NOISE HiLOGGER 3145-20
NOISE SEARCH TESTER 3144-20
Optical and Network Measurement Instruments

For support the Investigation and the measures of the noise disorder

- Specially designed for on-site noise measurements
  Locate and develop countermeasures against noise interference
- Non-contact measurements for simplicity and safety
  Measure noise on active power, telecom and ground lines without interruption
- Capture even one-shot noise
  Measure lightning surges, contact opening/closing surges and ESD noise

www.hioki.com
Have you ever had a problem with electronic device faults and telecommunications interference?

**Device malfunctions**

**Device damage**

**Network connection problems**

**Slow data communications, etc.**

How do you know if the noise ingress is from the device’s power, telecom or earth line?

HIOKI’s series of noise measurement instruments are designed to help your investigation.

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**Optimal frequency range for measuring conducted noise**

Check for broad ranges of noise at one time: Model 3145-20 measures noise between 10 kHz and 100 MHz, and Model 3144-20 measures noise between 500 Hz and 30 MHz.

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**Clamp-Type Noise Sensor (Non-Contact)**

Detect noise without contact, and earth-free (Model 9754). Because measurement requires no electrical contact, there’s no need to worry about interfering with communications, electric shock or short circuits, and use is simple and safe even in active-line conditions.

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The Clamp-On Noise Sensor 9754 detects noise current, and the Clamp-On Voltage Sensor 9741 detects noise voltage. Measure noise just by clamping around telecom, power and earth lines.

(The Clamp-On Voltage Sensor 9741 requires grounding)
The impedance of an earth line is proportional to its length and frequency. When noise current flows in an earth line, the resulting noise voltage may swing the potential of an electronic device to cause noise interference.

Using the NOISE HiLOGGER 3145-20 with the Clamp-On Noise Sensor 9754, the noise current level and frequency of the earth line can be measured simply, without direct contact.

One-shot noise such as from lightning surges, contact opening/closing surges and electrostatic discharges is captured using the peak-detection function (Model 3145-20).

With a spectrum analyzer
- One-shot noise cannot be reliably detected while sweeping the measurement range at a particular sweep frequency.

With FFT functions
- One-shot noise that occurs during the dead time cannot be detected with an FFT analysis function of a digital oscilloscope.

With the NOISE HiLOGGER 3145-20
- The 3145-20 is designed to measure noise that changes frequency or level over time, as well as one-shot noises such as surges.

High-end functionality in Model 3145-20, or the compact light weight Model 3144-20

<table>
<thead>
<tr>
<th>No.</th>
<th>Application</th>
<th>Model 3145-20 (High-End Functionality)</th>
<th>Model 3144-20 (Simple and Economical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Measuring earth line noise</td>
<td>☐ Clamp-only, earth-free connection</td>
<td>☐ Grounding required</td>
</tr>
<tr>
<td>2</td>
<td>Measuring surge and electrostatic noise</td>
<td>☐ Peak detection of one-shot noise</td>
<td>☐ Frequency range from power systems to CB transmissions (500 Hz to 30 MHz)</td>
</tr>
<tr>
<td>3</td>
<td>Measuring noise on power and telecom lines</td>
<td>☐ Frequency range from inverters to FM transmissions (10 kHz to 100 MHz)</td>
<td>☐ Records to internal memory View time-series graphs with supplied PC application program</td>
</tr>
<tr>
<td>4</td>
<td>Recording noise level fluctuations</td>
<td>☐ Logging function</td>
<td>☐ -</td>
</tr>
<tr>
<td>5</td>
<td>Compare noise levels</td>
<td>☐ Settable noise level threshold</td>
<td>☐ -</td>
</tr>
<tr>
<td>6</td>
<td>Determining when noise events occur</td>
<td>☐ Alarm function</td>
<td>☐ -</td>
</tr>
<tr>
<td>7</td>
<td>Measuring and monitoring remote sites</td>
<td>☐ Remote control via LAN</td>
<td>☐ -</td>
</tr>
<tr>
<td>8</td>
<td>Analyzing results on a personal computer</td>
<td>☐ PC application program supplied</td>
<td>☐ -</td>
</tr>
<tr>
<td>9</td>
<td>Measurements that require portability</td>
<td>☐ 90-minute rechargeable batteries</td>
<td>☐ Runs for five hours on six alkaline AA batteries</td>
</tr>
</tbody>
</table>

Noise current measurement
- The 9754 sensor (option for Model 3145-20) measures noise current.
- Noise current measurement is ideal for determining the noise propagation route from the point of ingress, and for measuring earth line noise.
- Measurement with the 9754 is earth-free (no grounding required).

