HIOKI

FLYING PROBE TESTER
FA1813, FA1816, FA1817, FA1283
Process Analyzer Pro UA1801

Detect Latent Defects on High-Density Printed Wiring Boards with Absolute Reliability

FA1813 For horizontal, double-sided testing with Ultra-high precision probing
FA1816 For high-speed testing using the capacitance measurement method
FA1817 For vertical, double-sided testing with high measurement precision
FA1283 For horizontal, double-sided testing with high measurement precision

Detect Latent Defects Hidden in PASS Boards

Process Analyzer Pro detects significant points that can cause latent defects using statistical analysis powered by the latest AI technologies. UA1801

- Improve board quality with Process Analyzer Pro (UA1801)
- Detect potential defects with Process Analyzer Client (E4781)
- Analyze test results with Process Analyzer (free application)
- Wide range of measurement from low resistance to high insulation resistance
- Half the depth of impact, high-precision probing
- Measurement of the embedded chip components
  (FA1813 standard function, FA1817/FA1283 optional function)
- Vertical model to definitely support board flex during testing (FA1817)
- Horizontal model for simplified automatic transport of boards (FA1283)

Choose from 4 models offering electrical testing of multifunction boards.

1. Identify latent defects with low-resistance and high-insulation-resistance measurement

4-terminal resistance measurement function

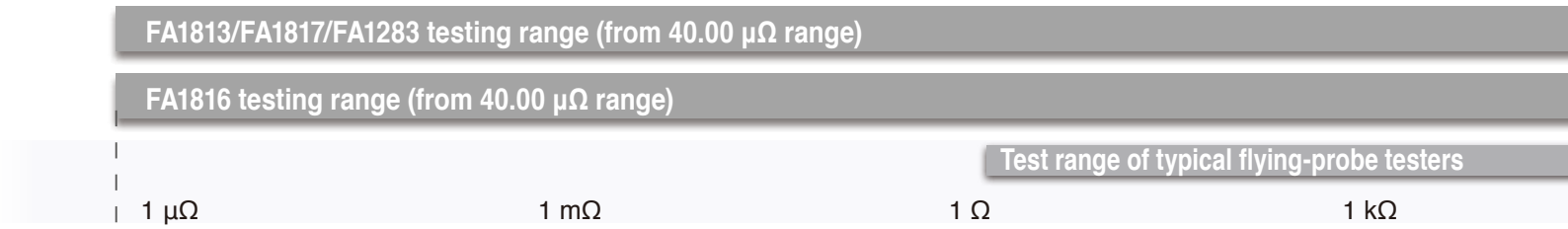
Use Kelvin probes to accurately measure the minuscule resistance of interstitial via holes (IVHs) and through-holes at outstanding levels of stability.

Large-diameter vias | Power supply net patterns | Large-area patterns | Signal patterns

200 mA continuity testing

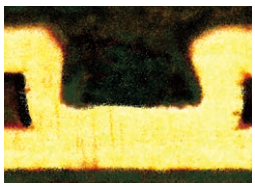
Pattern reliability is assured by applying a high current of up to 200 mA, close to the rated current of a typical fine pattern.

Micro-short | High-resistance short | Printed resistance



Importance of low-resistance testing

- Dedicated probes and a dedicated measurement board that use the 4-terminal low-resistance measurement method make it possible to detect the minuscule resistance values of open vias quickly and accurately.
- When there's an open via, resistance and inductance values increase, interfering with signal transmission. Low-resistance testing with the 4-terminal method using a high-resolution, high-precision instrument makes it possible to quickly assess via connectivity.

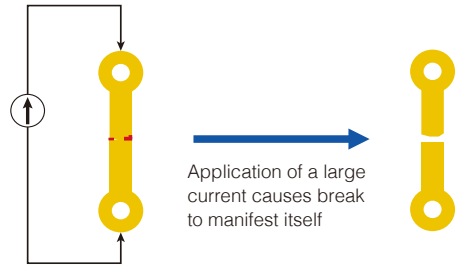


Normal via

Open via

Detecting near-open defects in patterns

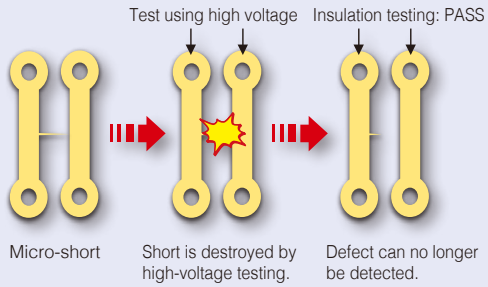
- Incipient breaks in patterns are detected by momentarily applying a high current (up to 200 mA).
- Since high-current continuity testing at up to 200 mA allows resistance to be measured in an environment that mimics the conditions of actual operation, it offers an ideal means of verifying the reliability of pattern and via connections.



Detecting latent pattern defects

Micro-short testing: Improving test reliability

Detect micro-shorts between patterns prior to insulation testing by applying a user-configured low voltage.



2. Augment LCR testing with measurement of boards with embedded devices

Consolidating technologies for measuring mounted electronic components

Insulation testing with automatic protection for peace of mind

- Insulation testing of nets with connected components is automatically carried out separately from other tests.
- Design delivers peace of mind by ensuring that a high voltage is not applied to components.

JIS-compliant MLCC measurement function

- Multilayer ceramic capacitors (MLCCs), whose capacitance values are voltage-dependent, are measured at the appropriate frequency and voltage.

Low-power LCR measurement with application of 0.1 V

- Achieve accurate measurement without causing LSIs and other semiconductors to operate.
- Measurement occurs at a low voltage that will not damage components.

