</tr>
<tr>
<td>±(10%+50mA)×(2+log f) (f in terms of MHz)</td>
<td></td>
</tr>
<tr>
<td>Basic accuracy</td>
<td>Z: ±0.5% rdg.; ( \theta ): ±0.3°</td>
</tr>
<tr>
<td>Output impedance</td>
<td>50Ω ±1Ω (at 100kHz)</td>
</tr>
<tr>
<td>Monitor</td>
<td>Voltage: 0.000V to 1.000V</td>
</tr>
<tr>
<td>Current: 0.000mA to 20.0mA</td>
<td></td>
</tr>
<tr>
<td>Limit</td>
<td>Current (when set at V or CV) 0.2mA to 20.00mA</td>
</tr>
<tr>
<td>Voltage (when set a CC) 0.005V to 1.000V</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>OFF, 2, 4, 8, 16, 32, 64</td>
</tr>
<tr>
<td>Trigger</td>
<td>Internal trigger, External trigger</td>
</tr>
<tr>
<td>Comparator</td>
<td>Available for two measurement parameters; percentage, %, or absolute value settings (for ( \Delta % ), the ovefset of the measurement value from the standard value is displayed)</td>
</tr>
<tr>
<td>Panel Memory and Load</td>
<td>Maximum 30 sets</td>
</tr>
<tr>
<td>Zoom Display</td>
<td>Measurement value and judgment result using comparator</td>
</tr>
<tr>
<td>Number of Lines Displayed</td>
<td>Can set at 3, 4, or 5; may differ depending on parameter</td>
</tr>
<tr>
<td>Printer</td>
<td>Hard copy of measurement value or screen (requires 9442, 9444)</td>
</tr>
<tr>
<td>Interfaces</td>
<td>GP-IB, RS-232C, EXT. I/O (All standard)</td>
</tr>
<tr>
<td>Operating Environment</td>
<td>10 to 40°C, 80%rh max., no condensation</td>
</tr>
<tr>
<td>Storage Environment</td>
<td>-10 to 55°C, 80%rh max., no condensation</td>
</tr>
<tr>
<td>Power Supply</td>
<td>100V to 240V AC, 50/60Hz  Approx.50VA</td>
</tr>
<tr>
<td>Dimensions, mass</td>
<td>Approx. 360W×130H×360D mm ; 8.3kg</td>
</tr>
<tr>
<td>Trigger Delay</td>
<td>0.01s to 9.999s, 0.01s resolution</td>
</tr>
</tbody>
</table>

9699 SMD TEST FIXTURE

Open Terminal Voltage (V) and Constant Voltage (CV) Mode

- Available for two measurement parameters; percentage, %, or absolute value settings (for \( \Delta \%), the offset of the measurement value from the standard value is displayed).
**3522-50**  
*LCR HiTESTER*

Better functionality and performance at a low cost

- High speed measurement of 5 ms LCR meter
- Higher frequency range (DC or 1 MHz to 100 kHz)
- Fourteen parameters measured (High resolution and high accuracy)
- DC resistance measurement

**SPECIFICATIONS**

- **Measurement parameters**: \( Z, \angle \), \( R \), \( R_{\text{DC}} \), \( R_{\text{ESR}} \), \( R_{\text{D}} \), \( C \), \( L \), \( Q \), and \( \theta \)
- **Measurement method**:
  - Constant current 10 µA to 100 mA (DC/AC), or constant voltage 10 mV to 1 V (DC/AC)
- **Source frequency**: DC, or 1 Hz to 10 kHz
- **Measurement ranges**:
  - \( Z \): 10 µΩ to 200 Ω, \( R \): 100 µΩ to 200 kΩ, \( C \): 0.1 pF to 1 nF, \( L \): 1 nH to 750 kH, \( \theta \): -180° to +180°, \( Q \): 0.01 to 999.99, \( Y \): 0.00001 to 99.999 S
- **Basic accuracy**: ± 0.08% rdg. ± 0.03°
- **Measurement times**:
  - Fast: 5 ms, to Show 2: 828 msec.
- **Display**:
  - 99999 full digits, LCD with backlight display
- **Comparator functions**:
  - Setting: Upper and lower limit, percentage, or absolute value
  - Output: 3 levels (Hi, Lo, Lo), Open-collector, Isolated
- **External printer**:
  - 9442 (use with the 9443-02 or 9446/9593-01)
- **Power supply**:
  - 100 to 240 V AC, 50/60Hz
- **Dimensions, mass**: 333 × 125 × 199 mm, 4.5 kg
- **Accessories**:
  - Power cord (1), Fuse (1)

**OPTIONS**

(The 3522-50 cannot be used alone. Measurement requires optional test fixture or probe.)

- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)

**3532-50**  
*LCR HiTESTER*

Impedance meter with a wide test frequency range

- Higher frequency range (42 Hz to 5 MHz)
- High speed measurement of 5 ms LCR meter
- Interactive touch panel operation
- Wide setting range for measurement voltage and current

**SPECIFICATIONS**

- **Measurement parameters**: \( Z, \angle \), \( R \), \( R_{\text{DC}} \), \( R_{\text{ESR}} \), \( R_{\text{D}} \), \( C \), \( L \), \( Q \), and \( \theta \)
- **Measurement method**:
  - Constant current 10 µA to 100 mA (42 Hz to 3 MHz), 50 pA to 20 mA (1 MHz to 5 MHz), or constant voltage 10 mV to 1 V (42 Hz to 1 MHz), 50 mV to 1 V (1 MHz to 5 MHz)
- **Source frequency**: 42 Hz to 5 MHz
- **Measurement ranges**:
  - \( Z \): 10 µΩ to 2000 kΩ, \( R \): 100 µΩ to 200 kΩ, \( C \): 0.32 pF to 370 mF, \( L \): 16.0 nH to 750.00 kH, \( \theta \): -180° to +180°, \( Q \): 0.01 to 999.99, \( Y \): 0.00001 to 99.999 S
- **Basic accuracy**: ± 0.08% rdg. ± 0.06°
- **Measurement times**:
  - Fast: 5 ms, to Show 2: 140 msec.
- **Display**:
  - 99999 full digits, LCD with backlight display
- **Comparator functions**:
  - Setting: Upper and lower limit, percentage, or absolute value
  - Output: 3 levels (Hi, Lo, Lo), Open-collector, Isolated
- **External printer**:
  - 9442 (use with the 9443-02 or 9446/9593-01)
- **Power supply**:
  - 100 to 240 V AC, 50/60Hz
- **Dimensions, mass**: 152 × 124 × 323 mm, 6.5 kg
- **Accessories**:
  - Power cord (1), Fuse (1)

**OPTIONS**

(The 3532-50 cannot be used alone. Measurement requires optional test fixture or probe.)

- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
- 9140 FOUR-TERMINAL PROBE (DC to 100 kHz)
- 9143 PINCHER PROBE (DC to 5 MHz)
- 9260 TEST FIXTURE (cable connection type, DC to 5 MHz)
- 9262 TEST FIXTURE (direct connection type, DC to 5 MHz)
- 9263 SMD TEST FIXTURE (DC to 5 MHz)
- 9264 SMD TEST FIXTURE (DC to 5 MHz)
## INSTANTANEOUS DETERMINATION OF BATTERY DETERIORATION

- **Model 3551**: support for high-capacity batteries
- **Model 3555**: for compact storage batteries (portable telephones)
- **Model 3550**: for medium-capacity lead-acid storage batteries
- **Three-rank rating of battery state**: Pass, Warning, or Fail

### 3550, 3551, 3555 specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>3550</th>
<th>3551</th>
<th>3555</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resistance Measurement</strong></td>
<td>30 mΩ to 3Ω, 3 ranges, 10µΩ resolution max.</td>
<td>3 mΩ to 300 mΩ, 3 ranges, 1µΩ resolution max.</td>
<td>300 mΩ to 3Ω, 3 ranges, 100µΩ resolution max.</td>
</tr>
<tr>
<td><strong>Voltage Measurement</strong></td>
<td>3 or 30 V DC, 2 ranges, 1 mV resolution max.</td>
<td></td>
<td>3 or 30 V DC, 2 ranges, 1 mV resolution max.</td>
</tr>
<tr>
<td><strong>Temperature Measurement</strong></td>
<td>-10 to 60°C, 1 range, 0.1°C resolution (platinum sensor)</td>
<td></td>
<td>-10 to 60°C, 1 range, 0.1°C resolution (platinum sensor)</td>
</tr>
<tr>
<td><strong>Sampling rate</strong></td>
<td>0.83 times/second</td>
<td></td>
<td>1.25 times/second</td>
</tr>
<tr>
<td><strong>Comparator functions</strong></td>
<td>Setting: Upper and lower limit for resistance, and lower limit for voltage. Output: LED, beep</td>
<td></td>
<td>Setting: Upper and lower limit for resistance, and lower limit for voltage. Output: LED, beep</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>3550: LR6(AA) x6, 3551: LR6(AA) x6, or 9418-10</td>
<td></td>
<td>3551: LR6(AA) x6, or 3555: <strong>Note</strong>: Non-CE mark product</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>3550: 196W x 130H x 50D mm, 710 g (including batteries)</td>
<td>3551: 196W x 130H x 65D mm, 860 g (including batteries)</td>
<td>3555: 196W x 130H x 50D mm, 680 g (including batteries)</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>3550: 9460 CLIP-TYPE LEAD WITH TEMPERATURE SENSOR(1), 9382 CARRYING CASE(1), Dust cover(1), LR6(6)</td>
<td>3551: 9465 PIN-TYPE LEAD(1), 9466 REMOTE CONTROL SWITCH(1), 9377 CARRYING CASE(1), Dust cover(1), LR6(6)</td>
<td>3555: <strong>Note</strong>: The 9455 probe is a precision instrument. Exercise appropriate care when handling it.</td>
</tr>
</tbody>
</table>

### OPTIONS

- 9203 DIGITAL PRINTER (for the 3550, 3551)
- 9425 CONNECTION CORD
  - (for the 3550, 3551)
  - (for connecting the 3550 / 3551 to the 9203 / 2 m length)
- **Note**: Non-CE mark product
- 9223 RECORDING PAPER (10 m, 10 rolls/1 set, for 9203)
- **Note**: Non-CE mark product
- 9418-10 AC ADAPTER (for the 3551 only)
- 9455 PIN-TYPE LEAD (for the 3550, 3555)
- 9287-10 CLIP-TYPE LEAD (for the 3555)
- 9382 CARRYING CASE (for the 3555)
- **Note**: The 9455 probe is a precision instrument. Exercise appropriate care when handling it.

---

**3550**: 30 mΩ to 3Ω, 3 ranges, 10µΩ resolution max.
**3551**: 3 mΩ to 300 mΩ, 3 ranges, 1µΩ resolution max.
**3555**: 300 mΩ to 3Ω, 3 ranges, 100µΩ resolution max.
Minimizing tact time with sequence control at a truly affordable price

High-speed DMM (3.3ms/sample)

- Samples at rates of up to 300 samples/sec. (3.3 ms/sample)
- Comparator function provides high-speed pass/fail evaluation
- Equipped with external input and output for sequence control
- Useful Save/Load function helps work go faster
- Interface supports full remote operation
- AC/DC current and frequency functions

High-accuracy, multi-functional model (3238)
A new DMM with 4-terminal resistance measurement! (3239)

- Samples at rates of up to 300 samples/sec. (3.3 ms/sample)
- Comparator function provides high-speed pass/fail evaluation
- Equipped with external input and output for sequence control
- Useful Save/Load function helps work go faster
- Interface supports full remote operation
- AC/DC current and frequency functions

3238, 3239 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>3238, 3239 SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage (DC V)</td>
<td>200mA/200mA/200mA/1000V (±0.01% rdg. ±2.0μA/V)</td>
</tr>
<tr>
<td>AC voltage (AC V)</td>
<td>2/20/200/200/200V/50Hz (±0.1% rdg. ±100μA/45 to 1kHz) True RMS</td>
</tr>
<tr>
<td>Resistance (Ω)</td>
<td>2Ω/20Ω/20kΩ/200kΩ/2MΩ/10MΩ (±0.05% rdg. ±25μΩ/kΩ to 2MΩ)</td>
</tr>
<tr>
<td>Resistance (LPΩ)</td>
<td>2kΩ/20kΩ/200kΩ/2MΩ/10MΩ (±0.05% rdg. ±25μΩ/kΩ to 2MΩ)</td>
</tr>
<tr>
<td>Open terminal voltage</td>
<td>6V DC max. (Ω. Diode check)</td>
</tr>
<tr>
<td>Continuity check</td>
<td>0.45V DC max. (LPΩ Continuity check)</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>FAST approx. 300 samples/s, SLOW approx. 1 sample/s</td>
</tr>
<tr>
<td>Display</td>
<td>LED max. 199999 (999999 for frequency)</td>
</tr>
<tr>
<td>Ancillary functions</td>
<td>Comparator, Average, Zero Adjust, Trigger and the Save/Load functions</td>
</tr>
<tr>
<td>Interface</td>
<td>External input/output, RS-232C, GP-IB (Option-01)</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC 100V/120V/220V/240V (50/60Hz)</td>
</tr>
<tr>
<td>Dimensions and mass</td>
<td>approx. 215W×80H×265D mm, 2.6 kg</td>
</tr>
</tbody>
</table>

Accessories

- 1196 RECORDING PAPER (25 m, 10 rolls/1 set, for the 9442)
- 9444 CONNECTION CABLE (for 9442 printer)
- 9443-02 AC ADAPTER (for the 9442, EU), 9443-03 (USA)
- 9151-02/04 GP-IB CONNECTION CABLE (2 m /4 m)
- 9132 CLAMP ON PROBE (20/50/100/200/500/1000 A AC)
- 9018 CLAMP ON PROBE (10/20/50/100/200/500 A AC)
- 9010 CLAMP ON PROBE (10/20/50/100/200/500 A AC)

Economically Priced Type

- 3237 DIGITAL HiTESTER (with GP-IB)

3237 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>3237 SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC voltage (DC V)</td>
<td>200mA/200mA/200mA/1000V (±0.025% rdg. ±2.0μA/V)</td>
</tr>
<tr>
<td>AC voltage (AC V)</td>
<td>2/20/200/200/200V/50Hz (±0.2% rdg. ±100μA/45 to 3kHz) True RMS</td>
</tr>
<tr>
<td>Resistance (Ω)</td>
<td>200Ω/2kΩ/20kΩ/200kΩ/2MΩ/10MΩ (±0.05% rdg. ±25μΩ/kΩ to 2MΩ)</td>
</tr>
<tr>
<td>Resistance (LPΩ)</td>
<td>2kΩ/20kΩ/200kΩ/2MΩ/10MΩ (±0.05% rdg. ±25μΩ/kΩ to 2MΩ)</td>
</tr>
<tr>
<td>Open terminal voltage</td>
<td>6V DC max. (Ω. Diode check)</td>
</tr>
<tr>
<td>Continuity check</td>
<td>0.45V DC max. (LPΩ Continuity check)</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>FAST approx. 300 samples/s, SLOW approx. 1 sample/s</td>
</tr>
<tr>
<td>Display</td>
<td>LED max. 199999</td>
</tr>
<tr>
<td>Ancillary functions</td>
<td>Comparator, Average, Zero Adjust, Trigger and the Save/Load functions</td>
</tr>
<tr>
<td>Interface</td>
<td>External input/output, RS-232C, GP-IB (Option-01)</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC 100V/120V/220V/240V, (50/60Hz)</td>
</tr>
<tr>
<td>Dimensions and mass</td>
<td>approx. 215W×80H×265D mm, 2.6 kg</td>
</tr>
<tr>
<td>Accessories</td>
<td>9170 TEST LEAD (1)</td>
</tr>
</tbody>
</table>
### 3153
**AUTOMATIC INSULATION / WITHSTANDING HiTESTER**

#### Programmable testing, full remote control
- **Automatic Insulation Withstanding Tester**
  - Insulation resistance test (DC50V~1200V), Withstanding voltage test (AC/DC5000V), full remote control in series
  - Programable testing (Testing Programs 32 files, Testing points 50 steps/file)
  - Accurate testing voltage generation by PWM control method
  - 3930 HIGH VOLTAGE SCANNER (Option)

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Withstanding test</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>AC 0.2 to 5.0 kV, 500VA (maximum 30 minutes)</td>
</tr>
<tr>
<td>DC 0.2 to 5.0 kV, 500VA</td>
<td></td>
</tr>
<tr>
<td><strong>Voltage setting method</strong></td>
<td>Digital setting</td>
</tr>
<tr>
<td><strong>Waveform</strong></td>
<td>Sin wave</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>50/60Hz, DC</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>Current: 0.10 to 100.0 mA, ±2% rdg. ±50 mV, ±10mA/100mA (AC) (Average value rectified, RMS display)</td>
</tr>
<tr>
<td><strong>Insulation test</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>DC50 to 1200V</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>0.1 to 9995MΩ, 4 ranges</td>
</tr>
<tr>
<td><strong>Judgment function</strong></td>
<td>Contents: UPPER-FAIL / PASS / LOWER-FAIL (Digital setting window comparator method)</td>
</tr>
<tr>
<td><strong>Timer section</strong></td>
<td>Setting range: 0.3 to 999 seconds</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>EXT I/O, EXT SW, RS-232C, GP-IB</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Fluorescent tube display (digital), Analog meter</td>
</tr>
<tr>
<td><strong>Monitor function</strong></td>
<td>Output voltage, detection current, Insulation resistance</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>AC100-120V/AC200-240V, 50/60Hz, 1000VA max.</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>320W×175H×400D mm, 18 kg</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>9615 H.V. TEST LEAD (high voltage side and return, 1 each), Power cord (1), spare fuse (1)</td>
</tr>
</tbody>
</table>

#### OPTIONS

- 9613 REMOTE CONTROL BOX (single)
- 9614 REMOTE CONTROL BOX (dual)
- 3930 HIGH VOLTAGE SCANNER
- 9267 SAFETY TEST DATA MANAGEMENT SOFTWARE
- 9637 RS-232C CABLE (Dsub 9pin-9pin, cross, 1.8m)
- 9638 RS-232C CABLE (Dsub 9pin-25pin, cross, 1.8m)

### 3159
**INSULATION / WITHSTANDING HiTESTER**

#### Perform insulation resistance and withstand voltage testing in a single series
- **Insulation resistance test (DC500V/1000V)**
- **Withstanding voltage test (AC5000V)**
- **Testing in series** (Insulation resistance test to Withstanding voltage test)
- **Standard Interfaces (EXT I/O, EXT SW, RS-232C, STATUS OUT)**

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Withstanding test</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>0 to 2.5 kV / 0 to 5.0 kV AC, dual-range configuration (Average value rectified, effective value display)</td>
</tr>
<tr>
<td>Voltage setting method</td>
<td>Manual adjusted transformer</td>
</tr>
<tr>
<td><strong>Waveform</strong></td>
<td>Same as the power supply waveform</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>Same as the power supply frequency</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>Current: 0.01 to 120 mA, ±3% f.s. ±20µA, ±2mA/3mA/12mA/32mA/120mA (AC) (Average value rectified, RMS display)</td>
</tr>
<tr>
<td><strong>Insulation test</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>DC500V/1000V</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>2MΩ to 2000MΩ (500V), 4MΩ to 2000MΩ (1000V)</td>
</tr>
<tr>
<td><strong>Judgment function</strong></td>
<td>Contents: UPPER-FAIL / PASS / LOWER-FAIL (Digital setting window comparator method)</td>
</tr>
<tr>
<td><strong>Timer section</strong></td>
<td>Setting range: 0.3 to 999 seconds</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>EXT I/O, EXT SW, RS-232C</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>Fluorescent tube display (digital), Analog meter</td>
</tr>
<tr>
<td><strong>Monitor function</strong></td>
<td>Output voltage, detection current, Insulation resistance</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>120 V AC, 50/60 Hz (3159-01)</td>
</tr>
<tr>
<td></td>
<td>220 V AC, 50/60 Hz (3159-02)</td>
</tr>
<tr>
<td></td>
<td>230 V AC, 50/60 Hz (3159-03)</td>
</tr>
<tr>
<td></td>
<td>240 V AC, 50/60 Hz (3159-04)</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>320W×175H×330D mm, 18 kg to 21.5 kg</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>9615 H.V. TEST LEAD (high voltage side and return, 1 each), Power cord (1), spare fuse (1)</td>
</tr>
</tbody>
</table>

#### OPTIONS

- 9613 REMOTE CONTROL BOX (single)
- 9614 REMOTE CONTROL BOX (dual)
- 9267 SAFETY TEST DATA MANAGEMENT SOFTWARE
- 9637 RS-232C CABLE (Dsub 9pin-9pin, cross, 1.8m)
- 9638 RS-232C CABLE (Dsub 9pin-25pin, cross, 1.8m)
- 9267 SAFETY TEST DATA MANAGEMENT SOFTWARE
**PORTABLE WITHSTANDING VOLTAGE HiTESTER**

- Measures between 0 to 3kV AC
- External Control (Standard)

**SPECIFICATIONS**

**Basic Specifications**

- **Output voltage range**: 0 to 3 kV AC (single range), 30 VA
- **Accuracy**: ±5% f.s.
- **Waveform**: Power waveform, Synchronized to power

**[Current detector]**

- **Setting range**: 0.1 to 9.9 mA
- **Current cut-off accuracy**: Setting value (±1% + 50msec)