Noise voltage measurement
- Electronic devices normally operate at a specific voltage level.
- Noise voltage measurement can determine whether noise is the cause of damage from exceeding a safe threshold or of malfunction due to inadequate noise margin.
- The 9741 Sensor (supplied with Model 3144-20) measures noise voltage.
- Noise voltage measurement with the 9741 requires grounding to establish a reference potential.

Noise current and voltage measurements have the following features.
- Noise current Measurement: The 9754 sensor measures noise current.
- Noise voltage Measurement: The 9741 sensor measures noise voltage.

Some other specifications differ for the two models, so please select a model according to your application.
NOISE HiLOGGER 3145-20
High-end functionality noise measurement instrument provides long-term recording and remote control functions.

Color LCD Noise Level Display
View instantaneous values of measured noise, and noise level variations over time.

The 3145-20 separates noise between 10 kHz and 100 MHz into seven frequency bands, and displays the noise current level of each band as one bar in a bar graph, which is refreshed every 100 ms. Just clamp around a signal line and start measuring immediately.

Monitoring Measurement
View instantaneous noise levels in a bar graph

Noise levels are displayed in a bar graph on the 3145-20

- **Peak Bar**: Peak Noise Level
- **Numerical Display**: View Instantaneous or Maximum Values
- **Level Bar**: Present Noise Level
- **Bands**: Displays Seven Frequency Ranges

Easily view the noise current level in each band. The displayed bar graph exposes the characteristics of the noise.

Current Ranges (using Model 9754 Sensor)

<table>
<thead>
<tr>
<th>Current Ranges</th>
<th>200 mA range</th>
<th>2.0 mAp-p to 280.0 mAp-p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 A range</td>
<td>0.020 Ap-p to 2.800 Ap-p</td>
<td></td>
</tr>
<tr>
<td>20 A range</td>
<td>0.20 Ap-p to 28.00 Ap-p</td>
<td></td>
</tr>
</tbody>
</table>

Voltage Ranges

<table>
<thead>
<tr>
<th>Voltage Ranges</th>
<th>10 mV range</th>
<th>0.20 mVp-p to 14.00 mVp-p</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mV range</td>
<td>2.0 mVp-p to 140.0 mVp-p</td>
<td></td>
</tr>
<tr>
<td>1 V range</td>
<td>0.020 Vp-p to 1.400 Vp-p</td>
<td></td>
</tr>
</tbody>
</table>

Monitoring on an oscilloscope

Noise waveform details can be measured, but the kind of noise cannot be determined.
**Logging Measurement**

**Record noise level variations over time**

Variations in the noise levels of the seven frequency bands over time are recorded in the instrument’s internal memory. By analyzing logged data, long-term and periodic noise levels can be captured and the timing of the noise occurrence can be determined. The recording interval can be set from 1 to 60 seconds. The peak level of noise measured within each recording interval is recorded.

**Automatically save data to a memory card while measuring**

Measurement data can be automatically saved to a PC Card. For continuous long-term recording, cards up to 1 GB are supported. Data saved to a PC Card can be analyzed on a personal computer using the supplied DATA VIEWER program for Model 3145-20.