Phase-isolated measurement of individual components from composite LCR circuits

- Resistance and capacitance components are isolated and measured accurately based on the phase difference between AC signals. Values as low as 0.1 pF can be tested.

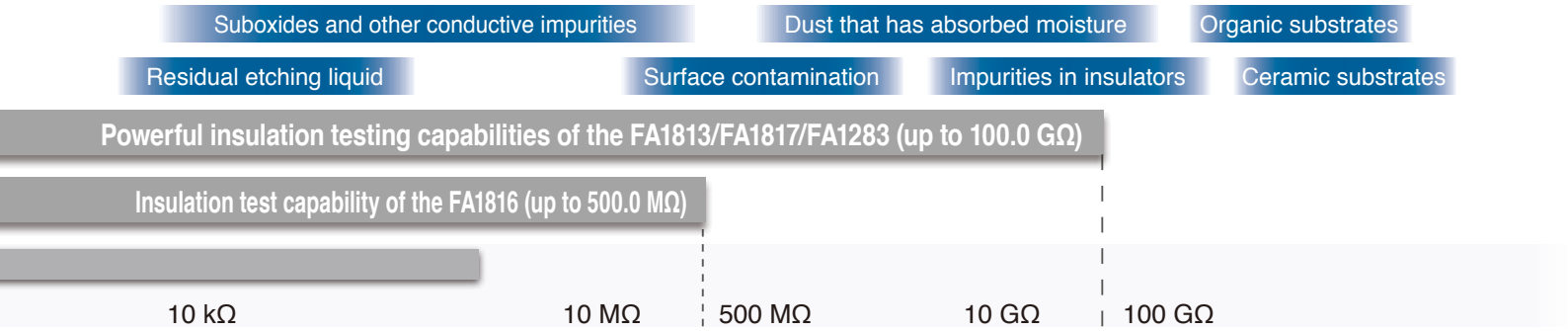
Testing & Measurement, Sorting & Analysis.
Advanced test tools provide functionality ranging from simple continuity and insulation testing to component parameter testing into a single testing system.

Detecting latent defects

Detect latent defects that would go unidentified with conventional testing by using micro-short testing and an extensive range of insulation testing modes.

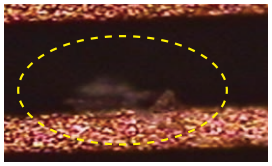
High-speed 100 GΩ/250 V high-insulation testing

The FA1817 delivers 100 GΩ/250 V high-insulation testing with performance that rivals function-specific inspection tools. (FA1816 up to 500MΩ / 250V)

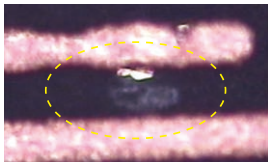


Detect insulation defects in patterns

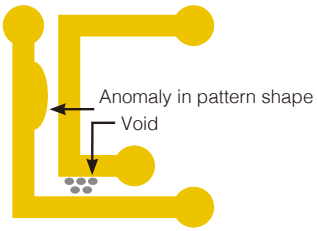
- A 100 GΩ/250 V high-insulation-resistance measurement board developed specifically for the FA1817 makes it possible to detect defects quickly while minimizing the stress caused by application of high voltages. (FA1817 only)
- Detect abnormalities in pattern shape, impurities that exist between patterns, and insulation defects caused by voids.



Void

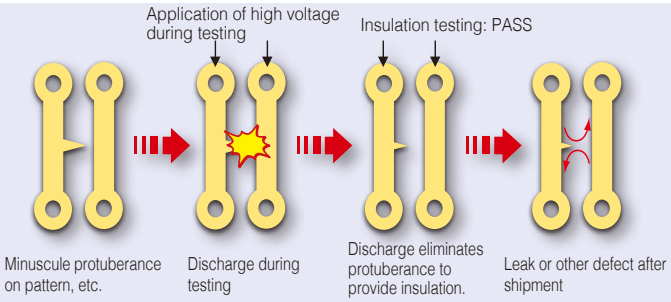


Impurity



Arc detection: Increasing long-term reliability

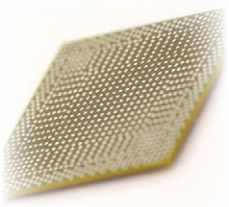
Detect arc discharges during insulation testing.

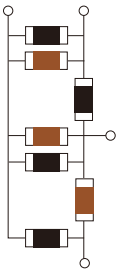


(FA1813 standard function, FA1817/FA1283 optional function)

Guarding function

- ICT function keeps measurement signals from flowing into the circuit network.
- Guard potentials can be automatically set based on component connection information.





