

## 1105 IN-CIRCUIT HiTESTER

Automatic Test  
Equipment



### Detection of Reversely Mounted Electrolytic Capacitors Capable of Detecting Lifted IC Leads

#### A leading-edge tester designed for high-density boards

The 1105 IN-CIRCUIT HiTESTER retains many of the outstanding characteristics of the 1102 IN-CIRCUIT HiTESTER, including stable wide-range measurement and fast inspection capabilities. Furthermore, when used with a personal computer and a standard OS, the 1105 provides better general-purpose utility and expandability, more sophisticated functions, and better operability. Also available is a special in-line model which provides an automatic inspection line.



**ISO14001**  
JQA-E-90091



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HIOKI company overview, new products, environmental considerations and other information are available on our website.

Sophisticated Functions/High Detection Rate

# A Tool for Improving Board Quality

The 1105 IN-CIRCUIT HiTESTER maintains the performance standards of the 1102 and is capable of stable measurement of even fine-pitch, high-density boards, due to the rigid press and cabinet. The 1105 also enables maintenance-free operation, as mechanical relays (reed relays) that have a limited operational life have been completely replaced by semiconductor switches in the scanner (MPX board) and the measurement system.



## High Detection Rate

### Wide-range measurement

Measurement over a wide range is possible: inductance (L) from 1  $\mu$ H to 400 H; capacitance (C) from 10 pF to 400 mF; and resistance (R) from 0.4 ohms to 40 Mohms.

### Maximum of 10,000 measurement steps

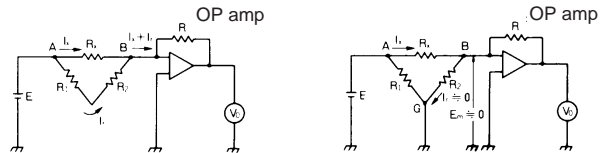
The maximum number of pins that can be measured is 2048 (using optional equipment). In the standard unit, the maximum number of inspection steps is as high as 10,000.

### Detection of photocoupler and digital transistor

The 1105 can determine whether photocouplers are mounted, and can evaluate them. Digital transistors (transistors with resistors) can also be detected easily, as can 25-V Zener diodes.

### Guarding

Component testing utilizes a “guarding” function, which permits measurement of the mounted value of each component in the same state as if it were independent of the surrounding circuitry. A maximum of five points can be guarded per step.

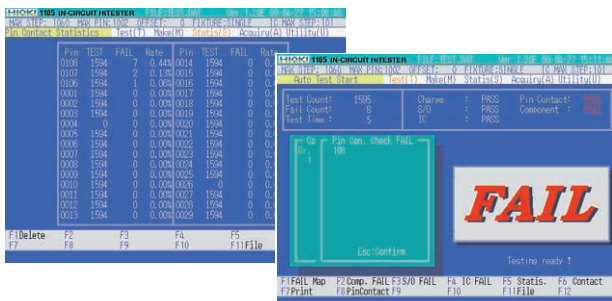


(1) Without guarding  
Measurement is affected by the current  $I_r$  from the surrounding circuitry.

(2) With guarding  
Since  $E_m$  is approximately “0”,  $I_r$  is approximately “0”, so only  $I_x$  is measured.

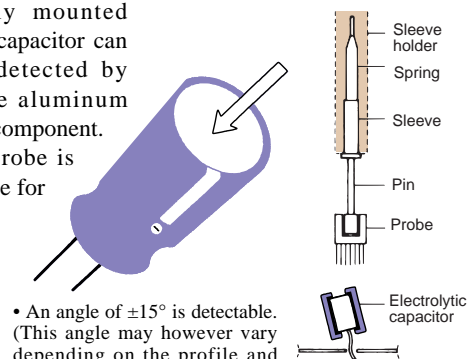
## Pin Contact Integrity Check Function

Probe contact integrity can be confirmed, to avoid errors resulting from poor contact during testing. This function helps ensure product testing reliability.