**Evaluation method**

- Analog comparator PASS, FAIL, a buzzer sound and external I/O

**[Timer area]**

- **Setting range**: 1 to 99 sec (1-second resolution)
- **Timer accuracy**: Setting value (±1% + 50msec)

**EXT I/O signal**

- START and STOP, PASS and FAIL, TEST

**Power supply**

- 120 V AC (3173-01), 220 V AC (3173-02), 240 V AC (3173-03, -04), 50/60 Hz, 50 VA

**Dimensions, Mass**

- Approx. 149 (W) × 200 (H) × 215 (D) mm
- Approx. 7.0 kg (for 120 to 240 V AC)

---

**HIGH VOLTAGE CONTACT CHECKER**

- Max. allowable input voltage: 5kV AC, 50/60 Hz
- Max. rated voltage to earth: 5kV AC, 50/60 Hz
- Measurement range: 200V to 5kV AC, 50/60 Hz
- Waveform: Commercial power waveform, sine waveform

**SPECIFICATIONS**

- **Voltage testing method**: Zero-toggle switch
- **Transformer capacity**: 500VA (maximum 30 minutes)
- **Frequency**: Same as the power supply frequency
- **Voltage: 0 to 5kV AC (Average value rectified, RMS display)**
- **Current: 0.01 to 120mA AC (Average value rectified, RMS display)**
- **Contents**: UPPER-FAIL / PASS / LOWER-FAIL (Digital setting window comparator method)
- **Setting range**: 0.5 to 999 seconds
- **Result output**: Beep, LED indication, EXT I/O output

**Display**

- LED

**Power supply**

- 120V to 240V AC (50/60Hz)  320W

**Dimensions, mass**

- 215W × 64H × 233D mm, 1.1 kg

**Accessories**

- Power cord (1)

---

**DIGITAL MΩ HiTESTER**

For the laboratory to the production line, six test voltages from 25 to 1000V

**SPECIFICATIONS**

- **Measurement function**: Insulation resistance (Applied DC voltage method)
- **Measurement range**: 25 to 50 V: 2MΩ to 200 MΩ, 3 ranges
  - 100 to 250 V: 2MΩ to 2000 MΩ, 4 ranges
  - 500 to 1000 V: 2MΩ to 4000 MΩ, 4 ranges
- **Accuracy**: ±2% rdg. (at 25 to 100 V testing voltage, 0 to 20.00 MΩ)
  - ±5% rdg. (at 500 V testing voltage, 0 to 400.0 MΩ)
  - ±5% rdg. (at 1000 V testing voltage, 0 to 999 MΩ)
- **Response times**: Fast: less than 0.7 second, Slow: less than 1.5 seconds (at manual ranging)
- **Sampling rates**: Fast: 10 samples/s, Slow: 1 sample/s
- **Functions**: Comparator functions: judgments PASS or FAIL, Test time timer functions: 0.5 to 99 second, Delay time timer functions: 0.1 to 99 second
- **Display**: LED
- **Power supply**: 120V to 240V AC (50/60Hz)
- **Dimensions, mass**: 215W × 64H × 233D mm, 1.1 kg
- **Accessories**: Power cord (1)

---

**AC WITHSTANDING VOLTAGE HiTESTER**

Guarantees electrical and electronic equipment safety

**SPECIFICATIONS**

- **Test function**: Withstanding test
- **Testing voltage**: 0 to 2.5kV / 0 to 5.0kV AC, dual-range configuration
- **Voltage testing method**: Zero-saggle switch
- **Transformer capacity**: 500VA (maximum 30 minutes)
- **Voltage adjustment**: Manually adjusted transformer
- **Waveform**: Same as the power supply waveform
- **Frequency**: Same as the power supply frequency
- **Measurement items**: Voltage: 0 to 5kV AC (Average value rectified, RMS display), Current: 0.01 to 20mA AC (Average value rectified, RMS display)
- **Judgment function**: Contents: UPPER-FAIL / PASS / LOWER-FAIL, (Digital setting window comparator method)
- **Timer section**: Setting range: 0.5 to 999 seconds
- **Interfaces**: EXT DO, EXT SW, RS-232C
- **Display**: Fluorescent tube display (digital), Analog meter
- **Monitor function**: Output voltage, detection current
- **Power supply**: 120V AC, 50/60Hz (3158-01), 220V AC, 50/60Hz (3158-02), 240V AC, 50/60Hz (3158-04)
- **Dimensions, mass**: 320W × 153H × 263D mm, 16kg (3158-01), 18kg (3158-02, -03, -04)
- **Accessories**: 963 V TEST LEAD, high voltage clip and turner, 1 unit, Pinset cord (1), spare fuse (1)
Leakage Current Measurement Essential for Electrical Safety

- Automatically compatible with Networks stipulated by IEC/UL/JIS standards
- Automatic measurement function (Measuring power supply polarity switching as well as the normal state / single failure state)
- Stores data for 100 units
- Power supply separation

### 3156 LEAK CURRENT HiTESTER

#### SPECIFICATIONS

- **Measurement mode**: Earth leakage current, Leakage current between enclosure and earth / Leakage current between enclosure and enclosure / Leakage current between enclosure and line / Patient leakage current I / Patient leakage current II / Patient auxiliary current
- **Target current**: DC / AC / AC+DC (25mA max), AC peak (75mA max)
- **Measurement range**: DC mode: 55μA / 500μA / 5mA / 25mA AC peak mode: 500μA / 1mA / 10mA / 75mA
- **Measurement system**: Indication of a current value calculated based on the measured drop in voltage caused by simulated resistance of the human body. Measurement of true effective value.
- **Accuracy**: DC / AC / DC+DC mode: ±(2.0 % rdg. + 6 dgt.) AC peak mode: ±(2.0 % rdg. + 2 dgt.) DC mode: ±(2.0 % rdg. + 3 dgt.)
- **Input resistance**: 1MΩ ±1 % (Excluding voltmeter section, simulated resistance of the human body)
- **Network (human simulated resistance)**: For medical electrical equipment / For IEC 60990 / For JIS / For UL / General-purpose 1 / General-purpose 2
- **Functions**: Setting of single-fault condition / Switching power supply polarity / Setting of measuring time / Measurement delay / Maximum value hold / Allowable value judgement / Data save / Clock / Data back up / etc.

#### OPTIONS

- 9637 RS-232C CABLE (9-pin to 9-pin, crossing cable 1.8m)
- 9638 RS-232C CABLE (9-pin to 25-pin, crossing cable 1.8m)
- 9151-02 GP-IB CABLE (2.0m)
- 9151-04 GP-IB CABLE (4.0m)
- 9442 PRINTER
- 9443-02 AC ADAPTER (for printer, for use in EU)
- 9443-03 AC ADAPTER (for printer, for use in USA)
- 9444 CONNECTION CABLE (for printer)
- 1196 RECORDING PAPER (for printer)
- 9686 CARRYING CASE (with casters)

### 3157-01 AC GROUNDING HiTESTER

Protective ground tester indispensable for standard certification

#### SPECIFICATIONS

- **Measurement items**: Low resistance, AC 4-terminal method
- **Generator section**: Current generator principle: PWM constant current control. Current setting range: 3.0A to 31.0A (0.1A resolution), into 0.1Ω load, Maximum output power: 130VA (at output terminals)
- **Monitor section**: Resistance measurement: 0 to 1.800Ω (0.001Ω resolution), Accuracy: 1.2% rdg. ±5 dgt. (after zero-adjust), Current monitoring range: 0 to 35.0A (AC 0.1A resolution), Monitoring cycle: 2 times/second
- **Other functions**: Timer setting, Counts down time after start until preset time, or shows elapsed time after start, Setting range: 0.5 to 999 second, Comparator: Pass/Fail evaluation using preset upper/lower limit, I/O output, Memory function: max. 20 settings (with save/load)

#### OPTIONS

- 9637 RS-232C CABLE (9-pin to 9-pin, crossing cable 1.8m)
- 9638 RS-232C CABLE (9-pin to 25-pin, crossing cable 1.8m)
- 9151-02 GP-IB CABLE (2.0m)
- 9151-04 GP-IB CABLE (4.0m)
- 9442 PRINTER
- 9443-02 AC ADAPTER (for printer, for use in EU)
- 9443-03 AC ADAPTER (for printer, for use in USA)
- 9444 CONNECTION CABLE (for printer)
- 1196 RECORDING PAPER (for printer)
- 9686 CARRYING CASE (with casters)

#### ACCESSORIES

- Power cord(1), Spare fuse(1), Shorting bar(2)
**7016 SIGNAL SOURCE**

Signal Generator with DMM

- Constant voltage 0 to ±15000V 0 to ±15.000V
- Constant current 0 to ±25.000mA
- Pulse generation and measurement

**7011 DC SIGNAL SOURCE**

All-in-one Signal source

- Check thermocouple temperature sensors
- Generate various signals for electronic circuit and equipment testing
- Calibrate industrial equipment all with a single unit

**7075 7075-01 WAVEFORM GENERATOR**

Arbitrary waveform generator with four independently controllable channels

- Even for complex signals, evaluation is made easy
- Easy touch panel operation
- Multiple channels, 4CH (7075), 2CH (7075-01)
- Large 128,000-Word/channel memory, sweep sequence functions

**SPECIFICATIONS**

**Generator functions and Accuracy**

- Constant voltage: 0 to ±11.5V, 100µV resolution, 0 to ±15V, 1mV resolution, Source: 125mA, ±20.0% of setting ±3%dgt.
- Constant current: 0 to ±25mA, ±A resolution, Source: ±125V, ±20.0% of setting ±3%dgt.

**Pulse generation and measurement**

- Pulse width: 0.5u to 4800Hz, 25 ranges, ±20.0% of setting ±3*dgt.

**Measurement functions and Accuracy**

- DC Voltage: 50mV to ±250V, 6 ranges, ±20.0% of setting ±3%dgt.
- AC Voltage: 50mV to ±250V, 6 ranges, ±20.0% of setting ±3%dgt.
- AC+DC Voltage: 50mV to ±250V, 6 ranges, ±20.0% of setting ±3%dgt.
- DC Current: 50 to ±50mA, 2 ranges, ±20.0% of setting ±3%dgt.
- AC Current: ±50 to 500mA, ±20.0% of setting ±3%dgt.
- Frequency: 100Hz to ±20kHz, 5 ranges, ±20.0% of setting ±3%dgt.

**Display**

- LCD with backlight, function display

**Power supply**

- LR6 AA: 6 pieces, included Ni-MH battery pack, or included AC adapter

**Dimensions, mass**

- 190x91x48x50 mm, 718 g (excluding batteries)

**Accessories**

- Carrying case (1), AC adapter (1), Yellow test lead (1), Test leads (1)

**Options**

- 9384 RJ SENSOR (for reference contact compensation)
- 9380 CARRYING CASE
- 9415-10 AC ADAPTER
- 9420 BATTERY PACK (Ni-Cd)
- 9184 SURFACE TYPE TEMPERATURE PROBE
- 9183 SHEATH TYPE TEMPERATURE PROBE (class 1)
- 9476 SURFACE TYPE TEMPERATURE PROBE (class 1)
- 9475 SHEATH TYPE TEMPERATURE PROBE (class 1)
- 9474 SHEATH TYPE TEMPERATURE PROBE (class 1)
- 9182 SHEATH TYPE TEMPERATURE PROBE (class 1)
- 3856-02 COMMUNICATION PACKAGE (USB)
- 3856-01 COMMUNICATION PACKAGE (RS-232C)
- 9181 SURFACE TYPE TEMPERATURE PROBE
- 9180 SHEATH TYPE TEMPERATURE PROBE

**WAVEFORM GENERATOR**

**SPECIFICATIONS**

**Number of channels**

- 7075: 4 channels, 7075-01: 2 channels

**Output functions**

- Function generator, Arbitrary waveform generator (for each channel)

**Max. output voltage**

- 10V range: 10mV to 10V in 1mV resolution
- 1V range: 1mV to 1V in 0.1mV resolution
- 0.1V range: 1mV to 0.1V in 0.01mV resolution

**Minimum load impedance**

- 40 Ohm

**Output impedance**

- 50 Ohm ±L% (DC)

**Function generator mode**

- Waveform types: square, triangle, ramp-up, ramp-down, pulse, noise, DC, Frequency range: 10Hz to 1MHz, square (10mHz to 10MHz), triangular (10mHz to 200kHz), pulse (10mHz to 200kHz)

**Arbitrary waveform generation mode**

- Voltage axis resolution: 16 bit (409600 counts)
- Waveform memory capacity: 128 kHz
- Filtering: 2-stage LPF, 50Hz to 1MHz, 14 steps
- Waveform input methods: DPO-IB (direct download from MEMORY REGISTER/DF or GP-IB), or RS-232C download (at use of G800)
- Arbitrary waveform clock: Max. 10MHz, Frequency range: 10mHz to 10MHz

**Display**

- 5.7-inch LCD (with touch panel)

**Data storage**

- MS-DOS format

**Power supply**

- 100/200/230V AC auto selects, (50/60Hz)

**Dimensions, mass**

- 455W×130H×280D mm, 7075: 7.8 kg, 7075-01: 7.5 kg

**Accessories**

- 7990 WAVEFORM CREATION SOFTWARE (CD-Rom)
Environmental Measuring Instruments

Environmental Measuring Instruments Index

Temperature measurement

<table>
<thead>
<tr>
<th>Model</th>
<th>Temperature Range</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3441/3442</td>
<td>-100 °C to 1300 °C</td>
<td>Choose from Basic or Waterproof models</td>
</tr>
<tr>
<td>3446-01</td>
<td>-100 °C to 1000 °C</td>
<td>With built-in memory</td>
</tr>
<tr>
<td>3412-50</td>
<td>-50 °C to 999 °C</td>
<td>With analog output</td>
</tr>
</tbody>
</table>

Rotation, Illumination

<table>
<thead>
<tr>
<th>Model</th>
<th>Rotation/illumination Range</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3403</td>
<td>10 to 100,000 r/min</td>
<td>Max. /Min. /Total /Period</td>
</tr>
<tr>
<td>3423</td>
<td>20 to 200,000 lx, digital</td>
<td></td>
</tr>
</tbody>
</table>

Non-contact temperature measurement (via infrared radiation energy)

<table>
<thead>
<tr>
<th>Model</th>
<th>Temperature Range</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>3415-01</td>
<td>-50 °C to 500 °C</td>
<td>Two-beam laser marker Narrow field measurement</td>
</tr>
<tr>
<td>3416-01</td>
<td>-50 °C to 500 °C</td>
<td>LED spot marker Spot measurement</td>
</tr>
<tr>
<td>3418</td>
<td>-50 °C to 500 °C</td>
<td>Without laser marker Narrow field measurement</td>
</tr>
<tr>
<td>3443</td>
<td>-50.0 °C to 500.0 °C</td>
<td>Two-beam laser marker Narrow field measurement</td>
</tr>
<tr>
<td>3444</td>
<td>-50.0 °C to 500.0 °C</td>
<td>Two-beam laser marker Spot measurement</td>
</tr>
<tr>
<td>3445</td>
<td>-50.0 °C to 500.0 °C</td>
<td>Two-beam laser marker Spot measurement</td>
</tr>
</tbody>
</table>

Data Loggers (Temperature/Humidity/Instrumentation/DC-Voltage/AC-Current/AC-Voltage/Leak-Current)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3634-20</td>
<td>Instrumentation</td>
<td>0 to 20.00 mA DC</td>
</tr>
<tr>
<td>3635-24, 25, 26</td>
<td>DC Voltage</td>
<td>-24: ±500.0 mV DC, -25: ±5.000 V DC, -26: ±50.00 V DC</td>
</tr>
<tr>
<td>3636-20</td>
<td>AC Current (2ch)</td>
<td>0 to 50.00/500.0 A AC</td>
</tr>
<tr>
<td>3638-20</td>
<td>AC Leak Current (2ch)</td>
<td>0 to 600.0 V AC</td>
</tr>
<tr>
<td>3638-20</td>
<td>AC Leak Current (2ch)</td>
<td>0 to 600.0 V AC</td>
</tr>
</tbody>
</table>

Data Loggers (Pulse/Illumination/DC-Voltage/Communication Base)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3639-20</td>
<td>Pulse Totalizer</td>
<td>9,999 counts/interval (1ch)</td>
</tr>
<tr>
<td>3640-20</td>
<td>Illumination</td>
<td>2000/2000/20000 lx (1ch)</td>
</tr>
<tr>
<td>3645-20</td>
<td>Multi-range Voltage Logger</td>
<td>with preheat signal function</td>
</tr>
<tr>
<td>3911-20, 3912-20</td>
<td>Communication Base</td>
<td>to analyze and process on a personal computer</td>
</tr>
</tbody>
</table>

Temp Logger

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3650</td>
<td>Temperature</td>
<td>-40°C to 85°C</td>
</tr>
</tbody>
</table>

Environmental Measuring Instruments 2300 Series

Remote Measurement System

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2300</td>
<td>Remote Measurement System</td>
<td>Various measurement modules, Internal memory LAN or SS Air Module</td>
</tr>
<tr>
<td>3641-20, 3632-20, 3633-20</td>
<td>Temperature/Humidity</td>
<td>-40<del>85°C 0</del>100% rh (using the 9680 sensor), -40.0 °C to 180.0 °C (external sensor)</td>
</tr>
<tr>
<td>3634-20</td>
<td>Instrumentation</td>
<td>0 to 20.00 mA DC</td>
</tr>
<tr>
<td>3635-24, 25, 26</td>
<td>DC Voltage</td>
<td>-24: ±500.0 mV DC, -25: ±5.000 V DC, -26: ±50.00 V DC</td>
</tr>
<tr>
<td>3636-20</td>
<td>AC Current (2ch)</td>
<td>0 to 50.00/500.0 A AC</td>
</tr>
<tr>
<td>3638-20</td>
<td>AC Leak Current (2ch)</td>
<td>0 to 600.0 V AC</td>
</tr>
</tbody>
</table>

Data Loggers (Pulse/Illumination/DC-Voltage/Communication Base)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3639-20</td>
<td>Pulse Totalizer</td>
<td>9,999 counts/interval (1ch)</td>
</tr>
<tr>
<td>3640-20</td>
<td>Illumination</td>
<td>2000/2000/20000 lx (1ch)</td>
</tr>
<tr>
<td>3645-20</td>
<td>Multi-range Voltage Logger</td>
<td>with preheat signal function</td>
</tr>
<tr>
<td>3911-20, 3912-20</td>
<td>Communication Base</td>
<td>to analyze and process on a personal computer</td>
</tr>
</tbody>
</table>

Temp Logger

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3650</td>
<td>Temperature</td>
<td>-40°C to 85°C</td>
</tr>
</tbody>
</table>

Environmental Measuring Instruments 3639-20, 3632-20, 3633-20

Temperature/Humidity/Instrumentation/DC-Voltage/AC-Current/AC-Voltage/Leak-Current

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3634-20</td>
<td>Instrumentation</td>
<td>0 to 20.00 mA DC</td>
</tr>
<tr>
<td>3635-24, 25, 26</td>
<td>DC Voltage</td>
<td>-24: ±500.0 mV DC, -25: ±5.000 V DC, -26: ±50.00 V DC</td>
</tr>
<tr>
<td>3636-20</td>
<td>AC Current (2ch)</td>
<td>0 to 50.00/500.0 A AC</td>
</tr>
<tr>
<td>3638-20</td>
<td>AC Leak Current (2ch)</td>
<td>0 to 600.0 V AC</td>
</tr>
</tbody>
</table>

Data Loggers (Pulse/Illumination/DC-Voltage/Communication Base)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3639-20</td>
<td>Pulse Totalizer</td>
<td>9,999 counts/interval (1ch)</td>
</tr>
<tr>
<td>3640-20</td>
<td>Illumination</td>
<td>2000/2000/20000 lx (1ch)</td>
</tr>
<tr>
<td>3645-20</td>
<td>Multi-range Voltage Logger</td>
<td>with preheat signal function</td>
</tr>
<tr>
<td>3911-20, 3912-20</td>
<td>Communication Base</td>
<td>to analyze and process on a personal computer</td>
</tr>
</tbody>
</table>

Temp Logger

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3650</td>
<td>Temperature</td>
<td>-40°C to 85°C</td>
</tr>
</tbody>
</table>

Environmental Measuring Instruments 3415-01, 3416-01, 3418, 3443, 3444, 3445

Non-contact temperature measurement (via infrared radiation energy)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3415-01</td>
<td>Two-beam laser marker</td>
<td>Narrow field measurement</td>
</tr>
<tr>
<td>3416-01</td>
<td>Two-beam laser marker</td>
<td>Without laser marker Narrow field measurement</td>
</tr>
<tr>
<td>3443</td>
<td>Two-beam laser marker</td>
<td>Narrow field measurement</td>
</tr>
<tr>
<td>3444</td>
<td>Two-beam laser marker</td>
<td>Narrow field measurement</td>
</tr>
<tr>
<td>3445</td>
<td>Two-beam laser marker</td>
<td>Narrow field measurement</td>
</tr>
</tbody>
</table>

Data Loggers (Temperature/Humidity/Instrumentation/DC-Voltage/AC-Current/AC-Voltage/Leak-Current)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3634-20</td>
<td>Instrumentation</td>
<td>0 to 20.00 mA DC</td>
</tr>
<tr>
<td>3635-24, 25, 26</td>
<td>DC Voltage</td>
<td>-24: ±500.0 mV DC, -25: ±5.000 V DC, -26: ±50.00 V DC</td>
</tr>
<tr>
<td>3636-20</td>
<td>AC Current (2ch)</td>
<td>0 to 50.00/500.0 A AC</td>
</tr>
<tr>
<td>3638-20</td>
<td>AC Leak Current (2ch)</td>
<td>0 to 600.0 V AC</td>
</tr>
</tbody>
</table>

Data Loggers (Pulse/Illumination/DC-Voltage/Communication Base)

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3639-20</td>
<td>Pulse Totalizer</td>
<td>9,999 counts/interval (1ch)</td>
</tr>
<tr>
<td>3640-20</td>
<td>Illumination</td>
<td>2000/2000/20000 lx (1ch)</td>
</tr>
<tr>
<td>3645-20</td>
<td>Multi-range Voltage Logger</td>
<td>with preheat signal function</td>
</tr>
<tr>
<td>3911-20, 3912-20</td>
<td>Communication Base</td>
<td>to analyze and process on a personal computer</td>
</tr>
</tbody>
</table>

Temp Logger

<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3650</td>
<td>Temperature</td>
<td>-40°C to 85°C</td>
</tr>
</tbody>
</table>

Environmental Measuring Instruments 3403, 3423

Rotation, Illumination

<table>
<thead>
<tr>
<th>Model</th>
<th>Rotation/illumination</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3403</td>
<td>10 to 100,000 r/min</td>
<td>Max. /Min. /Total /Period</td>
</tr>
<tr>
<td>3423</td>
<td>20 to 200,000 lx, digital</td>
<td></td>
</tr>
</tbody>
</table>
## Environmental Measuring Instruments

### Easily Construct a Centralized Data Management System for Monitoring Multiple Locations

LAN Module that paves the way for a low cost remote measuring system by utilizing existing data network

- Various measurement modules for temperature and humidity, instrumentation, and pulse
- Power measurement module for multiple circuits
- Large internal memory to avoid data loss due to communication problems
- Communication module with built-in real-time clock tracks the data of each measurement module to the second
- SS Air Module for constructing wireless systems

### 2300 Series

#### REMOTE MEASUREMENT SYSTEM

#### 2343-20 RS LINK MODULE
- For communicating with RS-232C interface equipped instruments
- Interface: RS-232C
- Transfer speed: 57.6kbps (max.)
- Please inquire regarding compatible instruments.
- (Existing compatible HIOKI instruments include Models 3331 and 3332.)