**Intended Recording Time**

<table>
<thead>
<tr>
<th>Recording Interval</th>
<th>Internal Memory</th>
<th>Using a PC Card (128 MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 s</td>
<td>16 days</td>
</tr>
<tr>
<td></td>
<td>2 s</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td>5 s</td>
<td>2.5 months</td>
</tr>
<tr>
<td></td>
<td>10 s</td>
<td>5 months</td>
</tr>
<tr>
<td></td>
<td>20 s</td>
<td>10 months</td>
</tr>
<tr>
<td></td>
<td>30 s</td>
<td>15 months</td>
</tr>
<tr>
<td></td>
<td>60 s</td>
<td>2.5 years</td>
</tr>
</tbody>
</table>

*Note: Recording times are calculated values, and cannot be guaranteed.*

**Charge the battery pack while operating (with Battery Pack Model 9447)**

The battery charges while measuring. If an unexpected power outage occurs during long-term recording, measurement continues on battery power, greatly improving the reliability of long-term measurements.

**What happens when power is lost while measuring?**

- If no battery pack is available for power backup, measuring is interrupted and data in the instrument’s memory is lost after about ten minutes.
- If Auto Save is enabled when using a PC Card, data measured up to one minute before a power outage is saved on the PC Card.
- Recovery to the pre-outage state is available with the Start Backup function.

**Alarm Function**

**An alarm sounds when the noise level exceeds a specified threshold**

**Using the Alarm Function**

Noise occurrences can be quickly discovered by setting the alarm threshold at the ambient noise level during normal conditions.

While logging measurements, the date and time of alarm events are recorded, so you can see precisely when rare noise interference events occur.

The e-mail notification function sends an e-mail to an office PC or cell phone when the noise at a remote location triggers an alarm event.

*Note: a LAN environment is necessary for e-mail.*
Communication Function | Remote Operation (Remote Measurement via HTTP Server)

The instrument’s settings, data acquisition and screen monitoring can be controlled via an Internet browser such as Internet Explorer.

- REMOTE CONTROL
- DATA GET BY FTP
- START/STOP
- CURRENT DATA DISP
- MEMORY DATA GET
- COMMENT SET

Remote Operating Screen
- The browser displays a working emulation of instrument’s control panel.
- Keys on the emulated panel work just like those on the instrument.

Starting and Stopping Measurement
- Start and stop measurement from your web browser.
- Real-time measurement conditions are displayed.

Communication Function | E-Mail Sending

An e-mail can be sent to a PC in a local network or located remotely when measurement stops, an alarm occurs, upon recovery from power outage, or when internal memory or a PC Card becomes full.

[E-Mail Example]
PC Application Program: DATA VIEWER for the 3145-20

This program allows data logged by the NOISE HiLOGGER to be viewed on a PC. Additional functions include searching measurement data according to specified criteria, time-series graph printing and converting measurement data to CSV format.

Operating environment
- Compatible OS: Windows 2000, XP, Vista, 7 (64-bit support limited to Windows 7) For system environment settings such as CPU, memory and display, use an environment which conforms to that recommended by your OS.
- HDD space: 10 MB or more of free disk space

Graph Display
Graphically displays recorded measurement data as a time series.

Cursor Function
Displays the time and measurement values at A/B cursor positions.

Numerical Value Display
Displays the numerical values of recorded measurement data.

Measurement Data Searching
Search criteria: current level, alarm level and peak level events can be specified and searched.

Day Display Example
Display data by day, week or month.

By viewing data in a Day Display, noise variations throughout the day can be seen at a glance.

Printing and Report Generation
- Print measurement data as a time-series graph.
- Capture an image of the displayed graph and copy it into Word or other programs.
- Paste an image of the displayed graph into other programs when generating reports.
- Print from the Application Program.
To investigate computer malfunctions, measure the noise current on a LAN cable using the NOISE HILOGGER 3145-20.

Clamp the CLAMP ON NOISE SENSOR 9754 around the LAN cable and monitor the NOISE HILOGGER display.

Results

The effectiveness of the noise suppression is obvious.

Noise Measurement Example using the Logging Function

Electronic device malfunctions sometimes occur intermittently. Although noise is a likely cause, it may be difficult to confirm with the monitor function if it is intermittent.

We could capture the noise waveform using the trigger function of an oscilloscope, but that doesn't give much information about the frequency and level of the noise, so the trigger settings may not be useful.

One-shot noise that occurs intermittently can be captured by the Peak Detection function. Once the frequency and level of the noise that causes the malfunction are known, appropriate noise suppression steps can be taken characteristics.