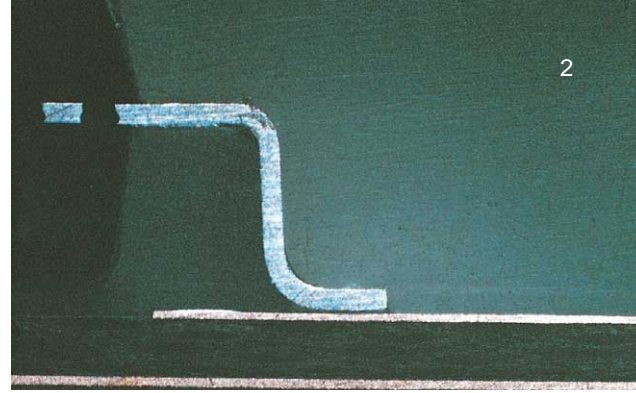
## Detection of reversely mounted electrolytic capacitors (optional)

A reversely mounted electrolytic capacitor can easily be detected by probing the aluminum case of the component. A special probe is also available for small and angled capacitors.



• An angle of  $\pm 15^\circ$  is detectable. (This angle may however vary depending on the profile and mounting condition of the capacitor.)

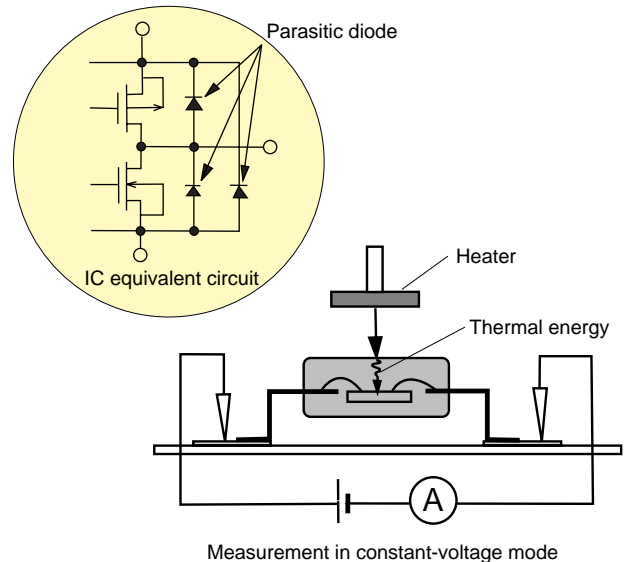
# Detection of Lifted IC Leads



## HiSCAN (Optional Equipment)

### How HiSCAN works

The forward voltage of a diode varies with the temperature. When the temperature of the diode is changed with a constant voltage applied, the current will be altered. Utilizing this temperature characteristic, the HiSCAN detects lifted IC leads. When the temperature of an IC is changed, and the current variation in protective diodes and parasitic diodes connected between the power pad or ground pad and the signal pad of the IC is measured, a substantial difference is observed between the measurements obtained using normal leads and lifted leads.



### Reliable detection

The HiSCAN reliably detects lifted leads according to the diodes' characteristics, without being significantly affected by variations in the ambient temperature or the features of the under-testing board.

### IC data-free measurement

The data used for operation is acquired by the HiSCAN from a board of good quality. Operation is simple and separate device information is not required.

### Bonding-wire breakage detection

The HiSCAN can detect bonding-wire breakage inside the IC, as well as damaged diodes.

### Compatible with various types of devices

The HiSCAN supports not only QFP and SOP, but J-lead, BGA, and many other types of devices.