#### 2351 AIR MODULE
- 2.4GHz band SS radio system (RS-232C equipped)
- Transfer speed: 51.9kbps (fixed), RS-232C: 57.6kbps (max.)

#### 2353-20 LAN MODULE
- For data logging via LAN
- Interface: 10BASE-T

#### 2361-20 AC POWER MODULE
- Power supply for the communication modules and measurement modules (max. 10 modules)
- Input: AC 100 to 240V, Output: DC5V / 2.4A

#### 2362-20 DC POWER MODULE
- Power supply for the communication modules and measurement modules (max. 10 modules)
- Input: DC 19 to 36V, Output: DC5V / 2.4A

### Measurement Modules

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2301-20 HUMIDITY MODULE</td>
<td>Temperature 1ch and humidity 1ch. Use with optional sensor 9764</td>
<td>Temperature: -40.0 to 85.0°C, Humidity: 0.0 to 100%RH</td>
</tr>
<tr>
<td>2302-20 PT MODULE</td>
<td>Temperature 2ch (Pt100)</td>
<td>2 types of platinum resistance thermo sensors available</td>
</tr>
<tr>
<td>2303-20 TC MODULE</td>
<td>2ch temperature measurement using thermocouples (K, J, T), 4 TC types available</td>
<td></td>
</tr>
<tr>
<td>2304-21 PULSE MODULE</td>
<td>For 2ch pulse input (voltage, contact), maximum 16M pulses/interval</td>
<td>Input pulse: 4kHz max. (voltage/electronic contact signal) 25Hz max. (mechanical contact signal)</td>
</tr>
<tr>
<td>2305-20 INSTRUMENTATION MODULE</td>
<td>Voltage / current 2ch measurement, for 4-20mA, 1-5V instrumentation signals</td>
<td></td>
</tr>
<tr>
<td>2331-20 POWER METER MODULE</td>
<td>For single circuit power measurement. Single-phase 2-wire to 3-phase 4-wire</td>
<td>Voltage: AC 100/200V, Current: AC 5A (with 9695-02 CLAMP ON SENSOR), AC 50A (with 9695-02, AC 100A (with 9695-03 or 9661-01), AC 500A (with 9661-01)</td>
</tr>
<tr>
<td>2332-20 POWER METER MODULE</td>
<td>For multiple circuit power measurement: from 6 circuits of single-phase 2-wire to 3 circuits of 3-phase 3-wire installations</td>
<td>Voltage: AC 100/200V (1000V accepted at 200V range), Current: AC 5A (with 9695-02 CLAMP ON SENSOR), AC 50A (with 9695-02, AC 100A (with 9695-03 or 9661-01), AC 500A (with 9661-01) *3-phase 4-wire circuit cannot be measured</td>
</tr>
<tr>
<td>2341-20 INPUT MODULE</td>
<td>For recording the status of contact signals</td>
<td>Input 8 ch, Input internal bus isolated Easiest capture on/off status with LED</td>
</tr>
<tr>
<td>2342-20 OUTPUT MODULE</td>
<td>Acts as receiver of higher order external control device, outputs control signals and monitors data of measurement modules</td>
<td>Output 8ch (Open corrector output), Output internal bus isolated</td>
</tr>
</tbody>
</table>

---

**New** Smart Site
### Data Loggers for All Types of Measurements

#### For HACCP-related Temperature and Humidity Recording

**HUMIDITY LOGGER**
- 3641-20
  - Options for 3634-20
  - Options for 3636-20
  - Options for 3638-20

**TEMPERATURE LOGGERs**
- 3632-20
- 3633-20

Can accurately record temperature and humidity on two channels for temperature and humidity measurement.
- -40.0 °C to 85.0 °C
- 0.0 %rh to 100.0 %rh

Waterproof with built-in sensor for temperature measurement.
- -20.0 °C to 70.0 °C

External sensor for temperature measurement.
- -40.0 °C to 180.0 °C

#### For Recording Voltage

**VOLTAGE LOGGERs**

- 3635-24, -25, -26
- 3645-20
- 3637-20

For measurement DC voltage.
- -24 ± 5000 mV DC
- -26 ± 5000 mV DC

With hysteresis function.
- For measuring DC voltage.
  - Range: ± 50.0 mV
  - ± 50.0 mV

#### For Recording Precipitation or Illumination

**PULSE LOGGER**
- 3639-20
- 3640-20

For cumulative pulse measurement.

**ILLUMINATION LOGGER**
- 3911-20
- 3912-20

For illumination measurement.
- 2000 lux to 180,000 lux

#### For Recording Load Current and Monitoring Leak Current

**INSTRUMENTATION LOGGER**
- 3634-20

For measuring typical instrumentation signals.
- Range: 2,000 mV to ± 50.00 V DC

**CLAMP LOGGER**
- 3636-20

For measuring alternating current on two channels.
- Range: ± 50.00 V DC to ± 120.0 V DC

**LEAK LOGGER**
- 3638-20

For measuring alternating current on two channels.
- Range: ± 100/1000 mA AC

**COMMUNICATION BASE**

The 3911-20, 3912-20 COMMUNICATION BASE are used to transfer data to a personal computer.

#### Analyze and Process Data on a Personal Computer

- The 3911-20, 3912-20 COMMUNICATION BASE are used to transfer data to a personal computer.

#### Options for 3911-20

- USB 3911-20
- RS-232C 3911-20

#### Options for 3912-20

- USB 3912-20
- RS-232C 3912-20

<table>
<thead>
<tr>
<th>3911-20</th>
<th>3912-20</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recording Capacity</strong></td>
<td>Max. 16,000 data points x 16 ch, 32,000 data points x 8 ch.</td>
<td></td>
</tr>
<tr>
<td><strong>Communication method</strong></td>
<td>USB 3911-20 to a PC (RS-232C)</td>
<td></td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>4.5 V (9V) ( \times ) (AAA) alkaline dry cell batteries</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>3911-20: 69W x 98H x 36D mm</td>
<td>3912-20: 69W x 98H x 36D mm</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>92H</td>
<td>128H</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>3911-20: USB cable ( \times ) (umbilical cord)</td>
<td>3912-20: USB cable ( \times ) (umbilical cord)</td>
</tr>
</tbody>
</table>

#### Accessories

- **9637**: 3911-20 RS-232C CABLE
  - 9-pin to 9-pin crossed cable/1.8 m
- **9638**: 3912-20 RS-232C CABLE
  - 9-pin to 25-pin crossed cable/1.8 m

#### Options for 3911-20

- 9-pin to 9-pin crossed cable/1.8 m
- 9-pin to 25-pin crossed cable/1.8 m
**3441 3442**

**TEMPERATURE HiTESTER**

Supports temperature management demands of various applications

- Compact and weighing only 160g
- More than 200 hours of continuous operation on a single battery
- An assortment of 9 optional temperature sensors
- 3442: Waterproof construction

**3443 3444 3445**

**TEMPERATURE HiTESTER**

Non-contact measurement, quick and easy temperature management

- Ideal for daily temperature checks -- 3443 with integrated memory
- For temperature monitoring -- 3444, 3445 with real-time output
- Dedicated software (option) -- For data analysis and management
- Use in tough environments -- dust/splash-proof design (IP54)

**3441, 3442** : SPECIFICATIONS

- **Material type**: K type thermocouple (Chromel/Alumel)
- **Measurement range**: -100°C to 1300°C (-148°F to 2372°F) (The actual measurement range is restricted by the temperature probe)
- **Resolution**: 0.1°C or 1°C
- **Unit Accuracy**: ±0.1% rdg. at 20.0°C, ±0.2% rdg. at 20°C to 200°C, ±0.5% rdg. at 50.0°C to 1500°C
- **Contact compensation**: Auto compensation
- **Functions**: Max/Min temperature recording and display, display data hold, sensor discontinuity display, Over-range display, °C/°F display switching (3441-02, 3442-03), auto power save, low battery warning
- **Place of use**: Indoor use to altitude of 2000 m
- **Power supply**: R6P (AA, AAA) or LR6 (AA/A)4
- **Operating time**: 200 hours or better of continuous use (with manganese battery)
- **Dimensions, mass**: 74W×155H×24D mm, 160 g
- **Accessories**: Strap band(1), R6P (AA, AAA) Batteries(4)

**OPTIONS**

9180 SHEATH TYPE TEMPERATURE PROBE (up to 500 °C)
9181 SURFACE TYPE TEMPERATURE PROBE (up to 400 °C)
9182 SHEATH TYPE TEMPERATURE PROBE (up to 500 °C)
9366 CARRYING CASE
9473 SHEATH TYPE TEMPERATURE PROBE (up to 800 °C)
9474 SHEATH TYPE TEMPERATURE PROBE (up to 300 °C)
9475 SHEATH TYPE TEMPERATURE PROBE (up to 500 °C)
9476 SURFACE TYPE TEMPERATURE PROBE (up to 500 °C)

**3443 : SPECIFICATIONS**

- **Measurement range**: -100°C to 500.0°C, 0.1°C resolution
- **Measurement field diameter**: ø24mm at a distance of 1 m
- **Accuracy**: ±1% rdg. at 200.1°C to 500.0°C, ±2°C at 0.0°C to 200.0°C, ±0.5% rdg. at 2°C at 50.0°C to 10°C
- **Response time**: 1.6 seconds (95% response)
- **Date memory function**: 130 points of data, memory dump to printer
- **Analog output function**: None
- **Interface**: RS-232C output (requires 3909 INTERFACE PACK)
- **Other functions**: Auto power save, low battery warning, auto-hold
- **Power supply**: 6F22 (AA, AAA) or AC adapter
- **Operating time**: Continuous use of 20 hours (light on) and 50 hours (light off)
- **Dimensions, mass**: 47W×200H×48D mm, 280 g
- **Accessories**: Carrying case(1), hand strap(1), R6P (AA, AAA) Batteries(4)

**3444, 3445** : SPECIFICATIONS

- **Measurement range**: -100°C to 500.0°C, 0.1°C resolution switchable
- **Measurement field diameter**: ø24mm at a distance of 1 m
- **Accuracy**: ±1% rdg. at 200.1°C to 500.0°C, ±2°C at 0.0°C to 200.0°C, ±0.5% rdg. at 2°C at 50.0°C to 10°C
- **Response time**: 1.6 sec (95% at 0.1°C resolution), 0.7 sec (95% at 1°C resolution)
- **Date memory function**: None
- **Analog output function**: Possible (requires 3909 INTERFACE PACK)
- **Interface**: RS-232C output (requires 3909 INTERFACE PACK)
- **Other functions**: Auto power save, low battery warning
- **Power supply**: 6F22 (AA, AAA) or AC adapter
- **Operating time**: Continuous use of 20 hours (light on) and 50 hours (light off)
- **Dimensions, mass**: 47W×200H×48D mm, 280 g
- **Accessories**: Carrying case(1), hand strap(1), 6F22(1), screwdriver(1)

---

*Note: Used for accurate measurement of the temperature of objects which have low thermal emissivity (ε) such as polished metal, and for calibrating thermal emissivity.*
3423 | LUX HiTESTER

Digital illumination meter, maximum scale of 199,900 lx

- Easy-to-operate, hand-held unit
- From low light up to a maximum intensity of 199,900 lx
- For illumination equipment, lighting work, and facility management

3423 : SPECIFICATIONS

| Measurement range | 20 to 200,000 lx full-scale, 5 ranges |
| Accuracy | 2% ±1 dgt. (environment temperature: 23 ±5°C) |
| Display | 1999 full digits. LCD with EL backlight (Note: in the 20,000 lx range, the maximum is 19990/10 digits steps, and in the 200,000 lx range, the maximum is 199900/100 digits steps) |
| Response time | 5 sec. or less (auto range), 2 sec. or less (manual range) |
| Receptor element | Silicon photodiode |
| Other functions | Sensor separate: Permits remote measurement with the sensor separated from the main unit (using the 9436) |
| Analog output | 200 mV DC at full scale rate |
| Power supply | R6P (AA) × 2 (continuous use of 25 hours) or AC adapter (6 V, 300 mA) |
| Dimensions, mass | 74W × 170H × 30D mm, 310 g (including the dry cells) |
| Accessories | 9376 CARRYING CASE(1), Sensor cap(1), R6P(2) |

3403 3404 | TACHO HiTESTER

Precise rotation speed meter

- Minimum 0.01 r/min resolution and high ±1 digit precision make the tachometer effective for precise measurements.
- By using the optional 9213 contact adapter, the 3403/3404 become contact-type tachometers, while the period ring can be used in applications like measurement of conveyor line speed.
- LED and buzzer signals confirm that the light pulses reflected from the tape on the rotating body are being picked up.
- MIN/MAX mode, TOTAL mode, PERIOD mode, FAST/SLOW sampling mode, and Analog output Multi-function performance for the 3404 only.

3403: SPECIFICATIONS

| Measurement ranges | r/min: rotation per minute, r/s: rotation per second |
| Sampling period | 0.5 second to 2 seconds |
| Detection distance | Distance of 50 mm to 200 mm |
| Analog output | None |
| Power supply | R6P (AA) × 4 (continuous use of 17 hours) or AC Adapter (6 V, 300 mA) |
| Dimensions, mass | 62W × 180H × 38D mm, 260 g |
| Accessories | 9211 REFLECTIVE TAPE(1Sheet), Carrying case(1) |

3404: SPECIFICATIONS

| Measurement ranges | r/min: (30.00 to 199.99)range to (20000 to 99990)range, 4 ranges (at slow sampling mode) |
| Sampling period | Slow: 0.5 sec. to 2 sec., Fast: 0.1 sec. to 0.5 sec. |
| Detection distance | Distance of 50 mm to 200 mm |
| Analog output | 1V DC at full-scale range output |
| Power supply | R6P (AA) × 4 (continuous use of 16 hours) or AC Adapter (6 V, 300 mA) |
| Dimensions, mass | 62W × 180H × 38D mm, 260 g |
| Accessories | 9211 REFLECTIVE TAPE(1Sheet), 9094 OUTPUT CORD (1), Carrying case(1) |

OPTIONS

9211 REFLECTIVE TAPE
(30 pieces /sheet, 10 sheets /1 set, 12 mm×12 mm /1 piece size)
9213 CONTACT ADAPTER SET
(includes 9032×1, 9033×2, 9212×1)
9212 PERIPHERAL RING
9033 RUBBER CONTACT TIP
9032 METAL CONTACT TIP
Clamp Sensors

Wide-band frequency, high-precision, ideal for observing waveforms (for AC / DC)

- **3273/3276**
  - DC to 50 MHz / 100 MHz
  - 15 A / 30 A maximum
  - 0.1 V / A output
  - ø 5 mm core jaw dia.
  - p. 33

- **3274**
  - DC to 10 MHz
  - 150 A maximum
  - 0.1 V / A output
  - ø 20 mm core jaw dia.
  - p. 33

- **3275**
  - DC to 2 MHz
  - 500 A maximum
  - 0.1 V / A output
  - ø 20 mm core jaw dia.
  - p. 33

- **3272/3269**
  - Power supply for 3273-50, 3274, 3275, 3276
  - Single sensor (3272)
  - Four sensors (3269)
  - p. 33

- **9274**
  - DC to 10 MHz
  - 20 A rated
  - ø 5 mm core jaw dia.

- **9276**
  - DC to 1 MHz
  - 150 A rated
  - ø 5 mm core jaw dia.

- **3270**
  - Power supply & amplifier for 9274, 9276
  - Single sensor connectable

High-precision sensors to view waveforms or to use with power meters (for AC/DC, or AC only)

- **9277**
  - DC to 100 kHz
  - 20 A rated
  - ø 20 mm core jaw dia.
  - p. 34

- **9278**
  - DC to 100 kHz
  - 200 A rated
  - ø 20 mm core jaw dia.
  - p. 34

- **9279**
  - DC to 20 kHz
  - 500 A rated
  - ø 20 mm core jaw dia.
  - p. 34

- **9270**
  - 5 Hz to 50 kHz, 20 A rated
  - 2 V / 20 A output
  - ø 20 mm core jaw dia.

- **9271**
  - 10 Hz to 1 kHz
  - 20 or 200 A rated
  - 2 V / 20 or 200 A output
  - ø 40 mm core jaw dia.

- **9272**
  - 10 Hz to 1 kHz
  - 200 A rated
  - 2 V / 200 A output

- **9290-10**
  - AC current up to 1500 A
  - Secondary current 1/10 of primary
  - ø 55 mm core jaw dia.

- **CT-101A**
  - AC current up to 15 A
  - Secondary current 1/10 of primary
  - ø 25 mm core jaw dia.

For power lines (50/60 Hz use)

- **9010, 9010-10**
  - 40Hz to 1kHz
  - 10A to 500A range
  - 200mV / range output
  - ø 46 mm core jaw dia.
  - p. 34

- **9018, 9018-10**
  - 40Hz to 3kHz
  - 10A to 500A range
  - 200mV / range output
  - ø 46 mm core jaw dia.
  - p. 34

- **9132, 9132-10**
  - 40Hz to 1kHz
  - 20A to 1000A range
  - 200mV / range output
  - ø 46 mm core jaw dia.
  - p. 34

- **9005-01**
  - 50Hz or 60Hz
  - 10A to 300A range
  - 300mV / range output
  - ø 55 mm core jaw dia.
  - p. 34

- **9657-10/9675**
  - LEAK CLAMP ON SENSOR
  - AC 25mV/A
  - Up to ø 40mm or 88mm width

- **9657-10**
  - LEAK CLAMP ON SENSOR
  - AC 25mV/A
  - Up to ø 40mm

Conversion Adapter

- **9657-10**
  - LEAK CLAMP ON SENSOR
  - AC 25mV/A
  - Up to ø 40mm

Clamp Sensors for 3169/3196 Power meters

- **9660**
  - 45Hz to 5kHz (±1%)
  - AC current up to 100A
  - 1mV / A output
  - ø 55 mm core jaw dia.
  - p. 37

- **9668**
  - Power supply & amplifier for 9660
  -ø 55 mm core jaw dia.