The time needed to resolve noise interference problems can be shortened.

Select the measurement range and recording interval, and start logging.

The noise level is constant and no device malfunctions occur.

Measurement Range Selection

Begin with the following settings:

- Telecom Line: 200 mA range
- Power and Earth Lines: 2 A range
- Lightning Surges: 20 A range

An electronic device malfunction occurred.

The characteristics of the noise and time of malfunction are indicated on the 3145-20's Logging screen.

- At the time of the device malfunction, a fluctuation in the 60 MHz noise level is evident.
- Nominal level: 0.060 A
- Level at the time of malfunction: 0.600 A

The noise level becomes ten times greater.
NOISE SEARCH TESTER Model 3144-20

Compact, light weight noise measurement tool handles like a hand-held tester

Features

- **Non-contact voltage sensor**
  Find noise in active circuits without disrupting signals or damaging cables.

- **Measures from 500 Hz to 30 MHz**
  Covers a broad frequency range, from power line noise to CB transmitters.

- **Level meter display on a large LCD**
  Noise is detected and displayed separately for each frequency band.

- **Peak-Hold function**
  Displays the peak voltage and its measurement time in each frequency band.

- **Logging function for long-term monitoring**
  Records up to 64,000 measurement points (levels and times).

- **USB interface included**
  With the supplied PC application program, transfer data to a PC, display time-series data and output to a printer.

- **Powered by battery or AC adapter**
  Supports both portable on-site measurements and long-term monitoring.

On-Site Measurement / Monitor Function

The Noise Search Tester measures noise from 500 Hz to 30 MHz in seven bands, and displays the noise voltage in each band as one of seven bars on the level meter. Measurement is performed just by clamping the CLAMP ON VOLTAGE SENSOR 9741 around the line of interest. Noise levels can thus be monitored easily in the active-line state, without removing insulation.

Record to Internal Memory / Logging Function

Measured levels and times are stored into internal memory at the specified recording interval. Two recording modes can be selected from the following:

- **Auto-Stop Mode**
  Recording stops when internal memory becomes full. Use this mode to retain all data recorded during the measurement period.

- **Overwrite Mode**
  Recording continues, overwriting the oldest data. By measuring in this mode continuously, the important data is captured whenever an anomaly occurs.

The Peak-Hold function displays the peak values and times of occurrence in each frequency band.

Analyzing Recorded Data on a PC / Bundled Application Program

The supplied PC program quickly transfers recorded data from the Tester to a PC. Measured noise levels and times can be viewed on a graph, saved as BMP files and printed, for use in generating reports.

Operating environment

- **Compatible OS:** Windows 2000, XP, Vista, 7 (64-bit support limited to Windows 7) For system environment settings such as CPU, memory and display, use an environment which conforms to that recommended by your OS.
- **HDD space:** 10 MB or more of free disk space.
Specifications

Model 3145-20

<Input Section>

Input terminal: BNC jack
Max. input voltage (between terminals): 5 V peak
Max. rated voltage to earth: +5 V
Frequency range: 5 kHz to 100 MHz (-3 dB range)

Specifications - Model 3145-20

<table>
<thead>
<tr>
<th>Measured parameter</th>
<th>Measurement parameter</th>
<th>Measurement Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>200 mA</td>
<td>2.0 mA to 280.0 mA</td>
</tr>
<tr>
<td></td>
<td>2 A</td>
<td>0.05 A to 2.90 A</td>
</tr>
<tr>
<td></td>
<td>20 A</td>
<td>0.20 A to 28.0 A</td>
</tr>
<tr>
<td>Voltage</td>
<td>50 mV</td>
<td>0.20 mV to 14.00 mV</td>
</tr>
<tr>
<td></td>
<td>100 mV</td>
<td>2.0 mV to 140.0 mV</td>
</tr>
<tr>
<td></td>
<td>1 V</td>
<td>0.002 V to 1.40 V</td>
</tr>
</tbody>
</table>

Measurement system: Seven continuous bands defined by BPFs, measuring the peak value in each band
BPF configuration (BPF characteristics): Q = 1, -40 dB/decade roll-off

