A New Series of LCR Meters to Meet Your Applications
From Production Lines to Research and Development
<table>
<thead>
<tr>
<th>Model</th>
<th>Measurement speed (Basic value)</th>
<th>Measurement frequency range</th>
<th>Applications and measurement object</th>
</tr>
</thead>
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<tr>
<td><strong>LCR METER</strong> IM3536</td>
<td>1ms</td>
<td>DC 4Hz 8MHz</td>
<td>General-purpose LCR meter up to 8 MHz Measure electronic components such as capacitors and inductors</td>
</tr>
<tr>
<td><strong>LCR METER</strong> IM3533</td>
<td>2ms</td>
<td>DC 1mHz 200kHz</td>
<td>Capable of special measurements of transformers including turn ratio and mutual inductance IM3533-01: High-end model of the IM3523 and IM3533 with sweep measurement</td>
</tr>
<tr>
<td><strong>LCR METER</strong> IM3523</td>
<td>2ms</td>
<td>DC 40Hz 200kHz</td>
<td>Extremely cost-effective model suitable for production lines including integration into automated machinery For C-D and ESR measurement of electrolytic capacitors and L-Q and DCR measurement of inductors</td>
</tr>
<tr>
<td><strong>LCR HiTESTER</strong> 3511-50 (legacy product)</td>
<td>5ms</td>
<td>120Hz 1kHz</td>
<td>Compact LCR meter with single function For production lines of aluminum electrolytic capacitors</td>
</tr>
<tr>
<td><strong>C METER</strong> 3506-10</td>
<td>1.5ms</td>
<td>1kHz 1MHz</td>
<td>C meter for low-capacity capacitors For production of MLCC and film capacitors</td>
</tr>
<tr>
<td><strong>C HiTESTER</strong> 3504</td>
<td>2ms</td>
<td>120Hz 1kHz</td>
<td>C meter for large-capacity MLCCs For sorting machines of large-capacity MLCCs (3504-50/60) and taping machines (3504-40)</td>
</tr>
<tr>
<td><strong>IMPEDEANCE ANALYZER</strong> IM7580A</td>
<td>0.5ms</td>
<td>1MHz 300MHz</td>
<td>High-frequency measurement up to 300 MHz Ideal for production lines of ferrite beads and inductors</td>
</tr>
<tr>
<td><strong>IMPEDEANCE ANALYZER</strong> IM3570</td>
<td>0.5ms</td>
<td>DC 4Hz 5MHz</td>
<td>LCR meter integrated with impedance analyzer Measure the frequency characteristics of piezo-electric devices, functional polymer capacitors, and power inductors</td>
</tr>
<tr>
<td><strong>CHEMICAL IMPEDEANCE ANALYZER</strong> IM3590</td>
<td>2ms</td>
<td>DC 1mHz 200kHz</td>
<td>Supports LCR impedance measurements for Cole-Cole plots and equivalent-circuit analyses Measure electrochemical components, materials, batteries, and electric double-layer capacitors (EDLCs)</td>
</tr>
</tbody>
</table>
LCR METER IM3523
Ideal for Production Lines and Automated Testing

- ±0.05% accuracy with wide measurement range (DCR testing, 40Hz to 200kHz, 5mV to 5V, 10μA to 50mA)
- Non-stop testing over mixed measurement conditions such as C-D and ESR at 10 times the speed of previous models
- Built-in comparator and BIN functions
- Rapid 2msec test time

LCR METER IM3533 IM3533-01
From R&D Applications to Windings, Coil and Transformer Manufacturing

- ±0.05% accuracy with wide measurement range (DCR testing, 1mHz to 200kHz, 5mV to 5V, 10μA to 50mA)
- Non-stop testing over mixed measurement conditions such as C-D and ESR at 10 times the speed of previous models
- Built-in low impedance high precision mode effective for testing lowinductance or the ESR of aluminum electrolysis capacitance (10x the measurement speed and dramatic improvements in repeatability and stability over the previous model 3522-50)
- Dedicated modes for measuring transformer winding ratio, mutual inductance and temperature compensated DCR
- Frequency sweep testing (IM3533-01 only)
- 2m/4m cable setting in addition to the standard 0m/1m (IM3533-01 only)
- Built-in comparator and BIN functions
- Rapid 2msec test time

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**Basic specifications**

- **Accuracy guaranteed for 1 year**

**LCR METER IM3523**

- **Measurement models**
  - LCR, Transformer testing (N, M, ΔL), Measurement modes
  - LCR, Transformer testing (N, M, ΔL), Measurement modes
  - LCR, Transformer testing (N, M, ΔL), Measurement modes

- **Measurement parameters**
  - Z, Y, Rs, Rp, Rr, Rs, Rr, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp

- **Measurement range**
  - 100 mΩ to 100 MΩ, 10 ranges (All parameters defined in terms of Z.)