### Detection of reversely mounted ICs

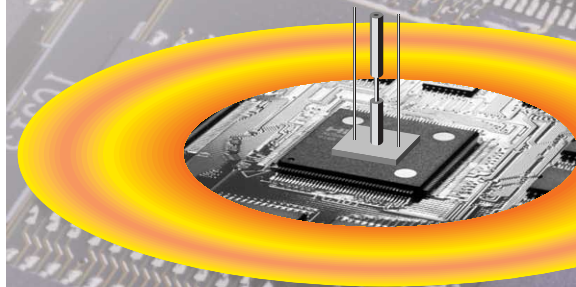
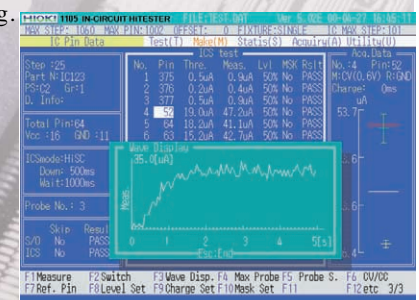
The HiSCAN also has the capability to detect reversely mounted ICs, and to determine the pin short/open condition. This enables comprehensive on-board IC testing.

### Inspection of up to 64 ICs

The HiSCAN can inspect a maximum of 64 ICs under standard conditions. The inspection capacity can be expanded in eight IC increments, and up to 64 ICs can be tested.

### Graphical indication

Temperature-dependent variations in the pin-by-pin characteristics are displayed on the monitor in the form of a transient-characteristic chart every five seconds, enabling efficient checking.



# HiSCAN



# Remote Control

## On-Line Maintenance Function

The 1105 IN-CIRCUIT HiTESTER can remotely be controlled using the on-line maintenance function of the 1137 support software (optional). The inspection data can be debugged and several settings can be provided through phone lines.

### ■ Functions

- Setup of the automatic inspection group
- Setup of various parameters for automatic inspection
- Creation and modification of component data
- Modification of S/O data
- Creation of charge data
- Creation and modification of IC data
- Summation and accumulation of statistical data
- Data saving and loading
- Conversion of data from 1101 to 1102
- Setup of various environmental parameters
- Self-testing



### ■ Low-resistance measurement capability

The 1105 can accurately measure the low resistance of fuses and components in a circuit through the use of a four-terminal scanner (optional).

### ■ Safety design

A safety cover can be mounted on both sides and the rear panel of the press. An area sensor can also be mounted in the area between the front supports. These components serve to improve safety characteristics.

**(The safety covers and area sensor are optional.)**

### ■ Support for double-fixtured conversion

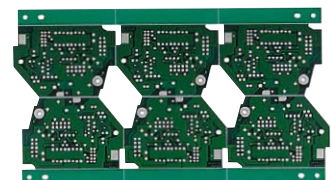
The addition of a press unit converts the 1105 to the double-fixtured type. Since each fixture has its own inspection data, different boards can be inspected. Each fixture can perform up to 10,000 inspection steps.



**Satisfies  
Diversified  
Needs**

### ■ Support for multiple-sample boards

Through grouping, multiple-sample boards can be inspected in a batch or individually, resulting in improved work efficiency.



# Increased Automatic Inspection Capability and Productivity

## 1105-11 Special In-Line Model

This 1105-11 special in-line model provides an automatic inspection line. The 1105-11 incorporates a conveyor as standard equipment, and is specially designed to enable in-line operation while maintaining the high-performance and high-reliability features of the 1105. Its compact and flexible design accommodates various in-line systems, allowing productivity to be increased.