Peak value detection method: Waveform peak detection
(for bands with fo = 15, 70 and 250 kHz, and 1 MHz Level comparator
(for bands with fo = 5, 20 and 60 MHz

Measurement accuracy (at center frequency to each band, 0 to 40°C and up to 80% RH)
- 1.5, 70 and 250 kHz, and 1 MHz bands

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Signal Level</th>
<th>Band Center Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 kHz</td>
<td>±1% rdg</td>
<td>15 kHz to 250 kHz</td>
</tr>
<tr>
<td>2 A</td>
<td>±1% rdg</td>
<td>70 kHz to 250 kHz</td>
</tr>
<tr>
<td>20 A</td>
<td>±1% rdg</td>
<td>1 MHz</td>
</tr>
</tbody>
</table>

- 2.5, 20, and 60 MHz bands

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Signal Level</th>
<th>Band Center Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 kHz</td>
<td>±1% rdg</td>
<td>5 MHz</td>
</tr>
<tr>
<td>2 A</td>
<td>±1% rdg</td>
<td>20 MHz</td>
</tr>
<tr>
<td>20 A</td>
<td>±1% rdg</td>
<td>60 MHz</td>
</tr>
</tbody>
</table>

<Functional Specifications>

Monitor function: Displays real-time peak-to-peak values in each frequency band on level meters
Measured values: Peak-to-peak
Display method: Level meter plus instantaneous or maximum values
Refresh interval: 100 ms
Peak-Hold function: Retains display of the maximum value measured in each band

Logging function: Records maximum peak-to-peak values in each frequency band at the specified recording interval to internal memory, and displays a time-series graph
Recording interval: 1, 2, 5, 10, 20, 30, or 60 s
Recording duration: Determined by memory capacity
Time-series graph display method: Full Screen, Time-Series Graph & Most-Recent Values or Time-Series Graph & Maximum Values
Time-series graph zoom: Zooms in/out along the time axis
Cursur function: Displays measured value at cursor position

Alarm function: While logging or display monitoring, a selected operation is performed when specified criteria are met
Alarm criteria: Level settings can be specified for each band (Logical OR criteria)
Alarm operations: Audible beeps, Display indication, Trigger output, E-mail notification

Event Mark function: Up to 100 Event Marks can be entered while logging
I/O functions:
<table>
<thead>
<tr>
<th>(1) External trigger input</th>
<th>Events Mark while logging</th>
</tr>
</thead>
<tbody>
<tr>
<td>- (a) External trigger</td>
<td>- (a) External trigger</td>
</tr>
<tr>
<td>- (b) External trigger</td>
<td>- (b) External trigger</td>
</tr>
<tr>
<td>- (c) External trigger</td>
<td>- (c) External trigger</td>
</tr>
</tbody>
</table>

Filter function: Storage media: PC Card
Saving format: Dedicated Model 3145-20 format, text, settings file, screen capture images (BMP format)
Communication functions: HTTP server for screen display and remote control
FTP server for data acquisition from internal memory and PC Card
E-mail sending upon alarm events

<PC Application Program Specifications>

Reads the dedicated Model 3145-20 format, displays logged data, cursor function, search function, text file conversion, printing and screen capture

Applicable standards:
- EN61010-1:2001, Pollution degree 2, Measurement category I (anticipated transient overvoltage 3500 V)
- EN61000-3-2:2000+A2:2005

External memory: PC Card slot: One 68-pin PC Card Standard-compliant Type II slot (supports Type I and II)
Card type: Flash ATA Cards (Hot brand)
Stored content: Settings, measurement data (text or proprietary Model 3145 format), screen capture images (BMP format)
Display: Device type: 5.7-inch STN color LCD
Display characteristics: English or Japanese, selectable
Power supply: AC Adapter Model 9418-15 (provides 12 V DC ±5%)
AC Adapter rated input voltage 100 to 240 V AC
AC Adapter input frequency 50/60 Hz
Battery Pack Model 9447
Charging function: The AC adapter charges the Battery Pack 9447
Quick-charge time: 2.5 hours or less (82°C, with High backlight setting)