- **9661**
  - 45Hz to 5kHz (±1%)
  - AC current up to 100A
  - 1mV / A output
  - ø 55 mm core jaw dia.
  - p. 37

- **9655**
  - Power supply for 9657-10
  - LEAK CLAMP ON SENSOR
  - AC 25mV/A
  - Up to ø 40mm

- **9667**
  - 10Hz to 20kHz (±3dB)
  - AC current up to 5000/500A
  - 0.1mV / A, AC 1mV / A output
  - ø 35 mm core jaw dia.
  - p. 37
Wide-range current probe allows direct input to oscilloscope

- 3273-50/3276: Wide Band from DC to 50/100 MHz, For Large Current Measurements (30 A rms)
- 3274/3275: Wide Band from DC to 10/2 MHz, For Large Current Measurements (150/500 A rms)

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>3273-50</th>
<th>3274</th>
<th>3275</th>
<th>3276</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency bandwidth</strong>&lt;br/&gt;DC to 50/10MHz (-3dB)</td>
<td>DC to 100MHz (-3dB)</td>
<td>DC to 10MHz (-3dB)</td>
<td>DC to 2MHz (-3dB)</td>
</tr>
<tr>
<td><strong>Rise time</strong></td>
<td>3 ns or less</td>
<td>3.3 ns or less</td>
<td>35 ns or less</td>
</tr>
<tr>
<td><strong>Continuously maximum input range</strong>&lt;br/&gt;30A rms</td>
<td>150A rms</td>
<td>30A rms</td>
<td>500A rms</td>
</tr>
<tr>
<td><strong>Maximum peak current</strong>&lt;br/&gt;Non-continuous 50A peak</td>
<td>Non-continuous 50 Apeak</td>
<td>Non-continuous 300A peak</td>
<td>Non-continuous 700A peak</td>
</tr>
<tr>
<td><strong>Output voltage rate</strong></td>
<td>0.1V/A</td>
<td>0.1V/A</td>
<td>0.01V/A</td>
</tr>
<tr>
<td><strong>Amplitude accuracy</strong>&lt;br/&gt;±1% rdg. ±1 mV (0 to 30 A)&lt;br/&gt;DC, 45 to 66Hz</td>
<td>±1% rdg. ±1 mV (0 to 30 A)&lt;br/&gt;DC, 45 to 66Hz</td>
<td>±2% rdg. ±3 mV (0 to 30 A)&lt;br/&gt;DC, 45 to 66Hz</td>
<td>±2% rdg. ±5 mV (0 to 30 A)&lt;br/&gt;DC, 45 to 66Hz</td>
</tr>
<tr>
<td><strong>Noise</strong>&lt;br/&gt;2.5mV rms or less (measured with 20MHz bandwidth equipment)</td>
<td>2.5mV rms or less (measured with 20MHz bandwidth equipment)</td>
<td>25mV rms or less (measured with 20MHz bandwidth equipment)</td>
<td>25mV rms or less (measured with 20MHz bandwidth equipment)</td>
</tr>
<tr>
<td><strong>Sensitivity temperature characteristics</strong>&lt;br/&gt;Within ±2%&lt;br/&gt;From 0 to 40°C</td>
<td>Within ±2%&lt;br/&gt;From 0 to 40°C</td>
<td>Within ±2%&lt;br/&gt;At 55Hz/150A input, 0 to 40°C</td>
<td>Within ±2%&lt;br/&gt;At 50Hz/500A input, 0 to 40°C</td>
</tr>
<tr>
<td><strong>Maximum rated power</strong>&lt;br/&gt;5.6VA</td>
<td>5.3 VA</td>
<td>5.3 VA</td>
<td>5.5VA (Input within the maximum input range.)</td>
</tr>
<tr>
<td><strong>Power supply voltage</strong></td>
<td>±12V ±10.5V</td>
<td>±12V ±10.5V</td>
<td>±12V ±10.5V</td>
</tr>
<tr>
<td><strong>Ambient conditions for use</strong>&lt;br/&gt;0 to 40°C, max. 80% rh (no condensation)</td>
<td>0 to 40°C, max. 80% rh (no condensation)</td>
<td>0 to 40°C, max. 80% rh (no condensation)</td>
<td>0 to 40°C, max. 80% rh (no condensation)</td>
</tr>
<tr>
<td><strong>External magnetic field resistance</strong>&lt;br/&gt;Max. 20mA (equivalent)&lt;br/&gt;DC and 60Hz, Magnetic field of 400A/m</td>
<td>Max. 5 mA (equivalent)&lt;br/&gt;DC and 60Hz, Magnetic field of 400A/m</td>
<td>Max. 150mA (equivalent)&lt;br/&gt;DC and 60Hz, Magnetic field of 400A/m</td>
<td>Max. 800mA (equivalent)&lt;br/&gt;DC and 60Hz, Magnetic field of 400A/m</td>
</tr>
<tr>
<td><strong>Maximum voltage in measurement circuit</strong>&lt;br/&gt;300V, CAT-I&lt;br/&gt;(insulated conductor)</td>
<td>300V, CAT-I&lt;br/&gt; (insulated conductor)</td>
<td>600V CAT-II, 300 V CAT-III&lt;br/&gt; (insulated conductor)</td>
<td>600V CAT-II, 300 V CAT-III&lt;br/&gt; (insulated conductor)</td>
</tr>
<tr>
<td><strong>Measurement conductor diameter</strong>&lt;br/&gt;Max. 5mm&lt;br/&gt;Denver max. 3.5mm</td>
<td>Max. 3.5mm&lt;br/&gt;Denver max. 2.5mm</td>
<td>Max. 2.5mm&lt;br/&gt;Denver max. 3.5mm</td>
<td>Max. 3.5mm&lt;br/&gt;Denver max. 2.5mm</td>
</tr>
<tr>
<td><strong>Dimensions and mass</strong>&lt;br/&gt;Sensor approx. 175Wx130Hx40D mm, 230g&lt;br/&gt;Termination unit approx. 270Wx55Hx18D mm</td>
<td>Sensor approx. 175Wx130Hx40D mm, 340g&lt;br/&gt;Termination unit approx. 270Wx55Hx18D mm</td>
<td>Sensor approx. 170Wx60Hx27D mm, 90g&lt;br/&gt;Termination unit approx. 270Wx55Hx18D mm</td>
<td>Sensor approx. 170Wx60Hx27D mm, 530 g&lt;br/&gt;Termination unit approx. 270Wx55Hx18D mm</td>
</tr>
<tr>
<td><strong>Cable length</strong>&lt;br/&gt;Sensor cable: approx. 1.5 m (BNC connector)&lt;br/&gt;Power cable: approx. 1 m</td>
<td>Sensor cable: approx. 1.5 m (BNC connector)&lt;br/&gt;Power cable: approx. 1 m</td>
<td>Sensor cable: approx. 2 m (BNC connector)&lt;br/&gt;Power cable: approx. 1 m</td>
<td>Sensor cable: approx. 2 m (BNC connector)&lt;br/&gt;Power cable: approx. 1 m</td>
</tr>
<tr>
<td><strong>Supplied accessories</strong>&lt;br/&gt;Soft case 1</td>
<td>Hard case 1</td>
<td>Hard case 1</td>
<td>Hard case 1</td>
</tr>
</tbody>
</table>

**3269/3272 POWER SUPPLY**

Please specify voltage when ordering for use with 120 V, 220 V, or 240 V.

<table>
<thead>
<tr>
<th>3269</th>
<th>3272</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(Four sensors)</strong></td>
<td><strong>(Single sensor)</strong></td>
</tr>
<tr>
<td><strong>3273-50, 3274, 3275, 3276 CLAMP ON PROBE</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Optional accessories**

- **3269/3272 POWER SUPPLY**
- **3272 (Single sensor)**
- **3273-50, 3274, 3275, 3276 CLAMP ON PROBE**
High-precision sensors to view waveforms or to use with power meters (for AC/DC)

- **9277/9278/9279**: Clamp on sensors
- **Wide frequency ranges including DC**
- **Use together with the 9555 SENSOR UNIT for current waveform monitoring (with a waveform recorder or oscillograph)**

**9010, 9010-10, 9018, 9018-10**: Easy-to-use, current to voltage transformer

- Intended primarily for application as an input sensor for a recorder
- A secondary output provides an AC voltage waveform, and can be connected to an input impedance over 1MΩ

### 9277, 9278, 9279 (Non-CE mark product)

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>9277</th>
<th>9278</th>
<th>9279 (Non-CE mark product)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated current</strong></td>
<td>20 A AC/DC (continuous 50 A)</td>
<td>200 A AC/DC (continuous 350 A)</td>
<td>500 A AC/DC (continuous 650 A)</td>
</tr>
<tr>
<td><strong>Frequency band width</strong></td>
<td>DC to 100 kHz (±5 % f.s.)</td>
<td>DC to 100 kHz (±5 % f.s.)</td>
<td>DC to 20 kHz (±5 % f.s.)</td>
</tr>
<tr>
<td><strong>Wide frequency ranges including DC</strong></td>
<td>20.5 % r.d.g. to 20.05 % f.s., phase ±0.2°</td>
<td>20.5 % r.d.g. to 20.05 % f.s., phase ±0.2°</td>
<td>20.5 % r.d.g. to 20.05 % f.s., phase ±0.2°</td>
</tr>
<tr>
<td><strong>Output rate (with the 9555)</strong></td>
<td>2 V/√ρ (average current range) (waveform output, with the 9555)</td>
<td>2 V/√ρ (average current range) (waveform output, with the 9555)</td>
<td>2 V/√ρ (average current range) (waveform output, with the 9555)</td>
</tr>
<tr>
<td><strong>Max. circuit voltage</strong></td>
<td>600 V peak (insulated wire)</td>
<td>600 V peak (insulated wire)</td>
<td>600 V peak (insulated wire)</td>
</tr>
<tr>
<td><strong>Core jaw dia.</strong></td>
<td>8/20 mm</td>
<td>8/20 mm</td>
<td>8/20 mm</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>9555 SENSOR UNIT (required)</td>
<td>9555 SENSOR UNIT (required)</td>
<td>9555 SENSOR UNIT (required)</td>
</tr>
<tr>
<td><strong>Dimensions, mass</strong></td>
<td>176W×63H×34D mm, 430 g, cord length: 3 m</td>
<td>176W×63H×34D mm, 430 g, cord length: 3 m</td>
<td>220W×103H×41.5D mm, 860 g, cord length: 3 m</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>9375 CARRYING CASE (1)</td>
<td>9375 CARRYING CASE (1)</td>
<td>9375 CARRYING CASE (1)</td>
</tr>
</tbody>
</table>

### 9555 SPECIFICATIONS

#### Suitable models

- 9270/9271/9272/9277/9278/9279, 1 unit max.

#### Power supply

- 85 to 250 V AC, 47 to 440 Hz (universal type)

#### Dimensions, mass

- 50W × 100H × 180D mm, 700 g

#### Accessories

- Power cord (1), Fuse (1), 9177 CONNECTION CORD (1), Setting parts (1)

### Optional accessories

**9555 POWER SUPPLY**

Power supply for the 9270/9271/9272/9277/9278/9279, single sensor connectable

### 9010, 9010-10, 9018, 9018-10: CLAMP ON PROBE

**Rated current** | 500 A AC (10 A to 500 A full scale, 6 ranges selectable)
| **Frequency band width** | 40 Hz to 1 kHz (10 % max.)
| **Accuracy** | 0.3 % f.s.
| **Output rate** | 0.2 V AC at full scale range (waveform output)
| **Core jaw dia.** | 46 mm, or 50 mm (20 mm busbar)
| **Power supply** | None

### 9018, 9018-10: SPECIFICATIONS

- **Rated current** | 500 A AC (10 A to 500 A full scale, 6 ranges selectable)
| **Frequency band width** | 40 Hz to 3 kHz (21 % max.), phase ±2.5° max.
| **Accuracy** | 1.5 % r.d.g. to 20.5 % f.s.
| **Output rate** | 0.2 V AC at full scale range (waveform output)
| **Core jaw dia.** | 50 mm (20 mm busbar)
| **Power supply** | None

### Dimensions, mass

- 74W×184H×57D mm, 410 g, cord length: 3 m
Power Measuring Instruments

Power Measuring Instruments Index

For high level performance

3193  DC, or Single-phase to 3-phase 4-wire. Wide-band up to 1 MHz. 6 ch-Direct/Clamp input
......................... p.39

3194  Analysis station for Motor Evaluation Power, Harmonics, Rotation Speed, Torque, Converter efficiency
......................... p.39

3196  Power quality analyzer DC, or Single-phase to 3-phase 4-wire Clamp input
......................... p.37

9624/9624-10  PQA- HiVIEW Software application for 3196
......................... p.38

For use on production lines

3186  Single-phase V,A,W,VA Direct input only
......................... p.39

3331  Single-phase to 3-phase 3-wire V,A,W,VA,var,integ.,PF Phase angle, Hz. Direct input only
......................... p.39

3332  Single-phase 2-wire V,A,W,VA,var,integ.,PF Phase angle, Hz Direct input only
......................... p.39

3187  DC, or Single-phase V,A,W,VA, var,integ.,PF Phase angle, Hz Direct input only
......................... p.39

3167  DC, or Single-phase V,A,W,VA, var,integ.,PF Phase angle, Hz Clamp input only

Wide bandwidth, multi-purpose models

For managing power lines

3169-20/-21  Single-phase to 3-phase 4-wire V,A,W,VA,var,integ.,PF,Hz Clamp input only
......................... p.36

9625  POWER MEASUREMENT SUPPORT SOFTWARE for 3169-20/21
......................... p.36

3286-20  Clamp-On Power Meter V,A,W,VA,var,PF,Hanz,Harmonics (V,A)
......................... p.44
CLAMP ON POWER HiTESTER

Offering a new approach to energy-related measurement such as energy conservation, ISO14001 testing, equipment diagnosis, and harmonics measurement.

- Measure up to two 3-phase, 3-wire systems
- Measure up to four single-phase, 2-wire systems
- 5 A to 5000 A range, PC card data storage
- Power recording for individual waveforms
- Simultaneous recording of demand values and harmonics

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Measurement lines</th>
<th>Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire, and three-phase 4-wire systems (50/60 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement item</td>
<td>Voltage, Current, Active power, Reactive power, Apparent power, Power factor, listaggregated value, Frequency, Harmonics</td>
</tr>
</tbody>
</table>
| Measurement range | Voltage: 150 V to 600 V, 3 ranges  
Current (When using 9660): 5 A to 100 A, 4 ranges  
Current (When using 9661): 5 A to 500 A, 5 ranges  
Current (When using 9669): 100 A to 1 kA, 3 ranges  
Current (When using 9667): 500 A / 5 kA, 2 ranges  
Current (When using 9694): 0.5 A to 5 A, 3 ranges |
| Basic accuracy    | 20.2% rdg. ±0.1% f.s. + Clamp accuracy (for active power) |
| Clamp sensor accuracy | 9660 (rated for 100 A): ±0.3% rdg. ±0.02% f.s.  
9661 (rated for 500 A): ±0.3% rdg. ±0.01% f.s.  
9669 (rated for 1000 A): ±1.0% rdg. ±0.01% f.s.  
9667 (rated for 5000 A): ±2.0% rdg. ±1.5 mV  
9694 (rated for 5 A): ±0.3% rdg. ±0.02% f.s. |
| Frequency characteristic | Fundamental waveforms up to the 50th order 2.5% f.s. + measurement accuracy |
| Other functions   | PC card, RS-232C, D/A output (3169-21 only, 4 channels), External I/O |
| Power supply voltage rating | 110 to 240 V AC, 50/60 Hz |
| Dimensions, mass  | 210W×160H×60D mm, 1.2 kg ±100 g  (3169-20, 3169-21) |
| Accessories       | 9438-03 Voltage cord set (1), Power cord (1), Input cord label (1), Operating manuals (2), CD-R (1), 9441 Connection cable (1) (for the 3169-21 only) |

### OPTIONS

- **Current measurement**  
  (The 3169-20/-21 cannot be used alone. Measurement requires one or more optional clamp-on sensors.)
  - 9660 CLAMP ON SENSOR rated current 100 A AC
  - 9661 CLAMP ON SENSOR rated current 500 A AC
  - 9669 CLAMP ON SENSOR rated current 1000 A AC
  - 9667 FLEXIBLE CLAMP ON SENSOR rated current 5000 A AC
  - 9290-10 CLAMP ON ADAPTER rated current 1500 A AC, output 150 A (10:1 ratio)

- **Voltage measurement**
  - 9438-03 VOLTAGE CORD (Supplied as standard with 3169-20/-21)
  - 9625 POWER MEASUREMENT SUPPORT SOFTWARE
  - 9612 RS-232C CABLE for connection to PC
  - 9626 PC CARD 32M
  - 9627 PC CARD 64M
  - 9726 PC CARD 128M
  - 9727 PC CARD 256M
  - 9728 PC CARD 512M

- **PC communication**
  - 9625 POWER MEASUREMENT SUPPORT SOFTWARE
  - 9612 RS-232C CABLE for connection to PC

- **Other options**
  - 9720 CARRYING CASE
  - 9440 CONNECTION CABLE for external I/O, 2 m length
  - 9441 CONNECTION CABLE (3169-21 standard), for D/A output, 2 m length

- **Printer**
  - 9442 PRINTER
  - 9443-02 AC ADAPTER for the 9442 PRINTER, EU type
  - 9443-03 AC ADAPTER for the 9442 PRINTER, USA type
  - 9721 RS-232C CABLE for connection to the 9442, 1.5 m length
  - 1196 RECORDING PAPER 112 mm width × 25 m, roll type, 10 rolls per set

---

When purchasing the 9442 printer, make sure you also purchase the 9721 RS-232C cable and 9443-02/03 AC adapter so that you can connect it to the 3169-20/21.
Monitor and record the quality of power to analyze the cause of trouble when it occurs!

Most complete instrument for power quality troubleshooting
- Measure Dips, Swells, Interruptions, Flicker, Transients
- Harmonic to the 50th order
- High frequency transient over voltage
- Detection and waveform display
- 4 current and 4 voltage channels

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Measurement lines</th>
<th>Single-phase two-wires, Single-phase three-wires, Three-phase three-wires, Three-phase four-wires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage range</td>
<td>ch1, ch2, ch3: 150/300/600V (AC), 60/600V (DC)</td>
</tr>
<tr>
<td>Current range</td>
<td>9660: 50/100A, 9661: 50/500A, 9667: 500/5000A, 9669: 1000A</td>
</tr>
<tr>
<td>Measurement Method</td>
<td>Transient overvoltage: 2MHz/s</td>
</tr>
<tr>
<td>Function</td>
<td>1. Transient overvoltage</td>
</tr>
<tr>
<td></td>
<td>2. Voltage swell, Voltage dip, Voltage interruption</td>
</tr>
<tr>
<td></td>
<td>3. Frequency, Voltage, Current, Voltage/Current peak, Active/Reactive /Apparent power, Power factor, DPF</td>
</tr>
<tr>
<td></td>
<td>4. Voltage unbalance ratio, Current unbalance ratio</td>
</tr>
<tr>
<td></td>
<td>5. Harmonic voltage/current, Inter harmonic voltage/current, Harmonic voltage/current phase angle, Total harmonic/inter harmonic distortion</td>
</tr>
<tr>
<td></td>
<td>6. IEC flicker[Pst, Plt], K factor</td>
</tr>
<tr>
<td></td>
<td>6. IEC flicker[Pst, Plt], K factor</td>
</tr>
<tr>
<td>Internal memory</td>
<td>13MB</td>
</tr>
<tr>
<td>Interface</td>
<td>PC card (Flash ATA card / up to 528 MB)</td>
</tr>
<tr>
<td></td>
<td>RS-232C, LAN (10BASE-T), HTTP server function</td>
</tr>
<tr>
<td>Power supply</td>
<td>9458 AC adapter or 9459 battery pack</td>
</tr>
<tr>
<td>Dimensions, mass</td>
<td>298W×215H×67D mm, 2.0 kg</td>
</tr>
<tr>
<td>Accessories</td>
<td>Voltage cord (1set), 9458 AC adapter (1), 9459 Battery pack (1), strap (1)</td>
</tr>
</tbody>
</table>

**OPTIONS**

(The 3196 cannot be used alone. Measurement requires one or more optional sensors.)
- **Current measurement**
  - 9660 CLAMP ON SENSOR rated current 100A AC
  - 9661 CLAMP ON SENSOR rated current 500A AC
  - 9669 CLAMP ON SENSOR rated current 1000A AC
  - 9667 FLEXIBLE CLAMP ON SENSOR rated current 5000A AC
  - 9694 CLAMP ON SENSOR rated current 5A AC
  - 9290-10 CLAMP ON ADAPTER rated current 1500A AC, output 150A (10:1 ratio)
  - 9445-02 AC ADAPTER (for the 9667, for America, Japan)
  - 9445-03 AC ADAPTER (for the 9667, for Europe)
- **Voltage measurement**
  - 9438-02 VOLTAGE CORD (standard accessory)
  - 9264-01 WIRING ADAPTER (3P9W)
  - 9264-02 WIRING ADAPTER (3P4W)
- **PC communication**
  - 9424 PQA HI VIEW (PC application software)
  - 9424-10 PQA HI VIEW PRO (PC application software for advanced data processing)
  - 9442 LAN CABLE (3m, with straight and crossover connectors)
  - 9266 PC CARD 32 M
  - 9272 PC CARD 128 M
  - 9273 PC CARD 256 M
  - 9278 PC CARD 512 M

**Other options**
- 9458 AC ADAPTER (included)
- 9459 BATTERY PACK (included)
- 9339 CARRYING CASE (soft)
- 9340 CARRYING CASE (hard)
- **Printer**
  - 9670 PRINTER (with one roll of recording paper)
  - 9671 AC ADAPTER (for 9670)
  - 9672 BATTERY PACK (for 9670)
  - 9673 BATTERY CHARGER (for 9672)
  - 9237 RECORDING PAPER (80 mm×25 m, 4 rolls, for 9670)
  - 9638 RS-232C CABLE (1.5 m, for printer connection)
Choose from 2 Easy-to-Use Application Software Packages for Further Data Analysis

- **Viewer function**
  Use this function to display screens similar to those used for the 3196.
  Select from the **TIME PLOT screen** (voltage fluctuation, RMS fluctuation, harmonic fluctuation, inter-harmonic fluctuation), **event list screen**, **event data screen** (waveforms, vectors, DMM, harmonics, event details), **V10 screen** (Japanese standard), or **settings screen**. In the TIME PLOT screen, and use the two cursors (A and B) to calculate waveforms within a specified interval.