Satisfies  
Diversified  
Needs



### Specifications

<b>Conveyable board dimensions:</b>	Min. 60 × 90 mm Max. 250 × 330 mm (for the double-pin board type only) Max. 210 × 330 mm	<b>Conveyor datum:</b>	The front side is defined as datum (standard).
<b>Conveyable board weight:</b>	Max. 1.5 kgf	<b>Feed direction:</b>	Right to left (standard)
<b>Conveyable mounted component height:</b>	Max. 50 mm (from the upper surface of the board)	<b>Carrying height:</b>	750±10 mm
<b>Dead carrying space:</b>	3 mm from both sides of a board to be inspected.	<b>Control system:</b>	Programmable controller
<b>Board guide-hole position:</b>	The respective guide holes must be at least 5 mm from both sides of a board to be inspected.	<b>Pneumatic pressure:</b>	0.5±0.1 MPa (on the secondary-pressure side of the regulator)
<b>Carrying system:</b>	Belt conveyor (antistatic type)	<b>Safety and alarm systems:</b>	Emergency stop switch Tricolor signal tower (red, amber, and green) Buzzer
<b>Conveyor speed:</b>	Approx. 0 to 24 m/min, max. (50 Hz) Approx. 0 to 29 m/min, max. (60 Hz)	<b>Power supply:</b>	100 VAC ± 10 %, 50/60 Hz
		<b>Power consumption:</b>	Max. 800 VA
		<b>Dimensions/mass:</b>	Approx. 780 (W) × 1,430 (H) × 940 (D) mm Approx. 290 kg

●The measurement section is the same as 1105-01.

### ■ Factory Options

- One-touch fixture (1024 pins)
- One-touch fixture (2048 pins)
- Area sensor
- Safety cover
- Evaluation stamping unit

Various models, including special types, are also available. Contact your HIOKI representative.

# User-Friendly operation

## ■ Easy Interactive Operation

All functions can be interactively accessed through the screen. Operations can be performed easily, whether every item is being changed or the measurement results are being checked on-screen.

## ■ Setting up passwords

By setting up passwords, unauthorized operators can be prevented from accidentally changing the inspection data.

## ■ ATG function

Parameters such as the measurement mode, range, and guard points can be automatically set to the optimal conditions based on the inspection data input.

## ■ Statistical data

The inspection results can be statistically processed so that the statistics will be displayed or printed. Various types of data can be obtained, including cumulative totals, subtotals, grand totals, group-by-group data, and inspection steps, allowing quality control and feedback to the preceding processes.

## ■ Charge test

If the components mounted on the board to be inspected are electrically charged, accurate component testing will not be performed, adversely affecting the 1105. Prior to component testing, the charge test can be performed to determine whether the components are charged. The charge-test parameters can be set automatically.

## ■ Automatic self-check function

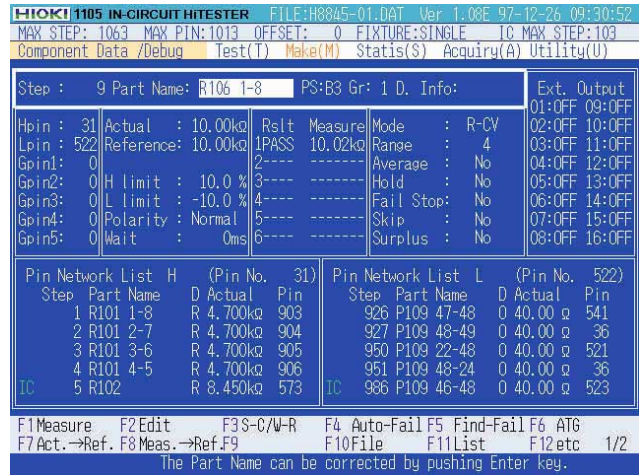
When the 1105 is started up, it automatically performs a hardware self-test, preventing incorrect evaluations resulting from a hardware failure.

## ■ Failure-map display

Depending on the settings, a map of incorrectly positioned components can be displayed on-screen or printed by the printer, allowing faulty components to be located quickly. This map can be divided into up to ten pieces vertically and horizontally, enabling the sample board to be divided into a maximum of 100 sections.

## ■ Graph Display

Graphically displays stepwise histograms, subtotal/total failure rate and monthly failure rate trends.

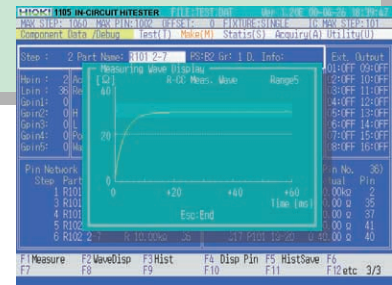


## ■ Pin network display

This function displays the component and opposing pin connected to a specified pin, enabling efficient debugging.