LSI connection reliability testing

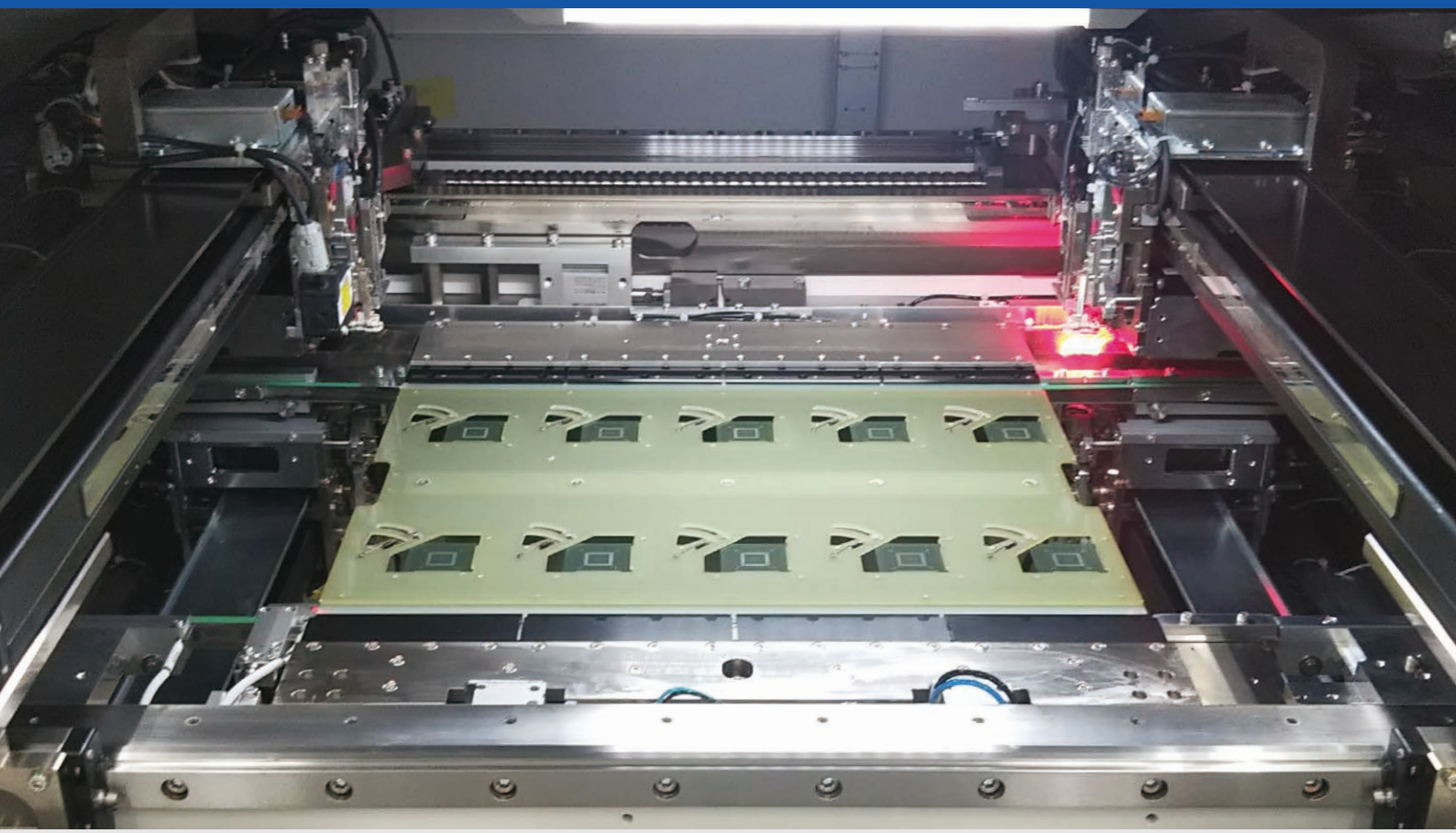
The FA1817 provides a dedicated mode for testing boards with embedded LSIs. (FA1817 only)

1. Stress on embedded devices caused by the test voltage ▶ Low-power mode (0.1 V measurement)
2. Bare chip initial defects and stress failures ▶ LSI current consumption testing
3. Energization current in diode characteristics testing ▶ Reducing load for diode characteristics testing by using a minuscule current range of 1 mA or less.

FA1813

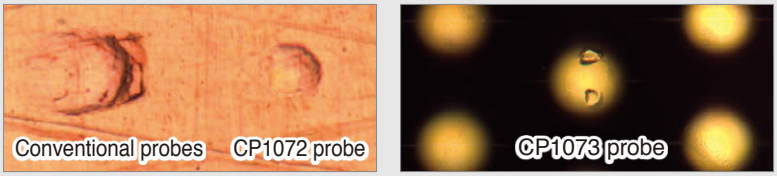
Evaluate high-density substrate reliability with super-high-precision probing

Inspect dual side simultaneously with a total of 4 arms, 2 arms on the top and 2 arms on the bottom
High speed inspection at Max. 76 point/sec.



Half the depth of impact

The FA1813 supports the high-precision probe CP1072-01 and the CP1073 (Hioki's latest probe), both of which were developed with proprietary technology that minimizes pattern damage.

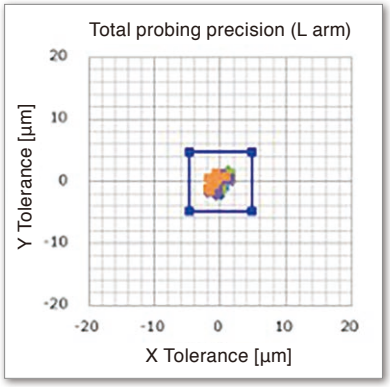


▲ Comparison of impact depth

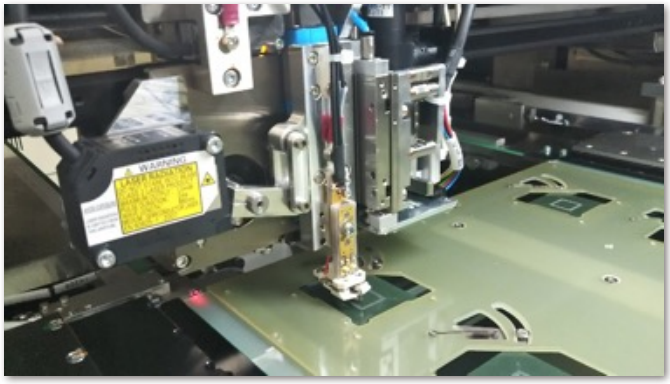
Choose from an extensive range of models to suit the type of board being tested.