Model 9754

<Product Specifications>

Frequency range: 1 kHz to 100 MHz (-3 dB)
Rated current: AC 10 A
Maximum current: 15 A peak
Output voltage ratio: 0.1 V/A
Amplitude accuracy: ±0.0% rdg, ±0.01% f.s. (90 A f.s.)
(f = 15 kHz, with conductor centered in clamp)
Amplitude accuracy: 1 year (approx. 10,000 clamp open/close cycles)
Conductor position effect: ±0.4% or less
Residual current characteristic: 40 mA or less
Maximum rated voltage to earth: CATIII 600 V, CATIII 300 V (insulated conductor)
Operating environment: Up to 2000 m ASL, indoors

Operating temperature & Humidity: 0°C (32°F) to 40°C (104°F), up to 80% RH (non-condensating)
Measureable conductor diameter: up to 20mm (0.79 in)
Sensor cable length: Approx. 2m (6.56 ft)
External dimensions: Sensor: Approx. 176mm (6.93") W x 68mm (2.7") H x 27mm (1.06") D
Terminator: Approx. 27mm (1.06") W x 55mm (2.17") H x 19mm (0.75") D
Mass: Approx. 450g (15.9 oz)
Accessories: Instruction Manual
Applicable standards: Safety: EN61010-1:2001, Pollution degree 2, Type B current sensor measurement categories II and III (anticipated transient overvoltage 4000 V), Pollution degree 2
### Model 3144-20

#### <General Specifications>

- **Input terminals:** Dedicated terminal for Model 9741, BNC jack (9741 has priority)
- **Input impedance:**
  - 9741 input: $50 \, \Omega \pm 10\%$
  - BNC input: $50 \, \Omega \pm 10\%$
  - $1 M\Omega \pm 10\% / 120 \, \text{pF} \pm 30 \, \text{pF}$
- **Maximum input voltage:** 5 Vp-p
- **Frequency range:** 500 Hz to 30 MHz, in 7 contiguous ranges (-3 dB)
- **Audio monitoring:** Output of envelope-detected signal
- **Communication function:** Transfers recorded data from the 3144-20’s internal memory to a PC
- **Interface:** USB Ver. 1.1

#### <Output function>

- **Waveform monitoring:** Outputs the signal from the 9741 dedicated input or the BNC input
- **Frequency range:** 500 Hz to 30 MHz (-3 dB, 50 Ω termination)
- **Input impedance:** $50 \, \Omega \pm 10\%$ (5 kHz bandwidth)
- **Input-output ratio:** 2.1 (50 Ω termination)
- **Input accuracy:** ±5% rdg. ±10 mV (50 Ω termination)
- **Max. open-circuit voltage:** ±4.5 V

#### <Communication function>

- **Power:** Six AA-size (LR6) alkaline batteries, 9 V DC, 500 mA
- **(AC Adapter Model 9445-02 or 9445-03, input voltage: 100 to 240 V AC, 50/60 Hz, max. rated current: 250 mA)**
- **Continuous operating time:** Approx. 5 hours (on battery power)
- **Operating temperature & humidity:** 0°C (32°F) to 40°C (104°F), up to 80% rh (non-condensing)
- **Low battery warning:** The low-battery indicator appears when supply voltage drops to approx. 6.5 V
- **Time setting:** Year, month, day, hour, minute and second by key entry
- **Applicable standards:** Safety: EN61010-1:2001, Measurement category I, Pollution degree 2, anticipated transient overvoltage 330 V
- **Dimensions:** Approx. 93 mm (3.66 in) W × 179 mm (7.04 in) H × 46 mm (1.81 in) D
- **Mass:** Approx. 450 g (15.9 oz)
- **Accuracy guaranty period:** 1 year
- **Product guaranty period:** 3 years
- **Functions of bundled application program:**
  - Data list display, time-series data waveform display, display of peak values and peak detection times, saving data, saving screen image to BMP printing