- **Demand/integral power consumption function**
  Calculate demand and integral power consumption from TIME PLOT data for effective power.

- **Binary CSV format conversion function**
  Convert binary data into CSV format for event waveforms within the specified range in the TIME PLOT screen or event waveforms selected in the event waveform screen. Files saved in CSV format can be used with spreadsheet software on your PC.

- **Print function**
  Use this function in each screen to output reports to a printer connected to your PC.

- **ITIC curve display function**
  Make ITIC (CBEMA) curve analyses (limit curve) based on the power quality control standards of the U.S.A.

- **EN50160 display functions**
  (applicable standard is EN50160:1999)
  Effectively evaluate and analyze the quality of power according to EU standards.

- **Downloading from LAN**
  Data (BINARY/TEXT/BMP) recorded on a PC card or the internal memory of the 3196 can be downloaded via LAN to a personal computer. (*This can be done without use of the freeware Down96. Measurement on the 3196 must be halted during download.)

Advanced functions added to the standard Model 9624

- **Report generation function**
  Choose from 3 types of report generation settings to take care of all the troublesome reporting operations, and either send the data to a printer or save as a Rich Text file. (Automatic: Output basic items. Individual setting: Select any item for output. Detailed setting: Specify a time-series graph in details for output.)

- **Positive phase, negative phase, and zero phase function**
  Recalculate event data captured by 3P4W circuits, and display each component of the voltage/current of the positive phase, negative phase, and zero phase.
3332 POWER HiTESTER

Measure very low effective power, for stand-by mode of home use equipment

- Ultra high-sensitive measurement, for use to measure the effective power of equipment in stand-by mode: Current 1.0000 mA full-scale, 0.1 µA resolution
- Wide measurement range, up to 50,000 A direct input

3193 POWER HiTESTER

Wide spectrum power meter for comprehensive device assessment

3194 MOTOR/HARMONIC HiTESTER

Analysis Station Extends Reach of Motor Evaluation!

Comprehensive measurement of power, rotation speed, torque, converter efficiency, and harmonics, all with a single unit

3194 Performs Comprehensive Evaluation of 3-phase Inverter Motors

Using the 9603-01 EXTERNAL SIGNAL INPUT UNIT, a torque sensor (strain gauge) is directly connected to chA. By inputting the output of a tachometer (analog signal or pulse signal) to chB, a system for measuring torque, rpm and motor power can be obtained.

With direct or clamp input unit, capable of measuring from micro motors up to large-size motors

Supports measurements of everything from micro motors used for household appliances and OA equipment up to industrial large-size motors. Also supports various applications such as harmonic measurement of equipment power sources and power quality measurement.

SPECIFICATIONS

| Measurement lines | Single-phase/two-wires to three-phase/four-wires |
| Measurement items | Voltage, Current, Peak, Active power, Apparent power, Reactive power, Power factor, Phase angle, Frequency, Power integral, Current integral |
| Measurement ranges | Voltage: 15000V to 6000V, auto or 6 ranges Current: 1.0000A to 50.000A, auto or 15 ranges Power: 15.000kW to 50.000kW, auto or 90 ranges Frequency: 4Hz to 100kHz, auto or 2 ranges |
| Integration range | 0 to 99999999999 MWh, (integration time up to 10000 hours) |
| Wave peak measurement | Current (displays maximum absolute value) |
| Basic accuracy | ±0.1% rdg. ±0.1% ts. (active power, at 45 to 66Hz) |
| Frequency characteristics | THD at 10kHz (THD at 100kHz at 10% or less, 1THD at 10kHz at 20% to 30%, 5000Hz, at 30A to 50A) |
| Signal output | Analog level: Voltage, current, active power, 5V DC ts. Waveform monitor: Voltage, current, 1V ms f.s. |
| Other function | Comparator function for 2 items Scaling function (PT, CT, TSC) Displays a moving average function, GP-IB/RS-232C interface |
| Sampling rate | 5 times/second |
| Power supply | 100 to 240V AC, 50/60Hz |
| Dimensions, mass | 370D mm, 15 kg (with all options) |

OPTIONS

9151-02 GP-IB CONNECTION CABLE (2 m)
9151-04 GP-IB CONNECTION CABLE (4 m)
9442 PRINTER
9443-02 AC/DC CLAMP INPUT UNIT
9600 AC/DC DIRECT INPUT UNIT
9601 AC DIRECT INPUT UNIT
9602 AC/DC DIRECT INPUT UNIT
9603 EXTERNAL SIGNAL INPUT UNIT
9604 PRINTER UNIT
9605 HARMONIC/FLICKER MEASUREMENTS UNIT
9720 series CLAMP ON SENSOR
9730-10 CLAMP ON ADAPTER

Accessories

Power cord (1), Connector for EXT I/O (1)
Current Meters (for AC only, basic type)

3127-10 AC current, up to 300 A, ø 33 mm dia.  
3128-10 AC current, up to 1500 A, ø 55 mm dia.  

3280-10 AC current, up to 1000 A, ø 33 mm dia., light 100 g and slim 16 mm  

3280-20 AC current, up to 1000 A, ø 33 mm dia., True RMS  

3281 AC current, up to 6000 A, ø 33 mm dia., Multi-function  

3282 AC current, up to 1000 A, ø 30 mm dia., Multi-function  

3283 Leak current, high-sensitivity 10mA range, 10μA resolution  

3286-20 Clamp-On Power Meter  

Current Meters (for AC/DC, two-way type)

3284 DC and AC current, up to 200 A, ø 35 mm dia., Multi-function  

3285 DC and AC current, up to 2000 A, ø 55 mm dia., Multi-function  

3287 AC/DC current, up to 100 A, ø 35 mm dia., Multi-function  

3288 AC/DC current, up to 1000 A, ø 35 mm dia., Average rectifier  

3290/3290-10 DC and AC current, up to 2000 A  

9691 3290(3290-10)+9691 Measure up to 100 A ø 35 mm  

9692 3290(3290-10)+9692 Measure up to 200 A ø 33 mm  

9693 3290(3290-10)+9693 Measure up to 2000 A ø 55 mm  

Conversion Adapter (for AC only, clamp-on type)

3290-10 AC current up to 1500 A, secondary current 1/10 of primary, ø 55 mm dia. or 88 mm width  

CT-101A AC current up to 15 A, secondary current 1/1 or 10 times of primary, ø 25 mm dia.
## CLAMP ON HiTESTERs

### Table of functions

<table>
<thead>
<tr>
<th>Model</th>
<th>Current Ranges</th>
<th>Voltage Ranges</th>
<th>Other Functions</th>
<th>Analog output</th>
<th>Power Supply</th>
<th>Frequency Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>3280-10</td>
<td>4.20 to 1000A AC, 3 ranges</td>
<td>4.20 to 600V AC, 4 ranges</td>
<td>Resistance: 420.0 to 42.00 kΩ, 6 ranges</td>
<td>None</td>
<td>DC voltage range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3280-20</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3280-20</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3281</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3282</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3283</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3284</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3285</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3286-10</td>
<td>150 to 2000A AC, 5 ranges</td>
<td>150 to 2000A AC, 5 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3287</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
<tr>
<td>3288</td>
<td>126.9 to 10kA AC, 3 ranges</td>
<td>20.0 to 600V AC, 6 ranges</td>
<td>None</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>DC current range: 0 to 50V DC, 6 ranges</td>
<td>AC current: 50 to 500Hz, AC voltage: 50 or 60Hz</td>
</tr>
</tbody>
</table>

### Additional Information

- **Display**: Sampling rate, Crest factor (RMS), Effect of magnetic field, Max. circuit voltage, Core jaw dia., Power supply, Dimensions, Mass, Accessories
- **3281** True RMS
- **3282** True RMS
- **3283** True RMS
- **3285** True RMS
- **3286-10** True RMS
- **3288** True RMS
- **3289** True RMS
- **3290** True RMS
- **3291** True RMS
- **3292** True RMS
- **3293** True RMS
- **3294** True RMS
- **3295** True RMS
- **3296-20** True RMS
- **3297** True RMS
- **3298** True RMS
- **3299** True RMS
- **3300** True RMS
- **3301** True RMS
- **3302** True RMS
- **3303** True RMS
- **3304** True RMS
- **3305** True RMS
- **3306** True RMS
- **3307** True RMS
- **3308** True RMS
- **3309** True RMS
- **3310** True RMS
- **3311** True RMS
- **3312** True RMS
- **3313** True RMS
- **3314** True RMS
- **3315** True RMS
- **3316** True RMS
- **3317** True RMS
- **3318** True RMS

---

**Note**: The table above provides a summary of the specifications and functions for various CLAMP ON HiTESTERs models. For detailed information, please refer to the Hioki official document or contact their customer support for assistance.
**3280-10**

**CLAMP ON HíTESTER**

**Easy operation!**

- 1000 A rms, clamp aperture: 33 mm dia.
- Light 100 g, and Slim 16 mm
- Independent-opening double-lever design
- Slim body allows easy clamping even for narrow conductors
- No metal (iron core) exposure, ensuring enhanced safety

**OPTIONS**

- 9209 TEST LEADS HOLDER
  *Note: Non-CE mark product*

**3280-20**

**CLAMP ON HíTESTER**

**True RMS!**

- 1000 A rms, clamp aperture: 33 mm dia.
- Light 100 g, and Slim 16 mm
- Independent-opening double-lever design
- Slim body allows easy clamping even for narrow conductors
- No metal (iron core) exposure, ensuring enhanced safety

**OPTIONS**

- 9209 TEST LEADS HOLDER
  *Note: Non-CE mark product*

**3287 3288**

**CLAMP ON AC/DC HíTESTER**

**Compact & easy, one-touch maintenance on all types of AC/DC equipment**

- The 3287 can handle even cogenerator / inverter energy-saving equipment (10/100A)
- Use the 3288 for high current measurements such as UPS emergency batteries and train motors (100/1000A)
- A slim core of only 10 mm (0.39") for easy clamping even in crowded wiring

**OPTIONS**

- 9209 TEST LEADS HOLDER
  *Note: Non-CE mark product*
3281 3282

**DIGITAL CLAMP ON HiTESTER**

True RMS is shown in the distorted waveform

3281: 600 A AC, ø 33 mm  3282: 1000 A AC, ø 46 mm

- AC Current/Voltage, Frequencies, Resistance, Conduction check, Temperature (probe sold separately)
- Wave peak value, Waveform distortion check
- Auto-power off to prevent the power from being left on
- Non-fuse type protects up to 600 V AC

3283

**CLAMP ON LEAK HiTESTER**

Easily monitor leak current fluctuations

- High-sensitivity with a full scale of 10mA (resolution:10µA)
- High-accuracy at ±1%
- True RMS measurement
- Analyzer functions, for filtering and output signals
- Wide bandwidth, 5Hz to 15kHz (Monitor output)

3284 3285

**CLAMP ON AC/DC HiTESTER**

Analysis for DC to distorted waves

- 3284: 200 Arms, clamp aperture: 33 mm dia.
- 3285: 2000 Arms, clamp aperture: 55 mm dia.
- Inrush current crest value
- RMS value of full-wave rectified waveforms
- Waveform and harmonic analysis

3284 3285 OPTIONS

- 9445-02 AC ADAPTER (for USA)
- 9445-03 AC ADAPTER (for EU)
- 9290-10 CLAMP ON ADAPTER
- CT-101A LINE SPLITTER
- 9094 OUTPUT CORD

3281 3282 OPTIONS

- *Note: Non-CE mark product

**OPTIONS**

- 9462 THERMISTER TEMPERATURE PROBE
- CT-101A LINE SPLITTER
- *Note: Non-CE mark product
All powerful! Easy operation!
True-RMS Clamp-on Power Meter!

- Use as a single-phase power meter or power factor meter (3kW to 600kW range)
- Simple checking of three-phase lines (6kW to 1200kW range)
- Check power supply fluctuations
- 1000 A, 1000 Hz, peak and harmonic measurement
- True RMS (effective value) display method
- Optional printer (9442 PRINTER)

Voltage / Current / Power measurement

<table>
<thead>
<tr>
<th>AC Voltage (V)</th>
<th>150.0</th>
<th>300.0</th>
<th>600.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase</td>
<td>3.000 kW</td>
<td>6.000 kW</td>
<td>12.000 kW</td>
</tr>
<tr>
<td>*3-phase(balanced load)</td>
<td>6.000 kW</td>
<td>12.000 kW</td>
<td>24.000 kW</td>
</tr>
<tr>
<td>Single-phase</td>
<td>3.000 kW</td>
<td>6.000 kW</td>
<td>12.000 kW</td>
</tr>
<tr>
<td>*3-phase(balanced load)</td>
<td>6.000 kW</td>
<td>12.000 kW</td>
<td>24.000 kW</td>
</tr>
</tbody>
</table>

Power factor / Phase angle / Reactivity measurement

- Detection method: Phase discrimination by phase detection (zero crossing)
- Power factor (cos θ): 0.000 (lead) to 1.000 to 0.000 (lag)
- Phase angle: 90.0° (lead) to 0.0° to 90.0° (lag)
- Reactivity (sin θ): 0.000 (lead) to 1.000 to 0.000 (lag)

Frequency measurement

- Effective in the voltage and current functions
- Measurement range: 30.0 Hz to 100 Hz (at 100.0Hz range)
- 100 Hz to 1000 Hz (at 1000Hz range)
- Min. input level: Voltage 10 Vrms-sine wave, Current 1 Arms-sine wave

Wave peak measurement

- Effective in the voltage and current functions
- Measurement range: 150 (375 peak) / 300 (750 peak) / 600 (1500 peak) V
- 20 (50 peak) / 200 (500 peak) / 1000 (1500 peak) A
- Effective Input Range: Effective value of sine wave is within effective input permissible in the range and within circuit dynamic

Harmonic measurement

- Effective in the voltage and current functions
- Measurement range: Fundamental frequency 45 Hz to 65 Hz
- Window width: 1 cycle (45 Hz to 65 Hz), Data points: 256 points
- Window type: Rectangular
- Orders analyzed: Up to 20th

Options

9636-01 RS-232C PACKAGE
9442 PRINTER
9443-02 AC ADAPTER (for 9442 printer, EU)
9443-03 AC ADAPTER (for 9442 printer, America)
1196 RECORDING PAPER (for 9442, 10 rolls)

Power factor, phase angle, and reactivity measurements are effective in the voltage and current functions. For apparent power and reactive power, the unit of watt in the above table is replaced by VA and var respectively.
3290/3290-10 | CLAMP ON AC/DC HiTESTER

9691 9692 9693 | CLAMP ON AC/DC SENSOR

All the Functions You Need for Measurement at DC or 1Hz and Up

- Choice of three sensors (Example combinations)
  - 3290+9691: Measure up to 100A
  - 3290+9692: Measure up to 200A
  - 3290+9693: Measure up to 2000A
- Choice of measurement methods
  - DC (for battery measurement)
  - AC+DC RMS (for full-/half-wave rectification measurement)
  - AC RMS (for current distortion measurement)
  - PEAK (for peak value measurement) of inrush current, etc.
- Choice of output (Simultaneous output)
  - Effective value output, frequency output, waveform output
- Choice of response times (Switchable among three response times)
- LPF function (filters out unnecessary harmonics: fc=550Hz)
- 3290-10 Functions
  - Current integral measurement (obtain polarity-specific integrated DC values)
  - Operating time/duty measurement

3290 & Sensor Common Specification
- Accuracy at 50 or 60 Hz: AC/DC/AC+DC Current (±1.3% rdg. + 3 dgt.)
- Frequency range: DC to 1kHz (±2.3% rdg. + 8 dgt.)
- Cable length: 2m(6.56ft)
- Maximum circuit voltage: 600V

9691 Specifications
- Frequency range: DC to 10kHz(-3dB)
- Effect of conductor position: less than ±0.1%
- Effect of external magnetic fields: equivalent to 0.5A or less (in a 400A/m external magnetic field)
- External dimensions: approximately 53W×129H×18D mm
- Weight: approximately 230g

9692 Specifications
- Frequency range: DC to 20kHz(-3dB)
- Effect of conductor position: less than ±0.5%
- Effect of external magnetic fields: equivalent to 0.7A or less (in a 400A/m external magnetic field)
- External dimensions: approximately 62W×167H×35Dmm
- Weight: approximately 410g

9693 Specifications
- Frequency range: DC to 15kHz(-3dB)
- Effect of conductor position: less than ±0.7%
- Effect of external magnetic fields: equivalent to 2A or less (in a 400A/m external magnetic field)
- External dimensions: approximately 62W×196H×35Dmm
- Weight: approximately 500g

3127-10 3128-10 | CLAMP ON HiTESTER

One meter drop-proof “Tested Tough!”

- With the range of 300 A (3127-10), 1500 A (3128-10)
- Temperature measurement
- Ohmmeter circuit tested to 250 V AC over voltage-OK
- Clamp-on measurement for busbars and thick conductors (3128-10)

Options

*9021-01 THERMISTER TEMPERATURE PROBE
9290-10 CLAMP ON ADAPTER (for large AC current)
*CT-101A LINE SPLITTER
*Note: Non-CE mark product
Field Measuring Instruments

Field Measuring Instruments Index

**Analog Multi Meters**
- **3030-10**
  - Basic type analog tester,
  - Average rectifier
  - p.52

**LAN Cable Tester**
- **3008**
  - Use for industrial power lines
  - Average rectifier
  - p.52

**OPTICAL POWER METER**
- **3660**
  - Affordable LAN cable testing, Wire-Map, Cable length, Direction-Check
  - p.52

**Noise Search Tester**
- **3144-20**
  - Noise Search Tester
  - Frequency range 50kHz to 30MHz
  - 0dBV and -20dBV fs
  - 2 ranges
  - p.52

**Voltage Detector**
- **3120**
  - Voltage Detector
  - AC 70 to 600V (50/60 Hz)
  - p.52

**Digital Multi Meters (basic functions)**
- **3246**
  - Pencil type DMM,
  - Average rectifier
  - p.48

- **3244**
  - Card size DMM with emphasis on safety,
  - Average rectifier
  - p.48

- **3245**
  - A card size DMM with solar charged battery,
  - Average rectifier
  - p.48

**Phase Detector**
- **3256-01**
  - Phase detector, Rotary disk style,
  - 110 to 480V
  - p.49

**Digital Multi Meters (multi-functional and high precision)**
- **3257-50, -51**
  - Terminal shutter interlock mechanism DMM,
  - True RMS rectifier
  - p.49

- **3801-50**
  - Multi-function type, 51000 count display,
  - RS-232C/USB communication,
  - True RMS rectifier
  - p.49

- **3802-50**
  - Low-cost type, 51000 count display,
  - RS-232C/USB communication,
  - True RMS rectifier
  - p.49

- **3803, 3805**
  - Multi-function type, 9999 count display (V range),
  - RS-232C communication,
  - True RMS rectifier
  - p.49

**Insulation Testers**
- **3120**
  - Voltage Detector
  - AC 70 to 600V (50/60 Hz)
  - p.49

**Earth Testers**
- **3151**
  - Grounding resistance meter,
  - Two-wire or three-wire measurement method,
  - Tough and durable design
  - p.53
## DIGITAL HiTESTERS

### Table of functions

<table>
<thead>
<tr>
<th>DC Voltage range</th>
<th>AC Voltage range</th>
<th>Frequency characteristics at AC Voltage</th>
<th>Resistance range</th>
<th>DC Current range</th>
<th>Frequency characteristics at DC Current</th>
<th>Frequency ranges</th>
<th>Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3244 420mV to 500V, 5 ranges</td>
<td>±0% rdg. ±24 dg</td>
<td>5.3V to 50V, 4 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3246 420mV to 600V, 5 ranges</td>
<td>±0% rdg. ±34 dg</td>
<td>4.2V to 60V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3256-50 420mV to 1000V, 5 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3256-51 (3257) 5mV to 1000V, 5 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3801-10 True RMS</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3802-10 True RMS</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3803 400mV to 1000V, 5 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3804 999mV to 999.9V, 4 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3805 999mV to 9999.9V, 4 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3255-50 420mV to 1000V, 5 ranges</td>
<td>±0% rdg. ±55 dg</td>
<td>4.2V to 600V, 5 ranges</td>
<td>Accuracy 23.5% rdg. ±50 dg</td>
<td>4200 ± 2.5 MΩ</td>
<td>±5% rdg. ±54 dg</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### Diode check

<table>
<thead>
<tr>
<th>Other functions</th>
<th>Auto power</th>
<th>safe</th>
<th>Range</th>
<th>switching</th>
<th>Display/Safety</th>
<th>Bar graph</th>
<th>Sampling rate</th>
<th>Power supply</th>
<th>Dimensions/ mass</th>
<th>Included accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>3244</td>
<td>None</td>
<td>None</td>
<td>(Cancel impossible)</td>
<td>Auto</td>
<td>Digital LCD, maximum 4199 ohm</td>
<td>Safety: IEC1010-1 Pollution degree 2 over voltage rating 34V</td>
<td>None</td>
<td>2.5 times/sec</td>
<td>CR2032/1 batteries (Continuous use 150 hours)</td>
<td>5W ≤ 10V/5V ≤ 9D mm/50g</td>
</tr>
<tr>
<td>3246</td>
<td>judgement only 15V open terminal voltage</td>
<td>(Cancel possible)</td>
<td>Auto &amp; Manual</td>
<td>Digital LCD, with Back light</td>
<td>LCD, max. 4199 ohm</td>
<td>2.5 times/sec</td>
<td>CR2032/1 batteries (Continuous use 150 hours)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>9700 TEST LEAD(1), 4075 CARRYING Case(1)</td>
<td>3851-10 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
</tr>
<tr>
<td>3801-10 True RMS</td>
<td>(1.3 V open terminal voltage)</td>
<td>Voltage detect function</td>
<td>Auto</td>
<td>Digital LCD, max. 4199 ohm</td>
<td>LCD, max. 4199 ohm</td>
<td>3 times/sec</td>
<td>3V ≤ 10V/5V ≤ 12D mm/50g</td>
<td>9700 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>3851-10 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
</tr>
<tr>
<td>3803 (3 V open terminal voltage)</td>
<td>RS-232C, Data hold</td>
<td>Auto</td>
<td>LCD, max. 4199 ohm</td>
<td>LCD, max. 4199 ohm</td>
<td>2.5 times/sec</td>
<td>6F22 (006P)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>9700 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>3851-10 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
</tr>
<tr>
<td>3804 (3 V open terminal voltage)</td>
<td>Refresh, Max/Min/Current, Relative/4-20mA display, RS-232C</td>
<td>Auto</td>
<td>LCD, max. 4199 ohm</td>
<td>LCD, max. 4199 ohm</td>
<td>2.5 times/sec</td>
<td>6F22 (006P)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>9700 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>3851-10 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
</tr>
<tr>
<td>3805 (3 V open terminal voltage)</td>
<td>DC Voltage, Temperature</td>
<td>Auto</td>
<td>LCD, max. 4199 ohm</td>
<td>LCD, max. 4199 ohm</td>
<td>2.5 times/sec</td>
<td>6F22 (006P)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>9700 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
<td>3W ≤ 10V/5V ≤ 12D mm/50g</td>
<td>3851-10 TEST LEAD(1), 3256-50/51 Holder(3256-51)</td>
</tr>
</tbody>
</table>

### 3803-10 0.7V (7.8kΩ) 5/1/50/200/300/ 600V(20kHz) 5%rdg. accuracy 22.5%±ε

- Diode check
- Judgement only 15V open terminal voltage
- Voltage detect function
- Relative function
- LCD, max. 4199 ohm
- 2.5 times/sec
- 3V ≤ 10V/5V ≤ 12D mm/50g
- 9700 TEST LEAD(1), 3256-50/51 Holder(3256-51)
Pencil-type DMM with Penlight

In addition to being compact, this pencil-type tester comes with auto-range and data hold functions for incredibly easy measurement of electrical and electronic circuitry.