Accurate probing ensured

Board alignment on the top-surface arms uses high-resolution cameras with a pixel count that's twice of previous models and a high-magnification lens (with 2× optical zoom) to implement highly accurate probing of fine pads on high-density substrate. New functionality that performs a contact check while probing down optimizes the probe stroke to reduce pad damage by minimizing impact force.



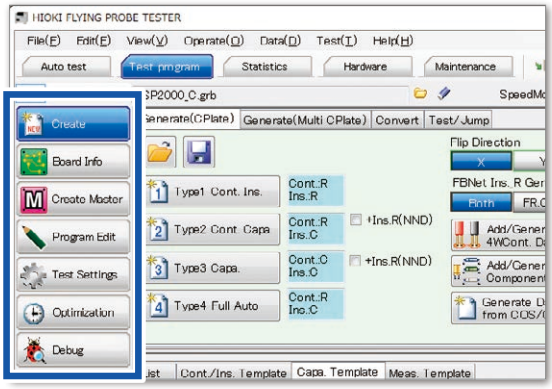
Blue lines indicate overall pass/fail limits for precise probing inspection. Plotted points indicate individual arms' probing positions. *



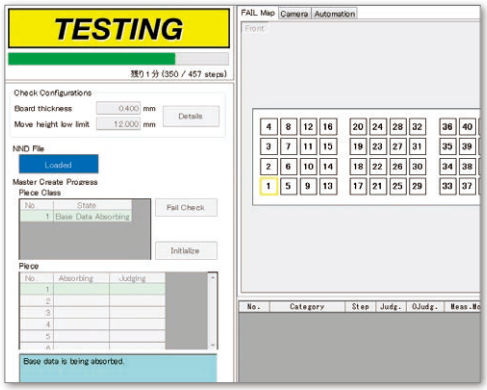
Realizing super-high-precision probing with a newly designed probe tip.

Significantly improved operability (FA1817, FA1816 and FA1813 shared feature)

Revamped operation includes a new data creation method that lets you start testing just from the 1st piece.
New workflow menu in test data creation process further simplifies operation.
Now basic value acquisition, golden board judgment, and step additions can be performed easily and automatically with the click of a single button.



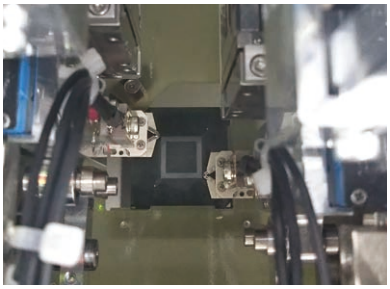
Basic tasks such as data creation have been simplified so that the operator need only follow the appropriate workflow.



Master data creation has been fully automated to save operator time.

Ships standard with all the functionality you need

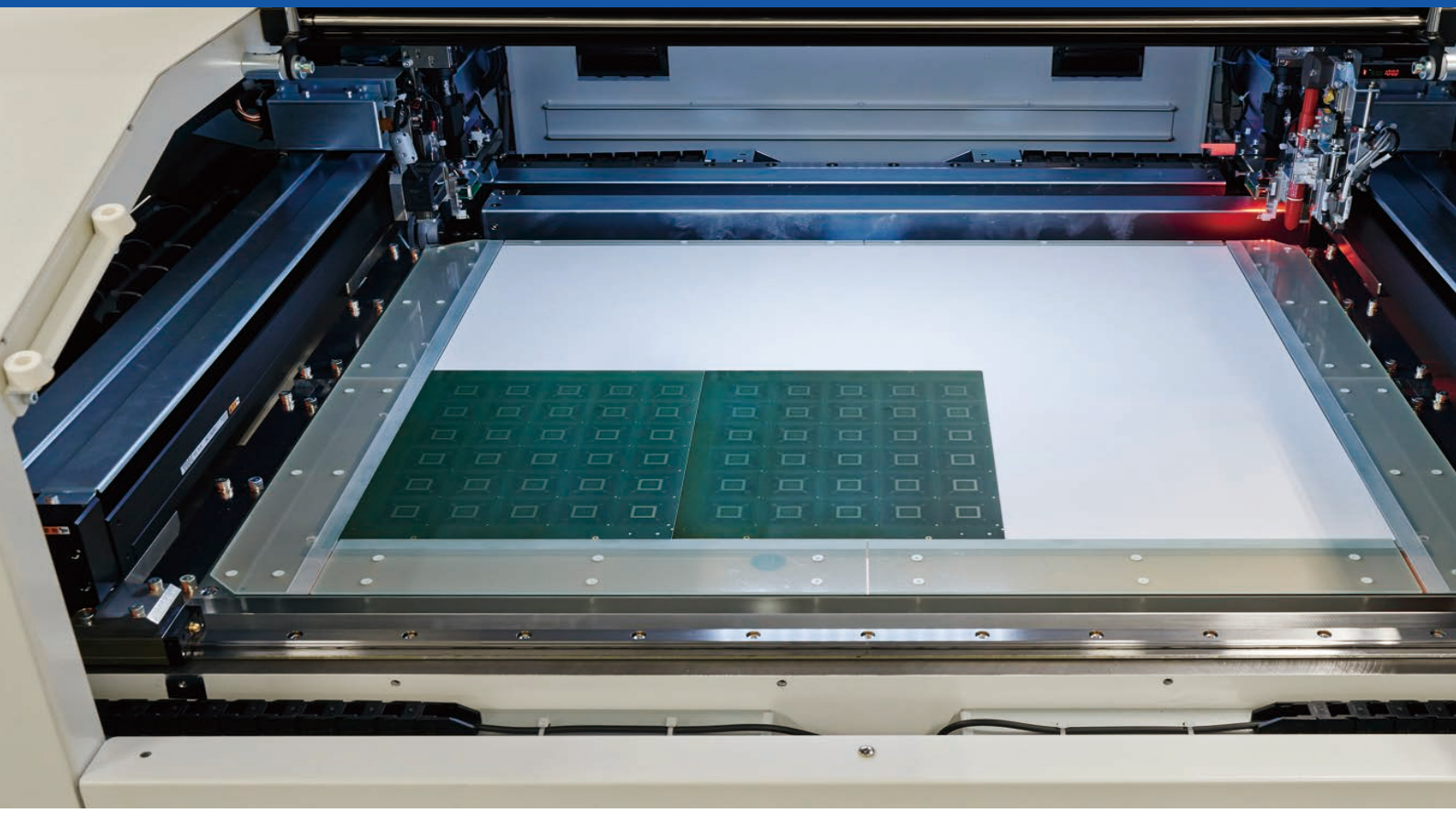
The FA1813 ships standard with exceptionally stable, high-speed low-resistance measurement and high-insulation measurement functionality. To facilitate even more accurate probing, it also ships standard with alignment cameras on all arms and laser board thickness correction. In addition, test data creation incorporates a workflow menu to simplify operation.