- **Displayable range**
  - Δ (0.00000 [unit] to 9.99999G [unit]) Real value display for Z and Y only

- **Basic accuracy**
  - Z: ±0.05% dfg; Ø: ±0.03%

- **Measurement frequency**
  - 1mHz to 20kHz (2 digits setting resolution)

- **Measurement signal level**
  - Normal mode: V mode, CV mode: 5 mV to 5 Vrms, 1 mVrms steps
  - Low impedance high accuracy mode: V mode, CV mode: 5μV to 5 Vrms, 1μVrms steps

- **Output impedance**
  - Normal: 100 Ω, Low impedance high accuracy mode: 25 Ω

**Options**

- POWER CABLE (2 m) 1951-01
- GP-IB CONNECTION CABLE (2 m) 1951-02

---

**Basic specifications**

- **Accuracy guaranteed for 1 year**

**IM3533 IM3533-01**

- **Measurement models**
  - LCR, Transformer testing (N, M, ΔL), Measurement modes
  - LCR, Transformer testing (N, M, ΔL), Measurement modes
  - LCR, Transformer testing (N, M, ΔL), Measurement modes

- **Measurement parameters**
  - Z, Y, Rs, Rp, Rr, Rs, Rr, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp, Rs, Rp

- **Measurement range**
  - 100 mΩ to 100 MΩ, 10 ranges (All parameters defined in terms of Z.)

- **Displayable range**
  - Δ (0.00000 [unit] to 9.99999G [unit]) Real value display for Z and Y only

- **Basic accuracy**
  - Z: ±0.05% dfg; Ø: ±0.03%

- **Measurement frequency**
  - 1mHz to 20kHz (2 digits setting resolution, minimum resolution 1mHz)

**Options**

- POWER CABLE (2 m) 1951-01
- GP-IB CONNECTION CABLE (2 m) 1951-02

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**Note**: This product is not supplied with measurement probes or test fixtures. Please select and purchase the measurement probe or test fixture options appropriate for your application separately. All probes are constructed with a 50Ω coaxial cable. For an RS-232C connection: A crossover cable for interconnection can be used. You can use the RS-232C CABLE 967 without hardware flow control.
**IM3570**

Single Device Solution for High Speed Testing and Frequency Sweeping

- LCR measurement, DCR measurement, sweep measurement, continuous measurement and high-speed testing achieved with one instrument
- High-speed testing, achieving maximum speeds of 1.5ms (1 kHz) and 0.5ms (100kHz) in LCR mode
- High-accuracy measurements, basic accuracy of Z parameter: ± 0.08%
- Perform frequency sweeps, level sweeps, and time intervals measurements in analyzer mode

**LCR METER**

**IM3536**

The New Standard for General-Purpose LCR Meters with Measurement Frequency from DC, 4Hz to 8MHz

- DC, 4Hz to 8MHz measurement frequency
- High-speed measurement of 1ms (fastest time)
- High-precision measurement of ±0.05% rdg. (representative value)
- Guaranteed accuracy range from 1 mΩ, low-inductance measurement with unmatched repeatability

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### IM3570

- **Basic specifications** (Accuracy guaranteed for 1 year)
  - **Measurement modes**: LCR mode, Analyzer mode (Sweeps with measurement frequency and measurement level). Continuous measurement mode
  - **Measurement parameters**: Z, Y, R, Rs (ESR), Rp, Dc (DC resistance), X, G, B, Cp, Lp, D (tanδ), Q
  - **Measurement range**: 100 mΩ to 100 MΩ, 12 ranges (All parameters are determined according to Z)
  - **Display range**: Z, Y, R, Rs (ESR), Rp, X, G, B, Cp, Lp, D (tanδ), Q: ±0.00006 [unit] to ±9999999 [unit]
  - **Basic accuracy**: Z: ±0.08% rdg, Y: ±0.03°
  - **Measurement frequency**: 4 Hz to 5 MHz (5 digits setting resolution, minimum resolution 10 mHz)
  - **Measurement signal level**: Normal mode: V signal/CV mode: 5 mV to 5 Vrms (typ: 1 MΩ, 100 Ω to 1 Vrms (1000 KΩ to 5 MHz), 30 mA steps
  - **Output impedance**: Normal mode: 100Ω, Low impedance high accuracy mode: 10Ω