### Model 9741

#### <Product Specifications>

- **Sensor type:** Electrostatically coupling non-contact voltage sensor
- **Frequency range:** 600 Hz to 300 MHz (-3 dB bands or more to 100 kHz)
- **Sensor output:** Voltage
- **Output impedance:** $50 \, \Omega \pm 10\%$ (81 kHz)
- **Measurable conductor diameter:** up to 20 mm (0.79 in)
- **Maximum rated voltage to earth:** 200 V AC
- **Cable length:** Approx. 1 m (3.28 ft)

#### <Supply Specifications>

- **Supply voltage:** ±5 V (via connection to Model 3144-20)
- **Operating temperature & humidity:** 0°C (32°F) to 40°C (104°F), up to 80% rh (non-condensing)
- **Applicable standards:** Safety: EN61010-1:2001, Measurement category III
- **Pollution degree:** 2, anticipated transient overvoltage 4000 V
- **Dimensions:** Approx. 62 mm (2.44 in) W × 158 mm (6.22 in) H × 40 mm (1.57 in) D
- **Mass:** Approx. 260 g (9.2 oz)
- **Accuracy guaranty period:** 1 year
**NOISE HILOGGER 3145-20**

Supplied Accessories: AC ADAPTER 9418-15 x1, PC Application Disc (CD-R) x1, Carrying Strap x1, Carrying Case x1, Instruction Manual x1, Measurement Guide x1, Ferrite Chokes x3

*Note: Measurement is not possible with the NOISE HILOGGER 3145-20 alone. The CLAMP ON NOISE SENSOR 9754 is required.*

**NOISE SEARCH TESTER 3144-20**

Supplied Accessories: CLAMP ON VOLTAGE SENSOR 9741 x1, Carrying Case x1, PC Application Disc (CD-R) x1, AA-size (LR6) alkaline batteries x6, USB cable x1, AC ADAPTER 9445-02 (UL Type) x1 or 9445-03 (CE Type) x1, Earphone x1, Strap x1, Instruction Manual x1

*Note: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies.*

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**Options for Model 3145-20**

**Peripherals and PC-Related Options**

- RS-232C CABLE 9612 9-pin mini DIN to 9-pin D-sub cross-over cable for PC, 1.5 m length
- LAN CABLE 9642 Straight-through cable with cross-over adapter, 5 m length
- RS-232C CABLE 9721 9-pin mini DIN to 9-pin D-sub straight-through cable for modem, 5.5 m length
- PC Card Slot (Type II)
- AC ADAPTER 9418-15 100 to 240 V AC, Output 12 V 2.5 A
- BATTERY PACK 9447 7.2 V, 2400 mAh
- CHARGE STAND 9643

**Power-Related Options**

- BATTERY PACK 9447 7.2 V, 2400 mAh
- CHARGE STAND 9643

**Clamp-On Noise Sensor**

CLAMP ON NOISE SENSOR 9754

**Carrying Case Packing Example**

- [Stowed items]
  - 3145-20 main unit
  - (AC Adapter 9418-15 with power cord)
- The following are options:
  - CLAMP ON NOISE SENSOR 9754
  - BATTERY PACK 9447
  - CHARGE STAND 9643

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**Model 3145-20 Main Device Only**

- RS-232C Terminal 9-pin mini DIN
- LAN Connector (10BASE-T)
- PC Card Slot (Type II)
- Display (5.7-inch Color STN LCD)
- External Trigger In/Out Terminals
- Battery Compartment on Rear
- Input Connector for Model 9741 Clamp-On Voltage Sensor
- Output Jack
- LAN Connector (10BASE-T)
- Earphone Jack
- AC Adapter Jack
- Volume Control
- Grounding Terminal
- USB Port

**Model 3144-20 Main Device Only**

- BNC Input Jack
- Input Selector Switch
- BNC Jack for Clamp-On Noise Sensor
- Screen Contrast Adjustment
- Peripherals and PC-Related Options
  - CLAMP ON NOISE SENSOR 9754
  - Power-Related Options
  - PC CARD 128M 9726 (128 MB capacity)
  - PC CARD 256M 9727 (256 MB capacity)
  - PC CARD 512M 9728 (512 MB capacity)
  - PC CARD 1G 9729 (1 GB capacity)

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All information correct as of Sep. 20, 2011. All specifications are subject to change without notice.