- Full-auto ranging, 4199 count display
- Penlight brightly illuminates test points
- Overload protection to 600 V
  (Ω and continuity functions)

Card size DMM with emphasis on safety

- Only 9.5 mm thick and 60 g in weight
- 4199 count display
- Test leads fit neatly inside the case.
- Automatic power saving function saves your batteries even when you forget to turn off the power.

High-precision, high-resolution, and multi-functional handy DMMs

- Display two different parameters simultaneously
- Optional RS-232C or USB package for transferring data captured by the 3801-50 to a PC
- Measures the AC components in DC voltage or DC current
- 1ms peak hold mode makes it possible to capture the peak value of a waveform

Compact and basic DMM

- 4000 count display full scale
- Average rectified RMS indication type
- Optional RS-232C package for transferring data captured by the 3803 to a PC
### Field Measuring Instruments

#### DIGITAL HiTESTER

**Model**
- 3256-50 (Standard type)
- 3256-51 (3256-50 with holster)
- 3257-50 (Standard type)
- 3257-51 (3257-50 with holster)

**Terminal shutter interlock mechanism**
- Terminal shutter interlock mechanism exposes only the correct terminals for connection in the currently selected function
- Wide range, maximum reading 4200 digit
- High-speed response, bar graph display
- Conforms with IEC1010
- Hold-auto function automatically displays voltage or current value and resistance value

**Fail-safe!**
Shutter mechanism prevents incorrect test lead connection

- Single operation
- Simple operation with rotary switch

**Check for live lines safely and easily**
In the AC V range, the 3256-50 can be used to check whether power lines are live. When the sensitivity level is set to 4 and the test head is placed near a live power line, the built-in buzzer sounds and a display indicator lights.

**Sensitivity threshold:** 100 V AC or higher

#### 3255-50
**DIGITAL HiTESTER**

**Tough for use on industrial power lines**
- Built-in current limiter and fuse capable of withstanding 1000 V to prevent short-circuit accidents
- Wide range, maximum reading 4199 digit
- Two-terminal configuration eliminates the need for probe reconnections
- Industrial grade test leads for enhanced safety

#### 3120
**VOLTAGE DETECTOR**

**Twin Light Audible Voltage Detector**
- Green for Battery Check
- Red for Voltage Detection

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Voltage Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Function</td>
<td>Voltage Detection</td>
</tr>
<tr>
<td>Voltage Range</td>
<td>AC 70 to 600 V, 50/60 Hz (when touching insulated wiring equivalent to IV2mm²)</td>
</tr>
<tr>
<td>Indication</td>
<td>Red LED and continuous beeping sound</td>
</tr>
<tr>
<td>Battery Check</td>
<td>Green LED</td>
</tr>
<tr>
<td>Power Source</td>
<td>&quot;AAA&quot; manganese/20300 or alkaline/LR03 battery x 2</td>
</tr>
<tr>
<td>Continuous Use</td>
<td>Approx. 200 hours (when switched to &quot;ON&quot; and in standby using LR03 batteries)</td>
</tr>
<tr>
<td>Dimensions/Weight</td>
<td>149H × ø18.5mm (excl. protrusions), 38g (incl. batteries)</td>
</tr>
</tbody>
</table>

---

*Note: Non-CE mark product*

---

**OPTIONS**

- 9014 HIGH-VOLTAGE PROBE
- 3853 CARRYING CASE (for 3256-51)

---

**OPTIONS**

- 9207-10 TEST LEAD
  - (Supplied as standard with the 3255-50)
- 9371 CARRYING CASE
  - (Supplied as standard with the 3255-50)
**3144-20**

**NOISE SEARCH TESTER**

**3144-20 SPECIFICATIONS**

**Input unit configuration**
- Dedicated input terminal, BNC input terminal (9741 takes priority)

**Frequency range低端**
- 500Hz to 30MHz, separated into 7 ranges (-3 dB)

**Input unit configuration**
- Single mode, multi mode

**Display update rate**
- Approx. 3 times/s (approx. 350 ms)

**Light receiver**
- InGaAs (dia. 1 mm)

**Fiber type**
- Single mode, multi mode

**Rated max. power**
- 0.01 dBm (optical power), 0.01 dB (optical loss)

**Calibration wavelength**
- 850 nm, 1310 nm, 1550 nm

**Measurement range**
- -60 dBm to +9 dBm (auto range)

**Accuracy**
- ±5 nm max. (3663-20), ±15 nm max. (3662-20)

**Range**
- ±0.1 dB (temperature constant, 5 minutes)

**Spectrum width**
- 850 nm, ±20 nm (3660)

**Resolution**
- 0.01 dB (optical power), 0.01 dB (optical loss)

**Dimensions and mass**
- 3661-20: 192(W) × 136(H) × 42(D) mm, 1.7 kg
- 3662-20: 34 D mm, Approx. 290 g
- 3663-20: 35 D mm, Approx. 260 g

**Conductor dia**
- Single mode: 9.25 μm, multi mode: 62.5 μm, 125 μm

**Connector**
- FC, SC (using optional connector adapter)

**Output connector**
- RJ-45 connector

**Required drivers**
- CAT 5, 6, 5E, 6E, 7

**Error detection**
- Open, short, other wiring errors (Split pairs cannot be detected.)

**Display**
- Can identify five cables using the optional 9337 DIRECTION TERMINATOR

**Dimensions and mass**
- Approx. 76 W × 150 H (including 36 mm cover) × 35 D mm, Approx. 180 g (without batteries)

**Battery check**
- Battery indicator appears when batteries are nearly exhausted.

**Power supply**
- LR6 (AA) alkaline battery × 2, 3.0 V A

**Power saving mode**
- Power saving mode after measurement

**Display**
- Can identify three cables using the optional 937 T WIREMAP TERMINATOR

**Dimensions and mass**
- Approx. 366(W) × 158(H) × 40(D) mm, 260 g

**Operating time**
- Approx. 36 hours (3663-20, continuous CW output)

**Frequency range**
- 0dBm to 30MHz, ±2.0dBV

**Input unit configuration**
- BNC input terminal (9741 takes priority)

**Interface**
- USB Ver. 1.1

**Dimensions and mass**
- 62(W) × 158(H) × 40(D) mm, 260 g

**Operating time**
- Approx. 159 hours (continuous use)

**Frequency range低端**
- 500Hz to 30MHz, separated into 7 ranges (-3 dB)

**Input unit configuration**
- Single mode, multi mode

**Display update rate**
- Approx. 3 times/s (approx. 350 ms)

**Light receiver**
- InGaAs (dia. 1 mm)

**Fiber type**
- Single mode, multi mode

**Rated max. power**
- 0.01 dBm (optical power), 0.01 dB (optical loss)

**Calibration wavelength**
- 850 nm, 1310 nm, 1550 nm

**Measurement range**
- -60 dBm to +9 dBm (auto range)

**Accuracy**
- ±5 nm max. (3663-20), ±15 nm max. (3662-20)

**Range**
- ±0.1 dB (temperature constant, 5 minutes)

**Spectrum width**
- 850 nm, ±20 nm (3660)

**Resolution**
- 0.01 dB (optical power), 0.01 dB (optical loss)

**Dimensions and mass**
- 3661-20: 192(W) × 136(H) × 42(D) mm, 1.7 kg
- 3662-20: 34 D mm, Approx. 290 g
- 3663-20: 35 D mm, Approx. 260 g

**Conductor dia**
- Single mode: 9.25 μm, multi mode: 62.5 μm, 125 μm

**Connector**
- FC, SC (using optional connector adapter)

**Output connector**
- RJ-45 connector

**Required drivers**
- CAT 5, 6, 5E, 6E, 7

**Error detection**
- Open, short, other wiring errors (Split pairs cannot be detected.)

**Display**
- Can identify five cables using the optional 9337 DIRECTION TERMINATOR

**Dimensions and mass**
- Approx. 76 W × 150 H (including 36 mm cover) × 35 D mm, Approx. 180 g (without batteries)

**Battery check**
- Battery indicator appears when batteries are nearly exhausted.

**Power supply**
- LR6 (AA) alkaline battery × 2, 3.0 V A

**Power saving mode**
- Power saving mode after measurement

**Display**
- Can identify three cables using the optional 937 T WIREMAP TERMINATOR

**Dimensions and mass**
- Approx. 366(W) × 158(H) × 40(D) mm, 260 g

**Operating time**
- Approx. 159 hours (continuous use)

**Frequency range低端**
- 500Hz to 30MHz, separated into 7 ranges (-3 dB)

**Input unit configuration**
- Single mode, multi mode

**Display update rate**
- Approx. 3 times/s (approx. 350 ms)

**Light receiver**
- InGaAs (dia. 1 mm)

**Fiber type**
- Single mode, multi mode

**Rated max. power**
- 0.01 dBm (optical power), 0.01 dB (optical loss)

**Calibration wavelength**
- 850 nm, 1310 nm, 1550 nm

**Measurement range**
- -60 dBm to +9 dBm (auto range)

**Accuracy**
- ±5 nm max. (3663-20), ±15 nm max. (3662-20)

**Range**
- ±0.1 dB (temperature constant, 5 minutes)

**Spectrum width**
- 850 nm, ±20 nm (3660)

**Resolution**
- 0.01 dB (optical power), 0.01 dB (optical loss)

**Dimensions and mass**
- 3661-20: 192(W) × 136(H) × 42(D) mm, 1.7 kg
- 3662-20: 34 D mm, Approx. 290 g
- 3663-20: 35 D mm, Approx. 260 g

**Conductor dia**
- Single mode: 9.25 μm, multi mode: 62.5 μm, 125 μm

**Connector**
- FC, SC (using optional connector adapter)

**Output connector**
- RJ-45 connector

**Required drivers**
- CAT 5, 6, 5E, 6E, 7

**Error detection**
- Open, short, other wiring errors (Split pairs cannot be detected.)

**Display**
- Can identify five cables using the optional 9337 DIRECTION TERMINATOR

**Dimensions and mass**
- Approx. 76 W × 150 H (including 36 mm cover) × 35 D mm, Approx. 180 g (without batteries)

**Battery check**
- Battery indicator appears when batteries are nearly exhausted.

**Power supply**
- LR6 (AA) alkaline battery × 2, 3.0 V A

**Power saving mode**
- Power saving mode after measurement

**Display**
- Can identify three cables using the optional 937 T WIREMAP TERMINATOR

**Dimensions and mass**
- Approx. 366(W) × 158(H) × 40(D) mm, 260 g

**Operating time**
- Approx. 159 hours (continuous use)
### 3455 | HIGH VOLTAGE INSULATION HiTESTER

Maximum 5kV Test Voltage - Up to 5TΩ of Insulated Resistance Testing
Safety evaluate the insulation characteristics of high voltage transformers, motors and cables

- Wide voltage range (250V to 5kV) for maximum 5TΩ of insulation resistance measurements
- Automatically calculate and display the PI (Polarization Index) and DAR (Dielectric Absorption Ratio) for all types of insulation evaluations
- Temperature compensation to accurately respond to variations in insulation material
- Internal memory stores 100 blocks of manually recorded data and 10 sets of log data
- USB interface, compact rugged case, and safe design

#### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Resistance Range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 V</td>
<td>0.00 MΩ to 250 GΩ</td>
<td>±5 % rdg. ±5 dgt. (at 100 to 1000 MΩ)</td>
</tr>
<tr>
<td>500 V</td>
<td>0.00 MΩ to 500 GΩ</td>
<td>±5 % rdg. ±5 dgt. (at 100 to 1000 MΩ)</td>
</tr>
<tr>
<td>1 kV</td>
<td>0.00 MΩ to 1.00 TΩ</td>
<td>±5 % rdg. ±5 dgt. (at 100 to 1000 MΩ)</td>
</tr>
<tr>
<td>2.5 kV</td>
<td>0.00 MΩ to 2.50 TΩ</td>
<td>±5 % rdg. ±5 dgt. (at 100 to 1000 MΩ)</td>
</tr>
<tr>
<td>5 kV</td>
<td>0.00 MΩ to 5.00 TΩ</td>
<td>±5 % rdg. ±5 dgt. (at 100 to 1000 MΩ)</td>
</tr>
</tbody>
</table>

#### Accessory

- 9750-01 to 03 TEST LEAD (red, black, blue 3m)
- LR6(AA) alkaline batteries × 6, 9459 BATTERY PACK
- USB CABLE(1)

#### Interface

- LCD with backlight
- Display cover and suspension band(1)
- All measurement mode: live wire warning, battery indicators, auto power save

#### Discharge function

- Effective: 1000 Ω
- Bar graph: 4000 dgt. LCD, Bar graph/42 seg.
- Comparator, memory: 5000 MΩ

#### Sampling rate

- 2 times/second

#### Common SPECIFICATIONS

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Resistance range</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 V</td>
<td>0.125 MΩ</td>
</tr>
<tr>
<td>250 V</td>
<td>0.250 MΩ</td>
</tr>
<tr>
<td>500 V</td>
<td>0.500 MΩ</td>
</tr>
<tr>
<td>1000 V</td>
<td>2.000 MΩ</td>
</tr>
</tbody>
</table>

#### Options

- 9750-01 to 03 TEST LEAD (red, black, blue 3m)
- 9751-01 to 03 ALLIGATOR CLIPS (red, black, blue)
- 9631-01 TEMPERATURE SENSOR (1m)
- 9631-05 TEMPERATURE SENSOR (6cm)
- 9750-11 to 13 TEST LEAD (red, black, blue 10m)
- 9459 BATTERY PACK
- 9753 AC ADAPTER

---

### 3453 | DIGITAL  MΩ HiTESTER

For efficient insulation measurement!

- One body with four ranges: 125 V/40 MΩ, 250 V/2000 MΩ, 500 V/2000 MΩ, and 1000 V/4000 MΩ
- Accurate digital display
- Insulation measurement through sight and sound
- Memorizes on the spot (Memorizes up to 20 data points)
- Recognizes variations of resistance
- Ability to measure AC voltage and low resistance (continuity)

#### SPECSIFICATIONS

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Resistance range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 V</td>
<td>0.250 MΩ</td>
<td>±2 % rdg. ±3 dgt. (at 0.100 to 1.000 MΩ)</td>
</tr>
<tr>
<td>250 V</td>
<td>0.500 MΩ</td>
<td>±2 % rdg. ±3 dgt. (at 2.000 to 2.000 MΩ)</td>
</tr>
<tr>
<td>500 V</td>
<td>2.000 MΩ</td>
<td>±2 % rdg. ±3 dgt. (at 10.000 to 10.000 MΩ)</td>
</tr>
<tr>
<td>1000 V</td>
<td>5.000 MΩ</td>
<td>±2 % rdg. ±3 dgt. (at 50.000 to 50.000 MΩ)</td>
</tr>
</tbody>
</table>

#### Options

- 9289 TEST PROBE
- 9288 BREAKER PIN

*Note: Non-CE mark product
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>3454-10</th>
<th>3454-11/51</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>50 V DC / 125 V DC / 250 V DC / 500 V DC</td>
<td>250 V DC / 500 V DC / 1000 V DC</td>
</tr>
<tr>
<td><strong>Measurement range</strong></td>
<td>4.000/4.000/0.0000/0.0000 MΩ</td>
<td>4.000/4.000/0.0000/0.0000 MΩ</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>1st effective range: ±3 %, 85 % digit</td>
<td>1st effective range: ±5 %, 85 % digit</td>
</tr>
<tr>
<td><strong>Voltage with no load</strong></td>
<td>Not more than 1.25 times rated measurement voltage</td>
<td>Not more than 1.25 times rated measurement voltage</td>
</tr>
<tr>
<td><strong>Short circuit current</strong></td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
</tr>
<tr>
<td><strong>Response time</strong></td>
<td>≤ to center, ≤ to 0 MΩ within 5 × (within accuracy range)</td>
<td>≤ to center, ≤ to 0 MΩ within 5 × (within accuracy range)</td>
</tr>
<tr>
<td><strong>Low resistance (continuity)</strong></td>
<td>Measurement range: 40.00/4.000/4.000/4.000 MΩ / 4.000 kΩ / 4.000 MΩ</td>
<td>Measurement range: 40.00/4.000/4.000/4.000 MΩ / 4.000 kΩ / 4.000 MΩ</td>
</tr>
<tr>
<td><strong>AC voltage scale &amp; tolerances</strong></td>
<td>5 % of scale indication at 0.1 MΩ to 50 MΩ</td>
<td>5 % of scale indication at 0.1 MΩ to 50 MΩ</td>
</tr>
<tr>
<td><strong>Insulation testing voltage</strong></td>
<td>1000 V DC</td>
<td>2000 MΩ</td>
</tr>
<tr>
<td><strong>Testing voltage</strong></td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
</tr>
<tr>
<td><strong>AC voltage scale &amp; tolerances</strong></td>
<td>5 % of scale length</td>
<td>5 % of scale length</td>
</tr>
<tr>
<td><strong>Open circuit terminal voltage</strong></td>
<td>5 % rdg. indication at 1 MΩ</td>
<td>5 % rdg. indication at 1 MΩ</td>
</tr>
<tr>
<td><strong>Power source</strong></td>
<td>R6P (AA) battery</td>
<td>4 or LR6 alkaline battery</td>
</tr>
<tr>
<td><strong>Dimensions and Mass</strong></td>
<td>Approx. 175 W × 70 H × 56 mm</td>
<td>Approx. 530g (with display cover closed)</td>
</tr>
</tbody>
</table>

## Options

- **OPTIONS**
  - 9294 TEST PROBE
  - 9288 BREAKER PIN
  - 9293 PIN-TYPE EARTH PROBE

---

### 3451-11 to 3451-15

**MΩ HiTESTER**

Compact and lightweight for perfect portability

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>3451-11</th>
<th>3451-12</th>
<th>3451-13</th>
<th>3451-14</th>
<th>3451-15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Testing voltage</strong></td>
<td>125 V DC</td>
<td>250 V DC</td>
<td>500 V DC</td>
<td>1000 V DC</td>
<td>2000 MΩ</td>
</tr>
<tr>
<td><strong>Rated resistance</strong></td>
<td>20 Ω</td>
<td>50 Ω</td>
<td>100 Ω</td>
<td>2000 MΩ</td>
<td>2000 MΩ</td>
</tr>
<tr>
<td><strong>First effective measurement range and tolerances</strong></td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 MΩ</td>
<td>≤5 % of scale indication at 0.001 MΩ to 10 MΩ</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 MΩ</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 MΩ</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 MΩ</td>
</tr>
<tr>
<td><strong>Second effective measurement range and tolerances</strong></td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
</tr>
<tr>
<td><strong>Exceeding 1st and 2nd effective measurement range include 0 MΩ &amp; infinity indication</strong></td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
</tr>
<tr>
<td><strong>Shorting measurement current</strong></td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>0.6 mA max.</td>
</tr>
<tr>
<td><strong>Scale indicator</strong></td>
<td>1.2 mA max.</td>
<td>2 MΩ</td>
<td>20 MΩ</td>
<td>50 MΩ</td>
<td></td>
</tr>
<tr>
<td><strong>AC voltage scale &amp; tolerances</strong></td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 100 MΩ</td>
</tr>
</tbody>
</table>