## ■ Waveform Display

Waveforms are displayed during measurement, and can be used during debugging, such as when setting wait times.

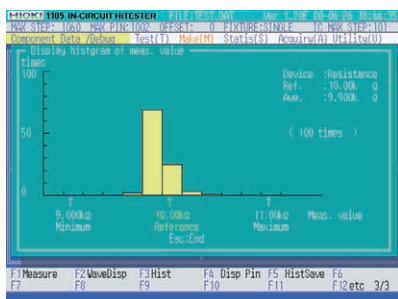


## ■ Data backup function

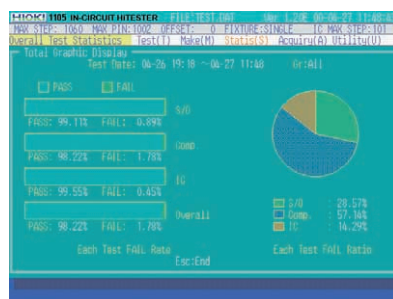
The data backup function periodically saves data during inspection or editing operations, preventing such data from being lost due to power interruption, etc.

## ■ On-Line help function

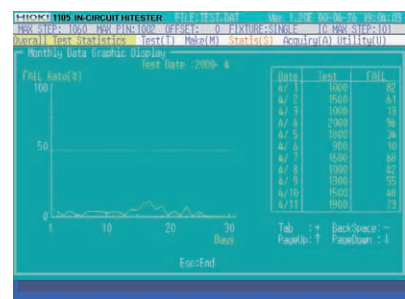
Basic operations can be seen on the monitor. This functions enables operations to be conducted without reference to the instruction manuals.



Histogram



Subtotal/total graph



Monthly graph



# Straight Probing of Even 0.5-mm-Pitch Components

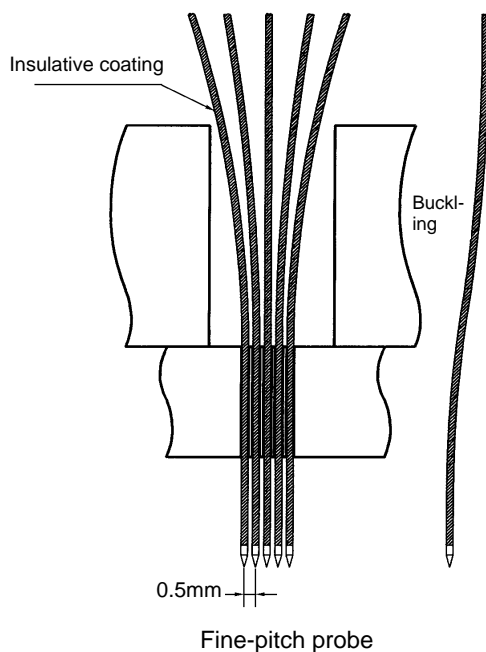
## 1160 Fine-Pitch Pin Board

The 1105 can stably inspect even fine-pitch, high-density boards, due to its substantially rigid press. The fine-pitch pin board (inspection tool) enables straight probing even at a pitch of 0.5 mm. The 1105 can inspect double-sided boards and high-density boards consisting of chips and flat packages.



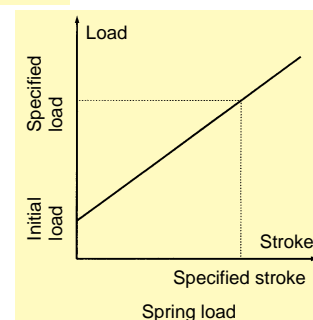
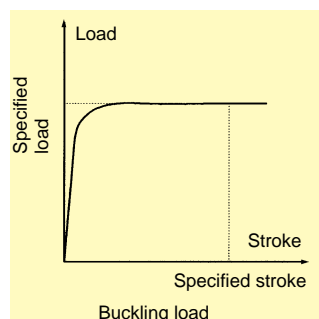
### ■ Ultra-slender fine-pitch probe

Unlike standard probes, the fine-pitch probe does not contain a spring. This fine-pitch probe has a simple structure of superfine metallic needles, and utilizes the buckling load to detect fine pitches.