FA1816

Horizontal, single-sided tester that delivers high-speed testing using capacitance measurement

Complete tests in the fewest possible steps compared to conventional resistance testing
High-speed testing at up to 100 points/sec.



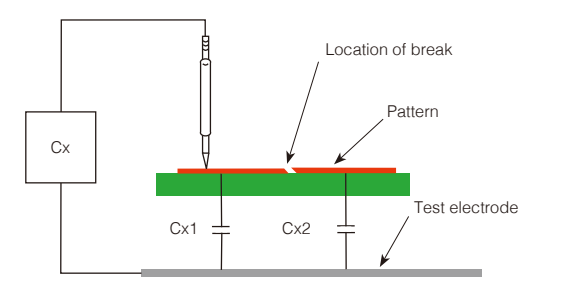
Capacitance measurement method

Circuit patterns on boards have a certain capacitance with the electrically isolated test electrode that is proportional to their area.
If a circuit pattern has a defect such as a short or break, its pattern area will change, causing its capacitance value to change. The FA1816 detects circuit pattern shorts and breaks by comparing test values to reference values.

Comparison of test steps (100 nets and total of 500 nodes)

	Continuity testing method	Capacitance measurement method
Testing for breaks	All nodes on same net 500 - 100 = 400	The capacitance of all nodes is measured to detect breaks and shorts. 500
Testing for shorts	nCr = 100C2 100 ×(100 - 1) / 2 = 4950	
Test steps	5350	500

The FA1816 also ships standard with an insulation measurement function so that it can assure insulation performance through insulation measurement as well as through capacitance measurement.



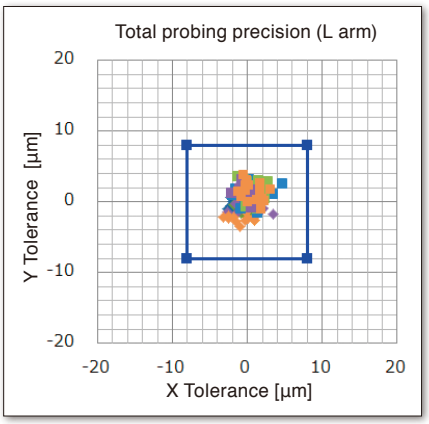
Capacitance value without break: Cx = Cx1 + Cx2
Capacitance value with break: Cx = Cx1

With break: Detected capacitance value is less than that of reference board.
With short: Capacitance value is augmented by the capacitance of other patterns, causing it to increase.

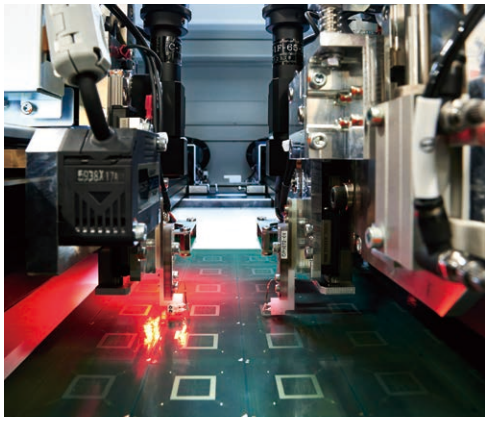
The capacitance measurement method allows testing for breaks and shorts simply by testing all endpoints of each pattern.

Accurate probing ensured

The FA1816 uses high-resolution cameras with high-power lenses (1× optical zoom) to deliver accurate probing of the board. Optional 2× lenses further improve alignment precision.