### Options

- **OPTIONS**
  - 9293 PIN-TYPE EARTH PROBE
  - 9294 TEST PROBE

---

### 3452-11 to 3452-13

**MΩ HiTESTER**

Compact analog three-range insulation resistance meter

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>3452-11</th>
<th>3452-12</th>
<th>3452-13</th>
<th>3452-14</th>
<th>3452-15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Testing voltage</strong></td>
<td>25 V DC</td>
<td>50 V DC</td>
<td>100 V DC</td>
<td>250 V DC</td>
<td>500 V DC</td>
</tr>
<tr>
<td><strong>Rated resistance</strong></td>
<td>10 Ω</td>
<td>10 Ω</td>
<td>10 Ω</td>
<td>100 Ω</td>
<td>100 Ω</td>
</tr>
<tr>
<td><strong>First effective measurement range and tolerances</strong></td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 Ω</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 Ω</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 Ω</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 Ω</td>
<td>≤5 % of scale indication at 0.01 MΩ to 10 Ω</td>
</tr>
<tr>
<td><strong>Second effective measurement range and tolerances</strong></td>
<td>≤5 % of scale indication at 0.1 MΩ to 1 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 1 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 1 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 1 MΩ</td>
<td>≤5 % of scale indication at 0.1 MΩ to 1 MΩ</td>
</tr>
<tr>
<td><strong>OMΩ &amp; infinity indication</strong></td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
<td>0.7 % of scale length</td>
</tr>
<tr>
<td><strong>Open-circuit terminal voltage</strong></td>
<td>Not more than 1.2 times rated testing voltage</td>
<td>Not more than 1.2 times rated testing voltage</td>
<td>Not more than 1.2 times rated testing voltage</td>
<td>Not more than 1.2 times rated testing voltage</td>
<td>Not more than 1.2 times rated testing voltage</td>
</tr>
<tr>
<td><strong>Rated measurement current</strong></td>
<td>1 m to 1.2 mA</td>
<td>1 m to 1.2 mA</td>
<td>1 m to 1.2 mA</td>
<td>1 m to 1.2 mA</td>
<td>0.5 m to 0.6 mA</td>
</tr>
<tr>
<td><strong>Shorting measurement current</strong></td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>1.2 mA max.</td>
<td>0.6 mA max.</td>
</tr>
<tr>
<td><strong>Scale indicator</strong></td>
<td>0.2 MΩ</td>
<td>0.5 MΩ</td>
<td>1 MΩ</td>
<td>2 MΩ</td>
<td>5 MΩ</td>
</tr>
<tr>
<td><strong>AC voltage scale &amp; tolerances</strong></td>
<td>≤5 % f.s. at 0 to 150 V (50/60 Hz)</td>
<td>≤5 % f.s. at 0 to 150 V (50/60 Hz)</td>
<td>≤5 % f.s. at 0 to 150 V (50/60 Hz)</td>
<td>≤5 % f.s. at 0 to 150 V (50/60 Hz)</td>
<td>≤5 % f.s. at 0 to 150 V (50/60 Hz)</td>
</tr>
</tbody>
</table>

### Options

- **OPTIONS**
  - 9293 PIN-TYPE EARTH PROBE

---

**DIGITAL MΩ HiTESTER**

Revolutionary insulation resistance tester with continuity function all in one low price

**SPECIFICATIONS**

**COMMON SPECIFICATIONS**

- **Discharge function**: effective
- **Power supply**: R6P (AA) × 4
- **Dimensions, mass**: 152W × 95H × 47D mm, 420 g

**ACCESSORIES**

- 9292 TEST PROBE
- 9288 BREAKER PIN
- 9293 PIN-TYPE EARTH PROBE

**SAFETY RATING**

- Conformance to IEC1010, pollution degree 2, installation category III

**OPTIONS**

- 9293 PIN-TYPE EARTH PROBE

**NOTE**: Non-CE mark product

---

**DIGITAL MΩ HiTESTER**

Revolutionary insulation resistance tester with continuity function all in one low price

**SPECIFICATIONS**

**COMMON SPECIFICATIONS**

- **Discharge function**: effective
- **Power supply**: R6P (AA) × 4
- **Dimensions, mass**: 152W × 95H × 47D mm, 420 g

**ACCESSORIES**

- 9292 TEST PROBE
- 9288 BREAKER PIN
- 9293 PIN-TYPE EARTH PROBE

**SAFETY RATING**

- Conformance to IEC1010, pollution degree 2, installation category III

**OPTIONS**

- 9288 BREAKER PIN
- 9293 PIN-TYPE EARTH PROBE

**NOTE**: Non-CE mark product
3151  EARTH HiTESTER
Stable measurement for earth resistance

- Measurement range for grounding resistance increased to 115 % of normal range
- Elastomer rotary knob fits the hand perfectly.
- Select the ‘simple’ two-wire measurement method, using a low ground conductor such as the ground side of a commercial power supply, or the conventional three-wire measurement method
- Select a measurement frequency to reduce the influence of harmonics of the power supply frequency on the ground current

3129  PHASE DETECTOR
Non-Metallic Contact for Optimal Safety

SPECIFICATIONS
- Measurement Function: Phase detection (positive, negative), live wire check (S-S-T only)
- Voltage Detection Method: Electrostatic induction method
- Voltage Range: 35V to 60V AC/DC (max. 300V AC/DC with live wire)
- Clamp Diameter: 17mm max. of insulated wiring
- Display: Phase Detection Positive: 4 LEDs lit in clockwise order and 3 short beeps
- Voltage Detection Method: Electrostatic induction method
- Measurement Function: Continuous measurement of earth resistance
- Accessories: Carrying case x 1, strap x 1, R6P manganese battery x 2, spiral tube x 1, user manual
- Dimensions: 70W x 75H x 30D mm, 200g; Cord length: 0.7m
- Power Supply: Two "AA" size batteries; rated voltage: DC3.0V; maximum rated power: 300mV A; continuous use: approx. 70 hours (standby)
- Auto shut-off if no activity is detected after power is turned ON for 15 minutes
- Battery Check Function: ON lamp blinks to indicate battery low status when instrument is turned on

Dimensions, Mass
Rating
Accuracy (50/60 Hz)
Model & rated current
Accessories

HS-1 SPECIFICATIONS
- Model & rated current: HS-1(500A), HS-1(50A), HS-1(75A), HS-1(100A), HS-1(150A), HS-1(200A), HS-1(300A)
- Accuracy (50/60 Hz): Class 0.5 (±0.5% at rated current)
- Rating: 50mV
- Dimensions, Mass: 350A type: 20(E), 60(F), M4(d), M8(d) mm, 320g; 200A type: 25(E), 15(F), M5(d), M10(d) mm, 330g
- Accessories: None

HS-2 SPECIFICATIONS
- Model & rated current: HS-2(250A), HS-2(250A), HS-2(100A)
- Accuracy (50/60 Hz): Class 0.5 (±0.5% at rated current)
- Rating: 5mV
- Dimensions, Mass: 200A type: 25(E), 15(F), M5(d), M10(d) mm, 330g
- Accessories: None

CT-2MR/CT-5MRN
CURRENT TRANSFORMER

SPECIFICATIONS
- Measurement Function: Grounding resistance, Grounding voltage
- Measurement Ranges: 0Ω to 115Ω, 0Ω to 1150Ω, 3 ranges
- Operating method: AC phase difference
- Open terminal voltage: 30V AC max.
- Measurement current: 1mA AC max. *3mA AC max. using two-wire method
- Measurement frequency: 575Hz or 600 Hz selectable
- Basic accuracy: Grounding resistance: ±3% f.s., Grounding voltage: ±3% f.s.
- Power supply: 60V (AAA), 6 pieces (at least 500 operations) or 6V (AAA), 6 pieces (at least 1000 operations)
- *Operation time: 30 second measurement, 30 second off
- Dimensions, mass: 140 x 75 x 30 mm, 900g (main unit only)
- Accessories: 9214 auxiliary earthing rod(2), 9215 measuring cable (one earth: black 5m, yellow 10m, red 20m, 9216 cable winder: 3), 9393 carrying case(1)

OPTIONS
9050 EARTH NET (set of two)
* Use in location where there is no driven-in ground and where water seepage is present

Options & Peripherals

HS-1  EXTERNAL SHUNTS
Used with a 50mV full scale meter

HS-1 SPECIFICATIONS
- Model & rated current: HS-1(500A), HS-1(750A)
- Accuracy (50/60 Hz): Class 0.5 (±0.5% at rated voltage)
- Rating: 1mA
- Dimensions, Mass: See figure, 75g
- Accessories: None

HB-1  EXTERNAL MULTIPLIER
Used with a 1mA full scale meter

HB-1 SPECIFICATIONS
- Model & rated voltage: HS-1(500V), HB-1(750V)
- Accuracy (50/60 Hz): Class 0.5 (±0.5% at rated voltage)
- Rating: 1mA
- Dimensions, Mass: See figure, 75g
- Accessories: None

External Multiplier
- External Multiplier: HB-1
- Accuracy (50/60 Hz): JIS-Class 0.5 (±1% of rated value)
- Rated load: 2VA
- Secondary current: 5A (all models)
- Conductor voltage rating: 150V AC
- Dimensions: 57×112×152mm
- Accessories: None

External Shunt
- External Shunt: HS-1
- Model & rated current: HS-1(500A), HS-1(750A)
- Accuracy (50/60 Hz): Class 0.5 (±0.5% at rated voltage)
- Rating: 50mV
- Dimensions, Mass: 350A type: 20(E), 60(F), M4(d), M8(d) mm, 320g; 200A type: 25(E), 15(F), M5(d), M10(d) mm, 330g
- Accessories: None
Advancing power saving and automation

- Electronic design assures high accuracy and reliability
- Ultra sensitive 1 mA, 10 mV DC movement
- Replaces relays in plug-in systems
- Includes a display lamp to illuminate movement at a glance
- Relay action delays circuit closure upon power on
- Both power circuitry and relay built-in

**Options & Peripherals**

**2103 2104 METER RELAY**

**Standard SPECIFICATIONS**
- Meter class: 2103: ±2.5% class, 2104: ±1.5% class
- Deflecting range: Passing type, full scale
- Setting pointer: Lance shape, upper limit and lower limit pointer
- Setting accuracy: ±1.5% of scale length
- Minimum setting width: Within 3% of scale length
- Relay power delay circuit: Approx. 2 second
- Relay output response: Approx. 0.5 second
- Output contact capacity: 5A (under condition of 250V AC, 30V DC, resistance load)
- Power supply: 100/200V AC ±10%

**Options**
- ±1.5% class: for Model 2103
- Extended scale: double or triple extended scale
- Segmented scale: magnified scale for up to 40% of the maximum scale value
- Double deflection meter: for example, zero-centered scale
- Relay response time: time constant 0.05 second fixed (DC) and variable types also available
- Setting accuracy: Version with ±1.0% type
- Delay time: Version with variable delay time after power on. 0.1 to 10 seconds: (for instruments input DC), 2 to 12 seconds: (for instruments input AC)
- Output signal: Version with 1 V DC ±5% output terminal
- *not isolated from input circuit ground.
- Power supply: Version with 110, 120, 220, 230, 240 V AC ±10%

**Standard Scale Graduations**

<table>
<thead>
<tr>
<th>Full-Scale Value</th>
<th>Graduations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1, 1.0, 0.9</td>
<td>0 2 4 6 8 10 15</td>
</tr>
<tr>
<td>1.5, 1.5, 1.5, 1.5</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>2.0, 2.0, 2.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>5.0, 5.0, 5.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>10.0, 10.0, 10.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>20.0, 20.0, 20.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>50.0, 50.0, 50.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>100.0, 100.0, 100.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>200.0, 200.0, 200.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>500.0, 500.0, 500.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>1000.0, 1000.0, 1000.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>2000.0, 2000.0, 2000.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>5000.0, 5000.0, 5000.0</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>10000.0, 10000.0, 10000.0</td>
<td>0 1 2 3 4 5</td>
</tr>
</tbody>
</table>

**Contact operation**

- HL type
  - [ ] contact used
  - ON: OFF
  - L setting: H setting

- L type
  - [ ] contact used
  - ON: OFF
  - L setting

- H type
  - [ ] contact used
  - OFF: ON
  - L setting: H setting

**Standard Full-Scale Values**

### DC Ammeter

<table>
<thead>
<tr>
<th>Value</th>
<th>Std. Full-Scale Value</th>
<th>Meter Sensitivity Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 µA</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>200</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>500</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>1000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>2000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>5000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 mA</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>20 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>50 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>100 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>200 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>500 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>1000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>2000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>5000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 A</td>
<td>10 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>20 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>50 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>100 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>200 A</td>
<td>100kΩ/V</td>
</tr>
</tbody>
</table>

### DC Voltmeter

<table>
<thead>
<tr>
<th>Value</th>
<th>Std. Full-Scale Value</th>
<th>Meter Sensitivity Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 µV</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>200</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>500</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>1000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>2000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>5000</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 mV</td>
<td>1 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>2 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>5 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>20 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>50 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>100 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>200 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>500 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 A</td>
<td>10 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>2 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>5 A</td>
<td>100kΩ/V</td>
</tr>
</tbody>
</table>

### Rectifying AC Ammeter

<table>
<thead>
<tr>
<th>Value</th>
<th>Std. Full-Scale Value</th>
<th>Meter Sensitivity Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 µA</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>20 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>50 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>100 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>200 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>500 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>1000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>2000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>5000 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 A</td>
<td>1 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>2 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>5 A</td>
<td>100kΩ/V</td>
</tr>
</tbody>
</table>

### Rectifying AC Voltmeter

<table>
<thead>
<tr>
<th>Value</th>
<th>Std. Full-Scale Value</th>
<th>Meter Sensitivity Spec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 µV</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>2 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>5 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>10</td>
<td>10 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>20</td>
<td>20 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>50</td>
<td>50 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>100</td>
<td>100 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>200</td>
<td>200 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>500</td>
<td>500 mV</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>1 A</td>
<td>1 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>2</td>
<td>2 A</td>
<td>100kΩ/V</td>
</tr>
<tr>
<td>5</td>
<td>5 A</td>
<td>100kΩ/V</td>
</tr>
</tbody>
</table>

**Options & Peripherals**
# Options & Peripherals

## Test Leads and Probes

Included as accessories with main unit, or sold separately (optional products)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>3851-10</td>
<td>TEST LEAD</td>
<td>for 3156, 3155, 3200*</td>
</tr>
<tr>
<td>9014</td>
<td>HIGH VOLTAGE PROBE</td>
<td>for 3000*, 3012*, 3015*</td>
</tr>
<tr>
<td>9017</td>
<td>HIGH VOLTAGE PROBE</td>
<td>for 3000*, 3012*, 3015*</td>
</tr>
<tr>
<td>9021-01</td>
<td>THERMISTE TEMPERATURE PROBE</td>
<td>for 3000*, 3015*</td>
</tr>
<tr>
<td>9060</td>
<td>TEST LEAD</td>
<td>for 3000, 3125*</td>
</tr>
<tr>
<td>9060-01</td>
<td>TEST LEAD</td>
<td>for 3108*</td>
</tr>
<tr>
<td>9077</td>
<td>TEST LEAD</td>
<td>for 3127*, 3128*, 3129*</td>
</tr>
<tr>
<td>9094</td>
<td>OUTPUT CORD</td>
<td>for 3412, 3283</td>
</tr>
<tr>
<td>9140</td>
<td>4-TERMINAL PROBE</td>
<td>for 3503, 3511*</td>
</tr>
<tr>
<td>9143</td>
<td>PINCHER PROBE</td>
<td>for 3000*, 3012*, 3015*</td>
</tr>
<tr>
<td>9153</td>
<td>TEST LEADS WITH FUSE</td>
<td>for 3012*, 3030*, 3127*</td>
</tr>
<tr>
<td>9165</td>
<td>CONNECTION CORD</td>
<td>for 3601*, 3014*</td>
</tr>
<tr>
<td>9166</td>
<td>CONNECTION CORD</td>
<td>for 3601*, 3014*</td>
</tr>
<tr>
<td>9168</td>
<td>INPUT CORD</td>
<td>for 3108*</td>
</tr>
<tr>
<td>9170</td>
<td>TEST LEAD</td>
<td>for 3156, 3155, 3200*</td>
</tr>
<tr>
<td>9177</td>
<td>INPUT CORD</td>
<td>for 3108*</td>
</tr>
<tr>
<td>9178</td>
<td>VOLTAGE CORD</td>
<td>for 3165*</td>
</tr>
<tr>
<td>9179</td>
<td>VOLTAGE CORD</td>
<td>for 3165*</td>
</tr>
<tr>
<td>9185</td>
<td>TEST LEAD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9186</td>
<td>INPUT CORD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9190</td>
<td>VOLTAGE APPLY PROBE</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9195</td>
<td>ENCLOSURE PROBE</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9196</td>
<td>APPLY UNIT</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9197</td>
<td>CONNECTION CORD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9198</td>
<td>CONNECTION CORD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9199</td>
<td>CONVERSION ADAPTOR</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9200</td>
<td>TEST LEAD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9207-10</td>
<td>TEST LEAD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9207</td>
<td>TEST LEAD</td>
<td>for 3155*</td>
</tr>
<tr>
<td>9208</td>
<td>TEST LEADS</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9209</td>
<td>TEST LEADS HOLDER</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9215</td>
<td>MEASURING CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9217</td>
<td>CONNECTION CORD</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9219</td>
<td>CONNECTION CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9219</td>
<td>CONNECTION CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9262</td>
<td>DC BIAS VOLTAGE UNIT</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9263</td>
<td>THERMISTE TEMPERATURE PROBE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9264-01</td>
<td>WIRING ADAPTER</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9265</td>
<td>MEASUREMENT CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9266</td>
<td>MEASUREMENT CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9267</td>
<td>MEASUREMENT CABLE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9268</td>
<td>TEST FIXTURE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>9269</td>
<td>TEST FIXTURE</td>
<td>for 3280*, 3280*</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Details</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9287-10</td>
<td>CLIP TYPE LEAD</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9286</td>
<td>BREAKER PIN</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9299</td>
<td>TEST PROBE</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9292</td>
<td>TEST PROBE</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9293</td>
<td>PIN TYPE EARTH PROBE</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9294</td>
<td>TEST PROBE</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9296</td>
<td>CURRENT PROBE</td>
<td>3118, 3118-12, 3151, 3151-12, 3151-14, 3152, 3152-12, 3152-14, 3541, 3541-10</td>
</tr>
<tr>
<td>9297</td>
<td>CURRENT APPLY PROBE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9299</td>
<td>SWITCHED PROBE</td>
<td>3154</td>
</tr>
<tr>
<td>9300</td>
<td>CONNECTION CABLE</td>
<td>8205*¹, 8205-10</td>
</tr>
<tr>
<td>9326</td>
<td>CONNECTION CABLE</td>
<td>8845*/8846*</td>
</tr>
<tr>
<td>9437</td>
<td>CONNECTION CABLE</td>
<td>3166*¹</td>
</tr>
<tr>
<td>9438</td>
<td>VOLTAGE CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9438-02</td>
<td>VOLTAGE CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9438-03</td>
<td>VOLTAGE CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9452</td>
<td>CLIP TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9453</td>
<td>FOUR TERMINAL LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9454</td>
<td>ZERO ADJUSTMENT BOARD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9455</td>
<td>PIN TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9456</td>
<td>PIN TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9457</td>
<td>PIN TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9460</td>
<td>CLIP TYPE LEAD WITH TEMPERATURE SENSOR</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9461</td>
<td>PIN TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9465</td>
<td>PIN TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9466</td>
<td>REMOTE CONTROL SWITCH</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9467</td>
<td>LARGE CLIP TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9574</td>
<td>INPUT CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9615</td>
<td>H.V.TEST LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9617</td>
<td>CLIP ON BASE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9618</td>
<td>CLIP-TYPE LEAD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9635</td>
<td>VOLTAGE CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9635-01</td>
<td>VOLTAGE CORD</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9639</td>
<td>CONNECTION CABLE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9641</td>
<td>CONNECTION CABLE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9665</td>
<td>10:1 PROBE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9666</td>
<td>100:1 PROBE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9677</td>
<td>SMD TEST FIXTURE</td>
<td>3157, 3157-01</td>
</tr>
<tr>
<td>9699</td>
<td>SMD TEST FIXTURE</td>
<td>3157, 3157-01</td>
</tr>
</tbody>
</table>

*marked products are discontinued models.