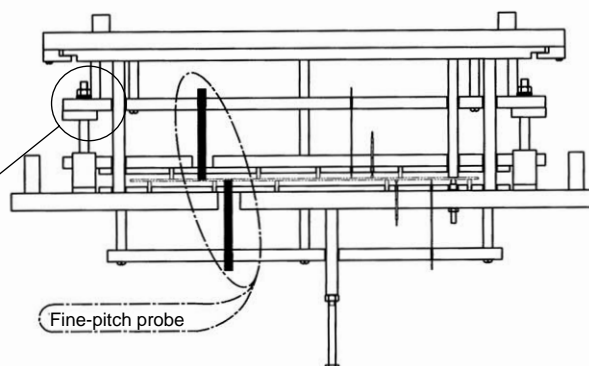
### ■ Stable contact pressure

While the load on the built-in probe of the spring varies in proportion to the stroke, the load on the fine-pitch probe is almost constant. If the stroke changes due to the amount of dispersed solder, a stable contact pressure is ensured.



### ■ Vertical shift adjustment function

Patterns may be shifted on the front and back faces, depending on the lot of the printed boards. This shift may affect the measurement of fine-pitch boards. Fine adjustment of the shift is included as a standard function of the 1105.



Adjuster  
Adjustable range:  
0.5 mm, max. (in both the X- and Y-axis directions)

## 1105-01 IN-CIRCUIT HiTESTER Specifications

Number of inspection points	Standard: 320 pins (expandable in 64-pin increments) Maximum: 1024 pins (2048 pins with optional equipment)
Number of inspection steps	10,000 steps, max.
Inspection items/ranges	In turn, short/open Component testing Resistor: 0.4 ohms to 40 Mohms Capacitor: 10 pF to 400 mF Coil: 1 $\mu$ H to 400 H Diode, transistor (VF): 0.1 V to 25 V Zener diode (VZ): 0.1 V to 25 V Digital transistor (Q): 0.1 V to 25 V Photocoupler inspection function HiSCAN (optional) (HiSCAN includes the reversely mounted IC detection function.) Reversely mounted capacitor detection function (optional) Reversely mounted IC detection function
Inspection signals	DC constant voltage: 0.1 V, 0.4 V; 2 ranges DC constant current: 200 nA to 20 mA; 6 ranges AC constant voltage: 160 Hz, 0.1 V peak 1.6 kHz, 0.1 V peak 16 kHz, 0.1 V peak 160 kHz, 0.1 V peak
Measurement section	DC voltmeter: 0.4 to 25 V f.s.; 3 ranges DC ammeter: 100 nA f.s. to 25 mA f.s.; 7 ranges AC ammeter: 10 $\mu$ A f.s. to 10 mA f.s.; 4 ranges
Evaluation range	-99.9% to +999.9%, or absolute value
Measurement time	Short/open: Approx. 1 ms/pin or more Component testing: Approx. 1.5 ms/step or more
Guarding	5 points/step, max.
Self-testing function	Auto: Scanner board, measurement section, I/O board Manual: Scanner board, measurement section, I/O board, fixture
Statistical functions	Calculation of the step-by-step or overall failure rate Group-by-group and total statistics function