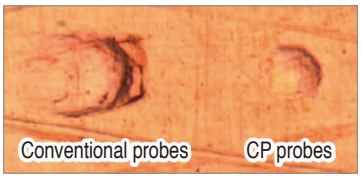


Blue lines indicate overall pass/fail limits for precise probing inspection. Plotted points indicate individual arms' probing positions. *



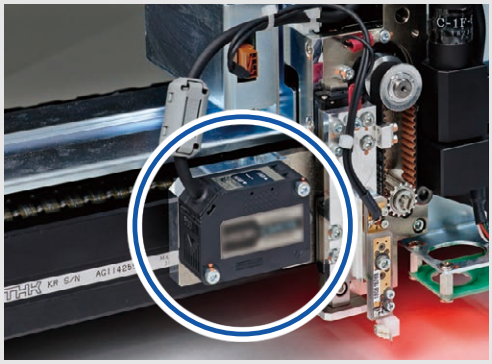
High-precision board alignment

Half impact depth (FA1817 and FA1816 shared feature)



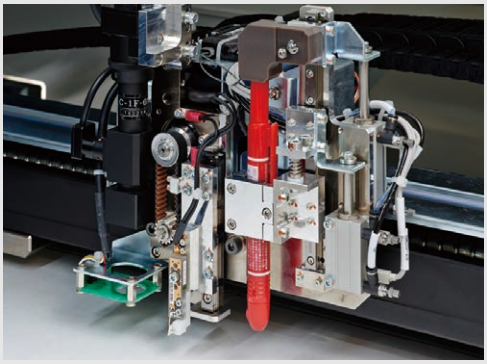
Proprietary probes enable testing with shallower impacts, all without compromising speed.

Options



LASER HEIGHT ADJUSTMENT UNIT E4601

A board thickness compensation function using a laser enables contact the board with the optimum force. (Standard on FA1813, FA1817, and FA1283)



DOT MARKING FUNCTION E4603

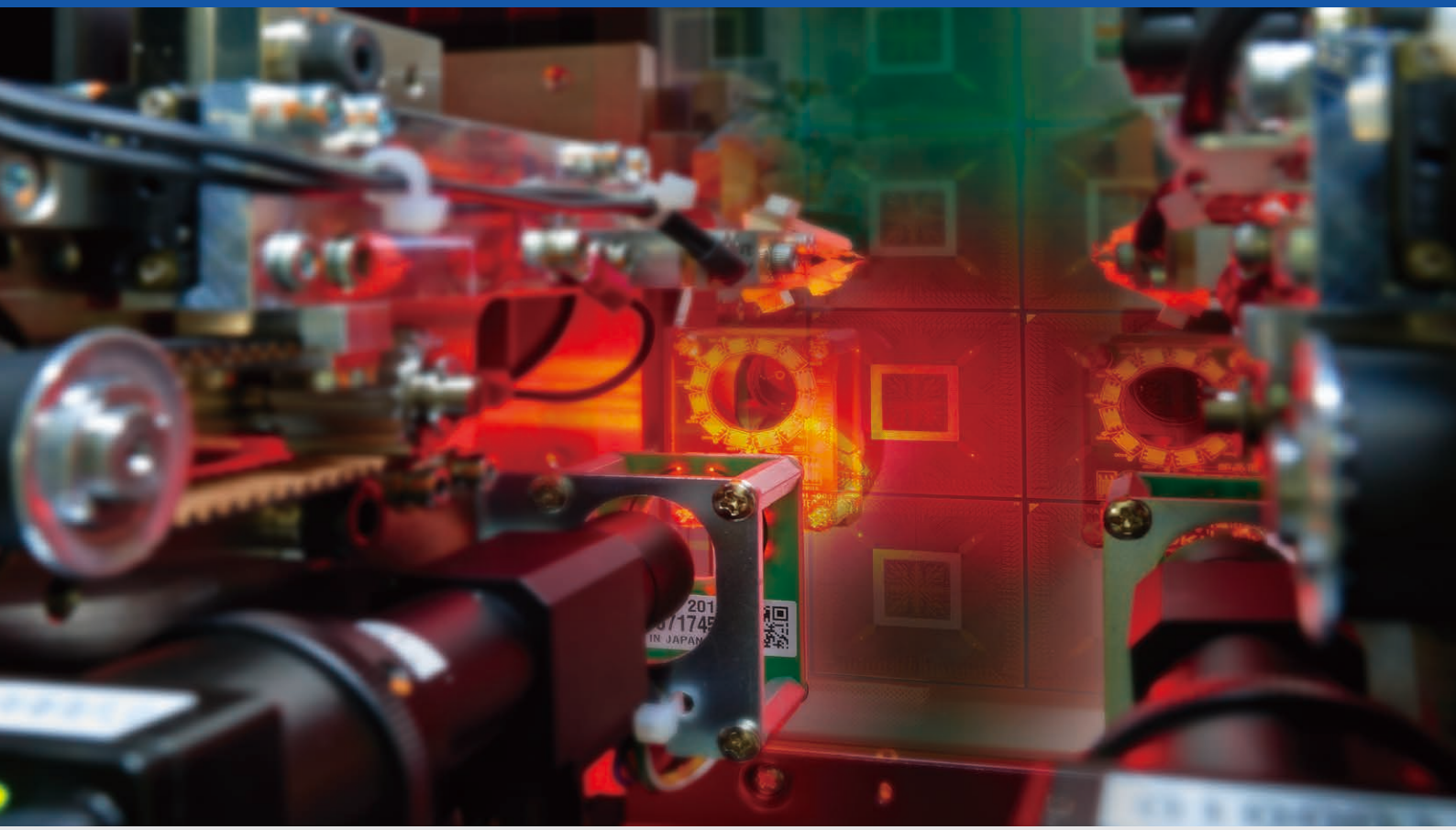
Dot marking using commercially available oil markers

FA1817

Minimize bending of test substrate

Vertical, double-sided inspection tool with small installation space

Test both surfaces simultaneously with a total of 4 arms (2 front and 2 rear)
High speed inspection at Max. 67 points / sec.