### IM3536

- **Basic specifications** (Accuracy guaranteed for 1 year)
  - **Measurement modes**: LCR mode, Continuous measurement mode
  - **Measurement parameters**: Z, Y, R, Rs (ESR), Rp, Dc (DC resistance), X, G, B, Cp, Lp, D (tanδ), Q
  - **Measurement range**: 100 mΩ to 100 MΩ, 10 ranges (All parameters are determined according to Z)
  - **Display range**: Z: 0.00 m to 9999.9 GΩ, Y: 0.000 n to 9999.9 GS, θ: ± (0.000° to 180.000°), Q: ±(0.00 to 99999.99), Δ %: ±(0.0000% to 999.9999%)
  - **Basic accuracy**: Z: ±0.05% rdg, Y: ±0.03°
  - **Measurement frequency**: 4 Hz to 8 MHz (5 digits setting resolution, minimum resolution 10 mHz)
  - **Measurement signal level**: Normal mode: Voltage (Up to 1 MHz): 10 mV to 5 V (minimum 50 mV), 10 mΩ to 5 V (maximum 50 mV) for DC resistance measurement. Low impedance high accuracy mode: Voltage (Up to 1 MHz): 10 mV to 1 V (minimum 100 mV)
  - **Low impedance high accuracy mode**: CC mode: 0 Ω to 1000 Ω, 0 mA to 10 mA
  - **DC bias measurement**: Generating range: DC voltage 0 V to 2.50 V (10 mV resolution) in low Z high accuracy mode: 0 V to 1 V (10 mV resolution)
  - **Output impedance**: Normal mode: 100Ω, Low impedance high accuracy mode: 10Ω
  - **Options**
    - Equivalent circuit analysis firmware
    - Four-terminal probe (DC to 8 MHz)
    - Pincher probe ( Cable length 730 mm, DC to 8 MHz)
    - Test fixture (Direct connection type, DC to 8 MHz)
    - Four-terminal probe (DC to 200 kHz)

### Options

- **Options**: Equivalent circuit analysis firmware, Four-terminal probe (DC to 8 MHz), Pincher probe (Cable length 730 mm, DC to 8 MHz), Test fixture (Direct connection type, DC to 8 MHz), Four-terminal probe (DC to 200 kHz)

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**Model No. (Order Cord) IM3570**

Note: This product is not supplied with measurement probes or test fixtures. Please select and purchase the measurement probe or test fixture options appropriate for your application separately. For an RS-232C connection: A crossover cable for interconnection can be used. You can use the RS-232C cable 9637 without hardware flow control.
IM3590 CHEMICAL IMPEDANCE ANALYZER

Ideal for Measuring Electrochemical Impedance
High-precision, Easy-to-use Operation

- 1mHz to 200kHz wide frequency source ideal for measuring ionic behavior and solution resistance
- High-speed LCR and continuous sweep testing with a single unit
- Measure the internal impedance of batteries in no-load state
- Fastest test speed of 2ms enables rapid sweep measurements
- Basic accuracy of ±0.05% ideal for both component inspections and R&D
- Rich functions such as Cole-Cole plot and equivalent circuit analysis meet advanced applications in electrochemical and material impedance (LCR) testing

Model No. (Order Cord) IM3590 (For electrochemical components)
Note: Test fixtures are not supplied with the unit. Select an optional test fixture or probe when ordering. Probes are constructed with a coaxial cable with 50 Ω impedance characteristics. For an RS-232C connection: You can use the RS-232C cable 9637 without hardware flow control.

OPTIONS

- FOUR-TERMINAL PROBE 9500-10
- DC BIAS VOLTAGE UNIT 9208-10
- DC BIAS CURRENT UNIT 9209-10
- GP-IB INTERFACE Z3000
- RS-232C INTERFACE Z3001
- LAN INTERFACE Z3002
- FOUR-TERMINAL PROBE (DC to 8 MHz) L2000
- FOUR-TERMINAL PROBE (DC to 200 kHz) 9140-10