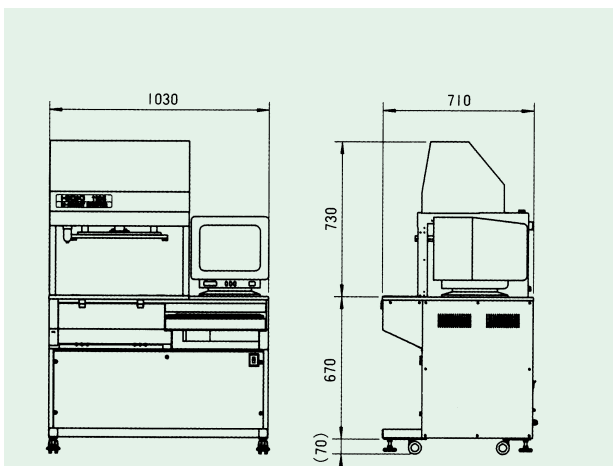
Automatic data-generation function	ATG: Automatic collection of data on high-quality components Automatic setting of guard points Cancellation of floating capacitance and wire resistance
Measurable board dimensions	420 $\times$ 300 mm
External storage	1 $\times$ 3.5-inch FDD; 1 $\times$ hard disk
Display	15-inch CRT (color)
External interface	Parallel interface for an external printer, RS-232C port
OS	MS-DOS*
Power supply/pneumatic pressure	100 VAC ( $\pm$ 10%) (standard) 120 VAC, 200 VAC, 220 VAC, 240 VAC ( $\pm$ 10%) (specify when ordering) Power consumption: 500 VA Pneumatic pressure: 0.5 MPa to 1.0 MPa (dry air)
Operating environment	Operating temperature and humidity ranges: 23 $^{\circ}$ $\pm$ 10 $^{\circ}$ C, 75% RH or less Surroundings: Avoid use in environments in which the unit will be exposed to dust, vibration, or corrosive gasses. Storage temperature range: 10 $^{\circ}$ C to 43 $^{\circ}$ C
Miscellaneous	Retesting (reinspection) function for imperfect contact Failure-map display function Password setting function Mask-pin setting function Screen hard-copy function Printout function
Dimensions/Weight	Approx. 1,030(W) $\times$ 1,470 (H) $\times$ 710(D) mm Approx. 220 kg
Standard accessories	1 $\times$ CRT 1 $\times$ 2P adapter 4 $\times$ wing bolts (M6 $\times$ 20) 1 $\times$ spare fuse (T3A/250 V) 1 $\times$ pin-board attachment set 5 $\times$ fixture extension cables (1152) 1 $\times$ test lead set (9046) 1 $\times$ keyboard 1 $\times$ system disk 1 $\times$ printer 1 $\times$ printer connection cable

\* MS-DOS is a registered trademark of the Microsoft Corporation.

1105-01 IN-CIRCUIT HiTESTER

1105-11 IN-CIRCUIT HiTESTER  
(special in-line type)

### External Dimensions



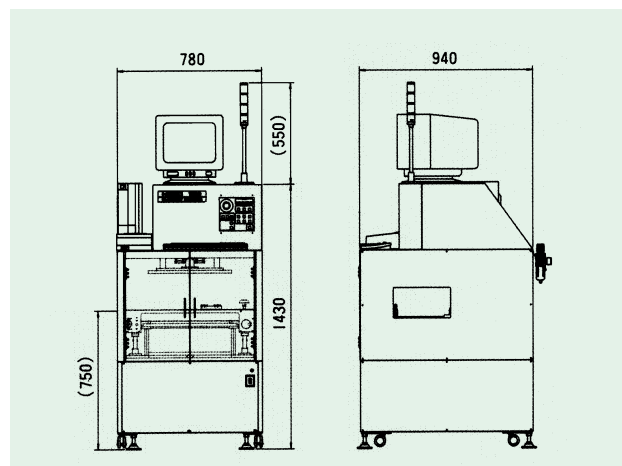
1105-01

### ■ Options

1131 SCANNER BOARD (64-pin units)

1137 SUPPORT SOFTWARE

1196 RECORDING PAPER (25 m, 10 rolls)



1105-11

# HIOKI

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■ Internet HIOKI website <http://www.hioki.co.jp/>

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