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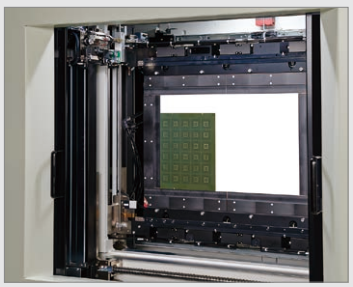
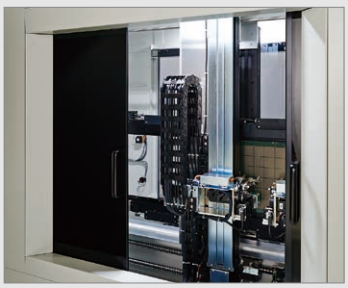


VACUUM UNIT FOR CAPACITANCE TEST E4701

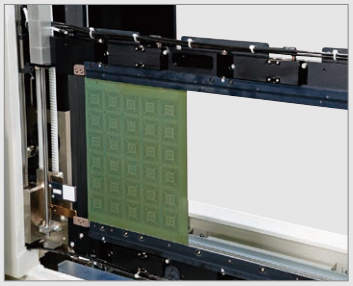
Augment resistance measurement by measuring capacitance on a single surface of the board under test. The E4701 can test boards with a variety of profiles, including thin boards and boards with unusual shapes.



(Shown with cover open)

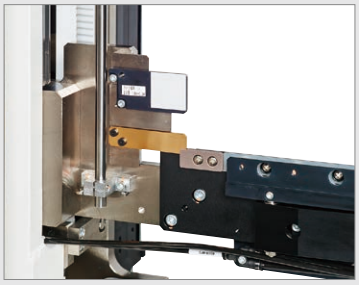
REAR SAFETY COVER E4711

A built-in interior light makes it easy to maintain the system from the rear.



AIR-TYPE BOARD LOCKING UNIT E4706

Clamp boards in place with one-touch operation.
Adjust the board clamp width while viewing a camera image.

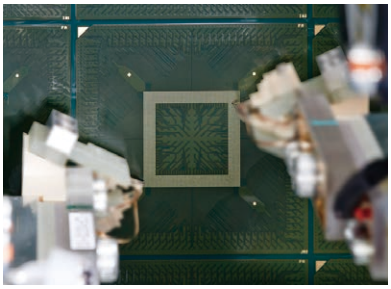


OFFSET STATION E4715 to E4718

Acquire probe offsets while a board is loaded in the system.

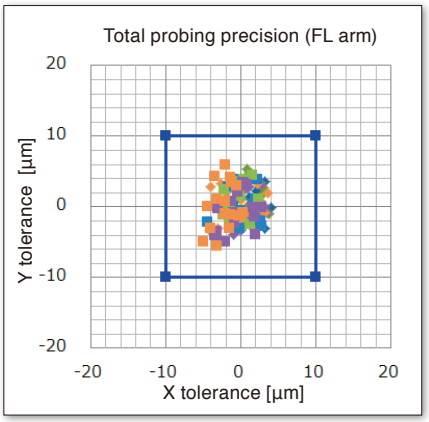
All required functionality built in

The FA1817 ships standard with high-speed low-resistance measurement and high-insulation-resistance measurement functionality that offer excellent stability.
Other standard equipment includes alignment cameras on all arms and laser board thickness compensation to facilitate accurate probing.
A workflow menu has been added to the test data creation process to further simplify operation.



Accurate probing ensured

The FA1817 uses high-resolution cameras with high-power lenses (1× optical zoom) as well as a laser board thickness compensation function for alignment, ensuring accurate probing of the board and optimal contact.
Optional 2× lenses further improve alignment precision.



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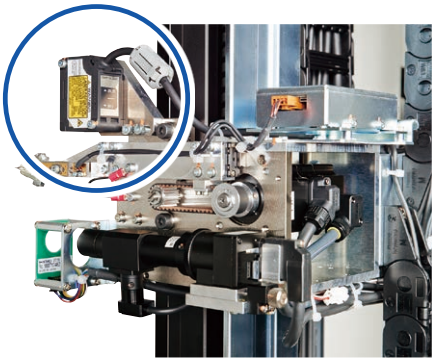
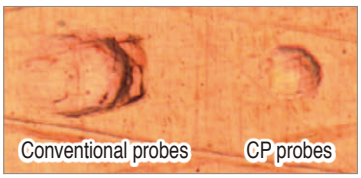


Laser board thickness compensation function

The FA1817's non-contact board thickness compensation function uses a laser so that probes can contact the board with the appropriate probe stroke.

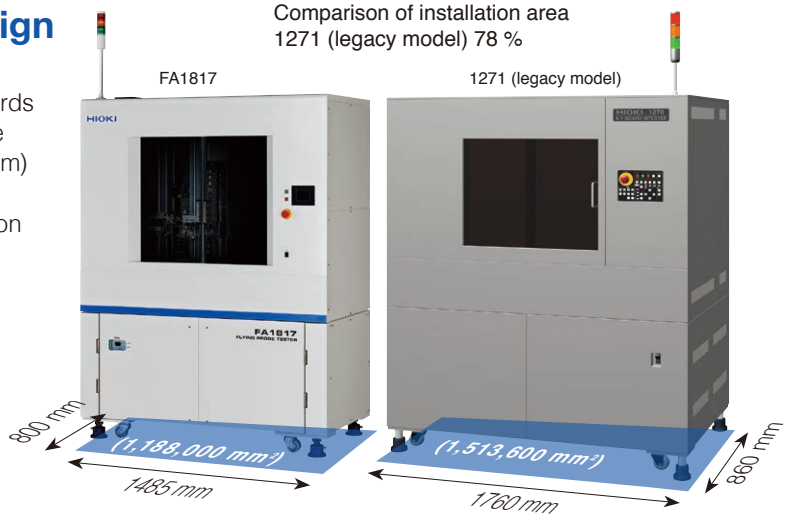
Half impact depth (FA1817 and FA1816 shared feature)



Proprietary probes enable testing with shallower impacts, all without compromising speed.