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<td><strong>Display range</strong></td>
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<td><strong>Basic accuracy</strong></td>
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<td><strong>Measurement frequency</strong></td>
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<td><strong>Measurement signal level</strong></td>
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PINCHER PROBE (cable length 730 mm, DC to 8 MHz) L2001
TEST FIXTURE (cable length 1m, DC to 8 MHz) 9261-10
TEST FIXTURE (direct connection type, DC to 8 MHz) 9262
SMD TEST FIXTURE (direct connection type, DC to 8 MHz) 9263
SMD TEST FIXTURE (DC to 120 MHz) 9677
SMD TEST FIXTURE (DC to 120 Hz) 9699
SMD TEST FIXTURE (DC to 6 MHz) IM9180
SMD TEST FIXTURE (DC to 1 MHz) IM9181
GP-IB CONNECTION CABLE (2 m) 9151-02
TEMPERATURE PROBE (Sheath type, 1m, waterproof) 9478
The IM9000 can automatically select the equivalent circuit model from the five typical models to minimize the differences between the measured values and the ideal frequency characteristics derived from the analysis results.

- An acceptance/rejection decision can be made for the L, C, and R elements comprising a part and the resonance sharpness (mechanical quality coefficient).
- A detailed decision can be made on the elements using the resonance of a piezoelectric element or inductor.

The Equivalent Circuit Analysis Firmware IM9000 Provides an Optional Function to Perform a Variety of Equivalent Circuit Analysis and Display Graphs

- Five equivalent circuit analysis (Auto/Fixed) patterns
- Acceptance/rejection decision for equivalent circuit elements
- Analysis results simulation
- Cole-Cole plot and admittance circle display

Cole-Cohe plot and admittance circle graphs that previously needed a PC to be displayed can now be shown on the IM3570 screen.

Model No. (Order Code) IM9000 (factory option firmware for the IM3570)

Note: The IM9000 is not included in the standard package. To use the IM9000 function, specify the option upon purchase. Customers who have purchased the Impedance Analyzer IM3570 can add the Equivalent Circuit Analysis Firmware IM9000 function. Please contact your local HIOKI representative.

Customers who have purchased the Impedance Analyzer IM3570 can add the Equivalent Circuit Analysis Firmware IM9000 function. Please contact your local HIOKI representative.

Model No. (Order Code) IM9000 (factory option firmware for the IM3570)
Features

- **Simple:** Automatic Selection of Equivalent Circuit Model
  The IM9000 can automatically select the equivalent circuit model from the five typical models to minimize the differences between the measured values and the ideal frequency characteristics derived from the analysis results.

- **Detailed:** Acceptance/Rejection Decision for Elements Comprising Part
  An acceptance/rejection decision can be made for the L, C, and R elements comprising a part and the resonance sharpness (mechanical quality coefficient). A detailed decision can be made on the elements using the resonance of a piezoelectric element or inductor.

Equivalent Circuit Analysis Firmware IM9000 Specifications

### Equivalent Circuit Model and Measurement Items

#### Three-element model

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Coil:</strong></td>
<td><strong>Capacitor:</strong></td>
</tr>
<tr>
<td>Core loss is large while ESR is small</td>
<td>Impact of the leakage resistance is large</td>
</tr>
<tr>
<td>Resistance:</td>
<td>Resistance:</td>
</tr>
<tr>
<td>ESR is relatively large and impact of the wire inductance is large</td>
<td>Resistance is large and impact of the floating capacitance is large</td>
</tr>
</tbody>
</table>

#### Four-element model

<table>
<thead>
<tr>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Diagram" /></td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Capacitor:</strong></td>
<td><strong>Capacitor:</strong></td>
</tr>
<tr>
<td>General capacitor</td>
<td>General capacitor</td>
</tr>
</tbody>
</table>

#### Measurement items (Three-element model)

- L1 (Inductance)
- C1 (Capacitance)
- R1 (Resistance)
- Qm (Resonance sharpness)
- fr (Resonance frequency)
- fa (Anti-resonance frequency)

#### Measurement items (Four-element model)

- L1 (Inductance)
- C1 (Capacitance)
- R1 (Resistance)
- C0 (Parallel capacitance)
- Qm (Resonance sharpness or mechanical quality coefficient)
- fr (Resonance frequency)
- fa (Anti-resonance frequency)
- fs (Series resonance frequency)
- fp (Parallel resonance frequency)
- fm (Maximum admittance frequency)
- fn (Minimum admittance frequency)
- f1 (Maximum susceptance frequency)
- f2 (Minimum susceptance frequency)