Note: * marked products are discontinued models.
Options & Peripherals

Recording Papers ... Sold separately (optional products)

<table>
<thead>
<tr>
<th>Model</th>
<th>Recording Paper</th>
<th>Paper Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>3155-01 LEAK CURRENT HITESTER</td>
<td>9233</td>
<td>58 mm × 10 m, 10 rolls</td>
</tr>
<tr>
<td>3165 CLAMP ON POWER HITESTER</td>
<td>9223</td>
<td>58 mm × 10 m, 10 rolls</td>
</tr>
<tr>
<td>3193 POWER HITESTER</td>
<td>9232</td>
<td>74 mm × 10 m, 10 rolls</td>
</tr>
<tr>
<td>3194 MOTOR/HARMONIC HITESTER</td>
<td>9232</td>
<td>74 mm × 10 m, 10 rolls</td>
</tr>
<tr>
<td>3196 POWER QUALITY ANALYZER</td>
<td>9237</td>
<td>80 mm × 25 m, 4 rolls</td>
</tr>
<tr>
<td>3541 RESISTANCE HITESTER</td>
<td>9237</td>
<td>80 mm × 25 m, 4 rolls</td>
</tr>
<tr>
<td>8205-10 MICRO HICORDER</td>
<td>9235 9236-01</td>
<td>60 mm × 15 m, 10 rolls</td>
</tr>
<tr>
<td>8206-10 MICRO HICORDER</td>
<td>9235 9236-01</td>
<td>60 mm × 15 m, 10 rolls</td>
</tr>
<tr>
<td>8420-01 MEMORY HLOGGER *</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8420-01 MEMORY HLOGGER</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8421-01 MEMORY HLOGGER *</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8421-01 MEMORY HLOGGER</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8422-01 MEMORY HLOGGER *</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8715-01 POWER HICORDER</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
<tr>
<td>8807-01 MEMORY HICORDER</td>
<td>9234</td>
<td>112 mm × 18 m, 10 rolls</td>
</tr>
</tbody>
</table>

Temperature probes or sensors ... Included as accessories with main unit, or sold separately (optional products)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type/Note</th>
<th>Compatible Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>9021-01 THERMISTER TEMPERATURE PROBE</td>
<td>50 to 200°C</td>
<td>3030, 3127, 3128, 3129</td>
</tr>
<tr>
<td>9180 TEMPERATURE PROBE</td>
<td>Sheath type, up to 750°C non-waterproof</td>
<td>3412, 3441, 3442</td>
</tr>
<tr>
<td>9181 TEMPERATURE PROBE</td>
<td>Surface type, up to 400°C non-waterproof</td>
<td>3412, 3441, 3442</td>
</tr>
<tr>
<td>9182 TEMPERATURE PROBE</td>
<td>Sheath type, up to 750°C non-waterproof</td>
<td>3412, 3441, 3442</td>
</tr>
<tr>
<td>9183 TEMPERATURE PROBE</td>
<td>Sheath type, up to 750°C non-waterproof</td>
<td>3412, 3441, 3442</td>
</tr>
<tr>
<td>9184 RJ SENSOR</td>
<td>Electric contact (at 25 to 80°C)</td>
<td>7011</td>
</tr>
<tr>
<td>9188 TEMPERATURE PROBE</td>
<td>Included with the 3227</td>
<td>3227</td>
</tr>
<tr>
<td>9451 TEMPERATURE PROBE</td>
<td>Included with the 3540</td>
<td>3540</td>
</tr>
<tr>
<td>9462 THERMISTER TEMPERATURE PROBE</td>
<td>50 to 150°C</td>
<td>3231, 3232</td>
</tr>
<tr>
<td>9463 TEMPERATURE HUMIDITY SENSORS</td>
<td>Fixed type</td>
<td>3265</td>
</tr>
<tr>
<td>9464 TEMPERATURE HUMIDITY SENSORS</td>
<td>Extension type (2.7mm)</td>
<td>3265</td>
</tr>
<tr>
<td>9472 TEMPERATURE PROBE</td>
<td>Sheath type, up to 300°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
<tr>
<td>9472-50 TEMPERATURE PROBE</td>
<td>Sheath type, up to 300°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
<tr>
<td>9473 TEMPERATURE PROBE</td>
<td>Sheath type, up to 800°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
<tr>
<td>9473-50 TEMPERATURE PROBE</td>
<td>Sheath type, up to 800°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
<tr>
<td>9474 TEMPERATURE PROBE</td>
<td>Sheath type, up to 500°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
<tr>
<td>9475 TEMPERATURE PROBE</td>
<td>Sheath type, up to 500°C waterproof structure</td>
<td>3441, 3442</td>
</tr>
</tbody>
</table>

Note: * marked products are discontinued models.
All Accessories

1195 RECORDING PAPER for 3192 (10 rolls)*
1196 RECORDING PAPER

3851-10 TEST LEAD for 3543, 3332-2, 3511, 3196 (10 rolls)
3852 RS-232C PACKAGE for 3801, 3802
3853 CARRYING CASE for 3803, 3804, 3805
3854 RS-232C PACKAGE for 3803, 3804, 3805
3909 INTERFACE PACK for 3443, 3444, 3445
3920-01 DATA READER for 3650...

9005-01 CLAMP ON PROBE for 3000*, 09*, 11*, 15*, 20*, 21*, 30, 3215*
9010 CLAMP ON PROBE for 8206*, 8255
9010-10 CLAMP ON PROBE for 8714*, 8715
9014 HIGH VOLTAGE PROBE for 808*, 3205*, 3207*, 3209*, 3219*, 3230*, 3266
9017 HIGH VOLTAGE PROBE for 3009*, 3012*, 3015*, 3021*, 3030
9018 CLAMP ON PROBE...
9018-10 CLAMP ON PROBE for 8714*, 8715
9021-01 THERMISTOR TEMPERATURE PROBE...
9032 METAL CONTACT TIP...
9033 RUBBER CONTACT TIP...
9035 AC ADAPTER...
9036 AC ADAPTER...
9039 AC ADAPTER...
9050 EARTH NETS...
9060 TEST LEAD...
9060-01 TEST LEAD...
9067 TEST LEAD...
9070 AC ADAPTER...
9073 RECORDING PAPER...
9074 RECORDING PAPER...
9081 EXTERNAL SHUNT...
9083 CARRYING CASE...
9084 CARRYING CASE...
9088 CARRYING CASE...
9094 OUTPUT CORD...
9132 CLAMP ON PROBE...
9132-10 CLAMP ON PROBE...
9135 RECORDING PAPER...
9140 4-TERMINAL PROBE...
9143 PINCHER PROBE...
9144 CARRYING CASE...
9148 CARRYING CASE...
9151-02 GP-IB CONNECTOR CABLE for 3511, 3332-2, 3332 (2m)
9151-04 GP-IB CONNECTOR CABLE...
9153 TEST LEADS WITH FUSE...
9165 CONNECTION CORD for 3511, 3601*, 7057, 7057-01 (BNC-BNC)
9166 CONNECTION CORD...
9168 INPUT CORD...
9170 TEST LEAD...
9177 INPUT CORD...
9178 VOLTAGE CORD...
9179 VOLTAGE CORD...
9180 SHEATH TEMPERATURE PROBE...
9181 SURFACE TEMPERATURE PROBE...
9182 SHEATH TEMPERATURE PROBE...
9183 SHEATH TEMPERATURE PROBE...
9184 TEMPERATURE PROBE...
9185 TEST LEAD...
9186 INPUT CORD...
9188 TEMPERATURE PROBE...
9190 VOLTAGE APPLY PROBE...
9195 ENCLOSURE PROBE...
9196 APPLY UNIT...
9197 CONNECT CORD...
9198 CONNECT CORD...
9199 CONVERSION ADAPTER...
9200 DIGITAL PRINTER...
9203 DIGITAL PRINTER...
9207 TEST LEAD...
9207-10 TEST LEAD...
9208 TEST LEADS...
9209 TEST LEADS HOLDER...
9211 REFLECTIVE TAPE...
9212 PERIPHERAL RING...
9213 CONTACT ADAPTER...
9214 AUXILIARY EARNING ROD...
9215 MEASURING CABLE...
9216 CABLE WINDER...
9217 CONNECTION CORD...
9219 CONNECTION CORD...
9221 RECORDING PAPER...
9222 RECORDING PAPER...
9223 RECORDING PAPER...
9224 RECORDING PAPER...
9225 RECORDING PAPER...
9226 RECORDING PAPER...
9227 RECORDING PAPER...
9228 RECORDING PAPER...
9229 RECORDING PAPER...
9229-01 RECORDING PAPER (PERFORATED)
9231 RECORDING PAPER...
9232 RECORDING PAPER...
9233 RECORDING PAPER...
9234 RECORDING PAPER...
9235 RECORDING PAPER...
9236-01 RECORDING PAPER...
9237 RECORDING PAPER...
9245 CARRYING CASE...
9246 CARRYING CASE...
9257 CONNECTION CORD...
9261 TEST FIXTURE...
9262 TEST FIXTURE...
9263 THERMISTOR TEMPERATURE PROBE...
9264-01 WIRING ADAPTER...
9264-02 WIRING ADAPTER...
9265 MEASUREMENT CABLE...
9267 SAFETY TEST DATA MANAGEMENT SOFTWARE...
9268 DC BIAS VOLTAGE UNIT...
9269 DC BIAS CURRENT UNIT...
9270 CLAMP ON SENSOR...
9271 CLAMP ON SENSOR...
9272 CLAMP ON SENSOR...
9274 CLAMP ON AC/DC SENSOR...
9276 CLAMP ON AC/DC SENSOR...
9277 UNIVERSAL CLAMP ON CT...

Options & Peripherals

Note: * marked products are discontinued models.
Options & Peripherals

Note: * marked products are discontinued models.
Note: * marked products are discontinued models.

9589 PRINTER INTERFACE .............. for 3227*
9593-01 RS-232C INTERFACE ........... for 3522*, 3531*, 3532
9593-02 RS-232C INTERFACE ........... for 3157, 3157-01
9598 MO UNIT ......................... for 8826
9599 MEMORY BOARD .................... for 8826 (48M-word)
9600 AC/DC DIRECT INPUT UNIT ........ for 3193
9601 AC DIRECT INPUT UNIT .......... for 3193
9602 AC/DC CLAMP INPUT UNIT ........ for 3193
9603 EXTERNAL SIGNAL INPUT UNIT .... for 3193
9603-01 EXTERNAL SIGNAL INPUT UNIT . for 3194
9604 PRINTER UNIT ..................... for 3193
9605 HARMONIC/FlickER MEASUREMENTS UNIT for 3193
9605-01 HARMONIC MEASUREMENTS UNIT ...... for 3194
9607 MO UNIT ......................... for 8841, 8842
9608 MEMORY BOARD/24M-WORD ........ for 8841, 8842
9612 RS-232C CABLE .................... for DIN 9pin-Dsub 9pin 8807, 8808, 8420
9613 REMOTE CONTROL BOX(NINGLE) .... for 3158
9614 REMOTE CONTROL BOX(DUAL) ....... for 3158
9615 H.V.TEST LEAD .................... for 3158
9615-01 H.V.TEST LEAD ................. for 3931 Red (High Voltage)
9615-03 H.V.TEST LEAD ................. for 3931 Black (Return)
9616 WARNING LAMP .................... for 3158
9617 CLIP ON BASE ...................... for 3158
9618 CLIP-TYPE LEAD ................... for 3501, 3801, 3802, 3804, 3805
9623 POWER ANALYZER .................. for 3193
9624 POA-HIVIEW......................... for 3196
9624-10 POA-HIVIEW PRO ............... for 3196
9625 POWER MEASUREMENT SUPPORT SOFTWARE for 3166*, 3168, 3169
9626 PC CARD 32M ...................... for 88008, 3169, 3196
9627 PC CARD 64M ...................... for 88008, 3159, 3196
9628 LAN CABLE ....................... for 3660
9629 CONNECTION CABLE ............... for 3659
9631-01 TEMPERATURE SENSOR .......... for 3641 (1m)
9631-02 TEMPERATURE SENSOR .......... for 3641 (1m)
9631-03 TEMPERATURE SENSOR .......... for 3641 (1m)
9631-04 TEMPERATURE SENSOR .......... for 3641 (1m)
9631-05 TEMPERATURE SENSOR .......... for 3641 (30 mm)
9631-11 TEMPERATURE SENSOR (9631-01,5m) ........ for 3641 (5 m)
9631-14 TEMPERATURE SENSOR (9631-04,5m) ........ for 3641 (5 m)
9631-21 TEMPERATURE SENSOR (9631-01,10m) ......... for 3641 (10 m)
9631-24 TEMPERATURE SENSOR (9631-04,10m) ......... for 3641 (10 m)
9632 CONNECTION CABLE ............... for 3641, 9304-04-06, 9305-24-26, 9306
9633 CONNECTION CABLE ............... for 3641, 9306
9634 CONNECTION CABLE ............... for 3630, 9305-01,02
9635 VOLTAGE CORD .................... for 3636
9635-01 VOLTAGE CORD ................. for 3636
9636 RS-232C CABLE .................... for 3636
9636-01 RS-232C PACKAGE ............... for 3636
9637 RS-232C CABLE (9pin-9pin/1.8m) ....... for 3636, 9305, 9301-20
9638 RS-232C CABLE (9pin-25pin/1,8m) ......... for 3636, 9305, 9301-20
9639 CONNECTION CABLE ............... for 9306
9641 CONNECTION CABLE ............... for 9306
9642 LAN CABLE ....................... for 9306
9643 CHARGE STAND ..................... for 9306
9644 SCSI INTERFACE .................. for 8855
9645 MEMORY BOARD .................... for 8855
9645-01 MEMORY BOARD ................ for 8855
9646 MO UNIT ......................... for 8855
9648 CARRYING CASE .................... for 8807, 8808, 8420, 8421, 8747, 8715
9649 PROTECTIVE CASE .................. for 8807, 8808, 8420, 8421
9650 CLAMP ON SENSOR .................. for 100A, 8205, 8206, 9305-35
9651 CLAMP ON SENSOR .................. for 9304-04-06, 9305-24-26, 9306
9652 FIXED STAND ...................... for 9306
9652-01 FIXED STAND ................... for 9306, 9304-04-06, 9305-24-26, 9306, 8807, 8808
9653 HUMIDITY SENSOR ................. for 8820, 8421
9657 CLAMP ON LEAK SENSOR ............ for 8820, 8421
9657-10 CLAMP ON LEAK SENSOR .......... for 8820, 8421
9658 CLAMP ON LEAK SENSOR ............ for 8820, 8421
9660 CLAMP ON SENSOR .................. for 9306, 9305-35
9661 CLAMP ON SENSOR .................. for 9306, 9305-35
9662 LUX SENSORS ...................... for 9306
9663 HD UNIT ......................... for 9306
9665 10PROBE ......................... for 9306
9666 100PROBE ......................... for 9306
9667 FLEXIBLE CLAMP ON SENSOR ...... for 3641, 9305
9668 CLAMP ON SENSOR .................. for 3641, 9305
9669 CLAMP ON SENSOR .................. for 3641, 9305
9670 PRINTER ......................... for 3196, 9346, 9447
9671 AC ADAPTER ...................... for 9670
9674 RS-232C PACKAGE .................. for 9346, 9447
9677 SMD TEST FIXTURE ................ for 3511
9678 CONNECTION CABLE ............... for 3511
9679 CONNECTION CABLE ............... for 3503
9680 HUMIDITY SENSOR ................. for 3641 (1m)
9680-01 HUMIDITY SENSOR ............... for 3641 (5m)
9680-02 HUMIDITY SENSOR ............... for 3641 (10m)
9681 HUMIDITY SENSOR ................. for 3641 (10m)
9685 CARRYING CASE ................... for 3511
9686 CARRYING CASE ................... for 3516
9689 CLAMP ON AC/DC SENSOR .......... for 3290 AC100A
9692 CLAMP ON AC/DC SENSOR .......... for 3290 AC200A
9693 CLAMP ON AC/DC SENSOR .......... for 3290 AC200A
9694 CLAMP ON SENSOR .................. for 3169, 3196 AC5A
9699 SMD TEST FIXTURE ................ for 3511
9700-10 HEAD AMP UNIT ............... for 3535
9713-01 CAN CABLE ..................... for 8910
9713-02 CAN CABLE ..................... for 8910
9714-01 LOGIC CABLE ................... for 8910
9714-02 LOGIC CABLE ................... for 8910
9720 CARRYING CASE ................... for 3169
9721 RS-232C CABLE .................... for 3169
9726 PC CARD 128M ..................... for 3169, 3196, 3199
9727 PC CARD 256M ..................... for 88005, 3169, 3196
9728 PC CARD 512M ..................... for 88005, 3169, 3196
9730 CARRYING CASE ................... for 3661, 3662, 3663
9731 FC CONNECTOR ADAPTER .......... for 3661
9732 SC CONNECTOR ADAPTER .......... for 3661
9733 FC CONNECTOR ADAPTER .......... for 3662, 3663
9734 SC CONNECTOR ADAPTER .......... for 3662, 3663
9735 FC-FC OPTICAL FIBER CABLE ...... for 3661, 3662, 3663
9736 SC-SC OPTICAL FIBER CABLE ...... for 3661, 3662, 3663
9737 SC-FC OPTICAL FIBER CABLE ...... for 3661, 3662, 3663
9738 OPTICAL CONNECTOR CLEANER ...... for 3661, 3662, 3663
9739 SPARE CLEANER ................... for 3661, 3662, 3663
CT-101A LINE SPLITTER ............... for 3127-11 etc.
2204 PAPER WINDER .................... TEPTOM-220H
ALLIGATOR CLIPS ....................... 9170 or similar devices (used with Test Lead, inserted)
In order to provide dependable and quality-assured products, HIOKI has acquired the international standard ISO/IEC17025 certification for calibration, which allows us to meet a wide variety of calibration needs. By regularly calibrating HIOKI instruments using reference calibrating equipment traceable to national standards while complying with the reference equipment organizational chart, customers are guaranteed complete accuracy. After purchase, it is highly recommended that customers regularly re-calibrate their HIOKI instruments to maintain their accuracy. Depending on your needs, calibration and adjustment can be conducted at HIOKI in one of 4 ways as illustrated on the right.

### Types of Calibration

<table>
<thead>
<tr>
<th>Type</th>
<th>Action</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calibration + Data Sheet</td>
<td>Calibration Data Sheet</td>
</tr>
<tr>
<td>2</td>
<td>Calibration + Adjustment + Data Sheet</td>
<td>Calibration + Adjustment + Data Sheet</td>
</tr>
<tr>
<td>3</td>
<td>Calibration + Data Sheet</td>
<td>Calibration Data Sheet</td>
</tr>
<tr>
<td>4</td>
<td>Adjustment + Calibration + Data Sheet</td>
<td>Adjustment + Calibration + Data Sheet</td>
</tr>
</tbody>
</table>

Accuracy can be regarded as the heart of a measuring instrument. To maintain accuracy, traceability and accountability in the form of a coherent and comprehensive management system that reaches to the national standards are indispensable.

Traceability allows us to manage and maintain instrument accuracy characteristics that are tied to recognized national and international standards. How they are managed and maintained are dependent on the measurement facilities that offer accuracy testing at the various levels, skilled technicians, as well as a strong link between national standards, manufacturer reference equipment, field measuring instruments, and basic measuring instruments.

The HIOKI Traceability System as indicated by the chart on the left is strictly managed by accounting for each individual instrument - from reference instruments to field equipment - and their constant accuracy. As scientific techniques and manufacturing technology continue to expand and develop, we will strive to meet new demands by not only providing the appropriate measuring instruments for our users, but also enhancing the accuracy in our test instruments and maintaining our Traceability System so that they are constantly on par with global standards.

HIOKI's Calibration System

In order to provide dependable and quality-assured products, HIOKI has acquired the international standard ISO/IEC17025 certification for calibration, which allows us to meet a wide variety of calibration needs. By regularly calibrating HIOKI instruments using reference calibrating equipment traceable to national standards while complying with the reference equipment organizational chart, customers are guaranteed complete accuracy. After purchase, it is highly recommended that customers regularly re-calibrate their HIOKI instruments to maintain their accuracy. Depending on your needs, calibration and adjustment can be conducted at HIOKI in one of 4 ways as illustrated on the right.
Established in 1935, HIOKI E. E. CORPORATION has grown to be a leading developer and manufacturer of advanced test and measurement technologies for use both in the field and leading edge facilities around the world. Our goal is simple: contribute to the advancement of society, while making sure the natural environment is not compromised. As a reliable producer and member of society, we pledge to continue to actively contribute to the cultural and educational development of the local community through activities such as greening efforts, scholarship programs and sponsoring children's sports teams. With the support of our customers and worldwide network, we are confident that our values and beliefs, and products and services, will be brought forth through the 21st century and beyond.

1935  HIOKI starts manufacturing electrical measuring instruments in Tokyo
1945  Move to Nagano Prefecture due to war
1946  Tester No.1 put to market
1952  HIOKI E.E. CORPORATION established
      Designated as the manufacturer of MULTITESTER (MIL Standard) for the U.S. Far East Air Forces
1965  Mass production of VU instruments for recording level adjustments to tape recorders
1975  Independent development and sale of instruments with internal magnetic taut bands
1983  Multiple awards received for innovative clamp-style instruments
1990  Move to HIOKI Forest Hills
1991  Registered on the over-the-counter market
1992  Awarded the Afforestation Center Presidential Award for positively promoting afforestation
1993  ISO9001 certified
1997  ISO14001 certified
1998  HIOKI USA CORPORATION established
2001  HIOKI Shanghai Representative Office established
      Listed on the Second Section of the Tokyo Stock Exchange
2003  Listed on the First Section of the Tokyo Stock Exchange
2005  “Solution Fair” - 70th Anniversary Celebration