Other functions

<table>
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<tr>
<th>Circuit model selection</th>
<th>AUTO (automatic selection) / HOLD (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation execution</td>
<td>AUTO (estimation is executed after frequency sweep ends) / MANUAL (estimation is executed by the user)</td>
</tr>
<tr>
<td>Sweep range using estimation</td>
<td>Normal sweep: Analysis is performed in the sweep range from the analysis start frequency to the analysis end frequency Segment sweep: Analysis is performed in the sweep range of the set segment number</td>
</tr>
<tr>
<td>Simulation</td>
<td>Enables displaying and comparing the ideal frequency characteristics graph derived from the analysis results or the values specified by the user</td>
</tr>
</tbody>
</table>

Comparator

- Runs a comparator on the analysis results and outputs the decision results to LCD, EXT, I/O, R1, L1, C0, Qm: HI/IN/LO, absolute value setting

Display position of estimation results

- Select the display position from upper, lower, left or right

X-Y display

- Cole-Cole plot:
  Set Rs to the first measurement item, X to the third measurement item, reverse the polarity of the third measurement item, and set correction coefficient A = 1 for scaling correction
- Admittance circle display:
  Set G to the first measurement item and B to the third measurement item
**Probes and Test Fixtures for Lead Components**

**FOUR-Terminal Probe L2000**
- Direct connection type, DC to 200 kHz, 50Ω
- Measurable sample size: 1 mm (0.04 in) to 2 mm (0.08 in)
- Contact tips IM901 (compatible tip sizes: 1005 to 750 (JIS))
- Contact tips IM902 (compatible tip sizes: 601 to 570 (JIS))
- Diameter: ø0.3 mm (0.01 in) to 2 mm (0.08 in)

**SMD Test Fixtures**
- **SMD Test Fixture IM9100**
  - Compatible with 0402-, 0603-, and 1005-size SMDs, DC to 8 MHz, 4-terminal electrode design
  - Measurable range: DC to 1 MHz, For SMD with electrodes on side
  - Measurable sample sizes: 080504 (EIA), 0201 (JIS), Please contact HIOKI for information about other sizes
  - Direct connection type

- **SMD Test Fixture IM9110**
  - Measurable sample sizes: 080504 (EIA), 0201 (JIS)
  - Direct connection type

- **SMD Test Fixture IM3533-01**
  - Measurable sample sizes: 080504 (EIA), 0201 (JIS)
  - Direct connection type

- **SMD Test Fixture IM3570**
  - Measurable sample sizes: 080504 (EIA), 0201 (JIS)
  - Direct connection type

- **SMD Test Fixture IM3590**
  - Measurable sample sizes: 080504 (EIA), 0201 (JIS)
  - Direct connection type

**HIOKI LCR Fixtures and Probes**

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<tr>
<th>3506-10</th>
<th>3504 series</th>
<th>IM3536</th>
<th>IM3523</th>
<th>IM3533</th>
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<th>IM3570</th>
<th>IM3590</th>
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<tr>
<td>LCR</td>
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<td>LCR</td>
<td>LCR</td>
<td>LCR</td>
<td>LCR</td>
<td>LCR</td>
</tr>
<tr>
<td>1 kHz/1 MHz</td>
<td>120 kHz/1 kHz</td>
<td>40 kHz to 200 kHz</td>
<td>1 kHz to 200 kHz</td>
<td>1 kHz to 200 kHz</td>
<td>4 kHz to 5 MHz</td>
<td>1 kHz to 200 kHz</td>
<td></td>
</tr>
</tbody>
</table>

- **IM9100**
  - SMD Test Fixture
  - DC to 8 MHz, 50Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **IM9110**
  - SMD Test Fixture
  - DC to 1 MHz, 50Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9140**
  - 4-Terminal Probe
  - DC to 100 kHz, 75Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9261-10**
  - Test Fixture
  - DC to 5 MHz, 50Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **L2001**
  - Pin Type Probe
  - DC to 8 MHz, 50Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9262**
  - Test Fixture
  - DC to 8 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9263**
  - SMD Test Fixture
  - DC to 8 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9677**
  - SMD Test Fixture
  - DC to 120 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9699**
  - SMD Test Fixture
  - DC to 120 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9268-10**
  - DC Bias Voltage Unit
  - 40 Hz to 8 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9269-10**
  - DC Bias Current Unit
  - 40 Hz to 2 MHz
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

- **9500-10**
  - 4-Terminal Probe
  - DC to 200 kHz, 50Ω
  - ✔ ✔ ✔ ✔ ✔ ✔ ✔ ✔

*External voltage or current power supply required*

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https://www.hioki.com/

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