Space-saving design

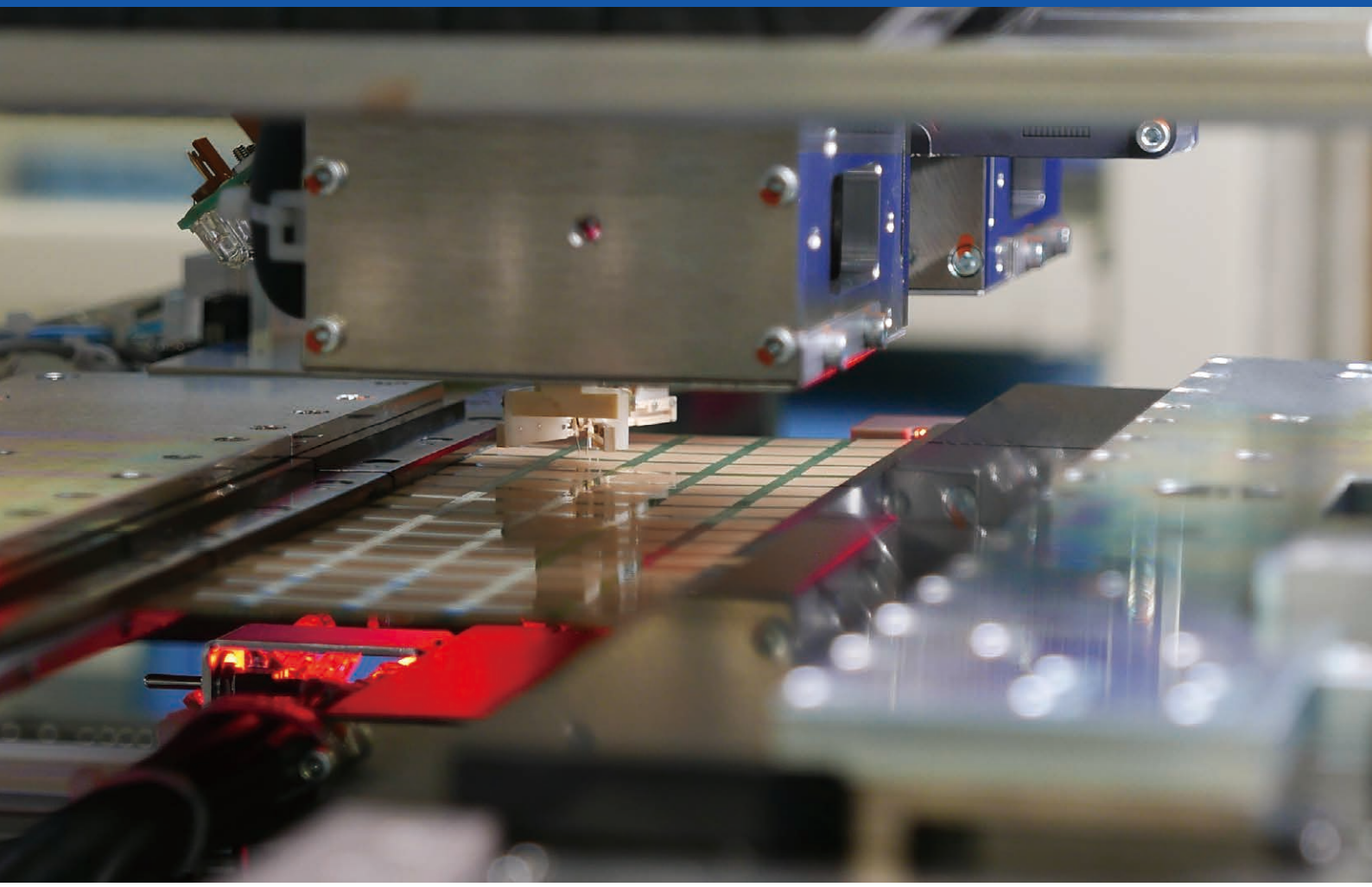
Despite being able to test boards of the same dimensions as the legacy 1271 (610 mm × 510 mm) (24.02 inch × 20.08 inch), the FA1817 takes up less installation space than its predecessor.



FA1283

Horizontal, double-sided tester with support for automatic board transport

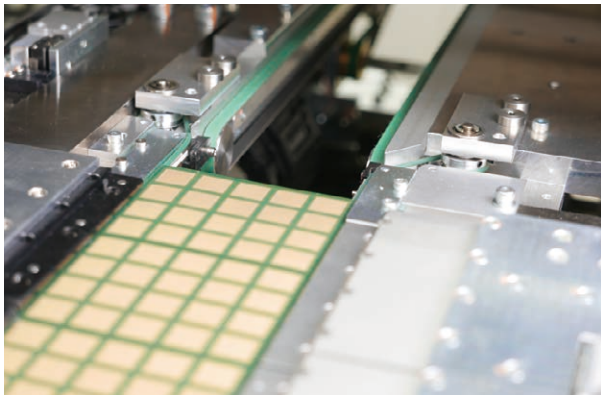
Inspect both sides simultaneously with a total of 4 arms, 2 arms on the top and 2 arms on the bottom
High-speed testing at up to 100 points/sec.



Ships standard with tension clamps that limit flex

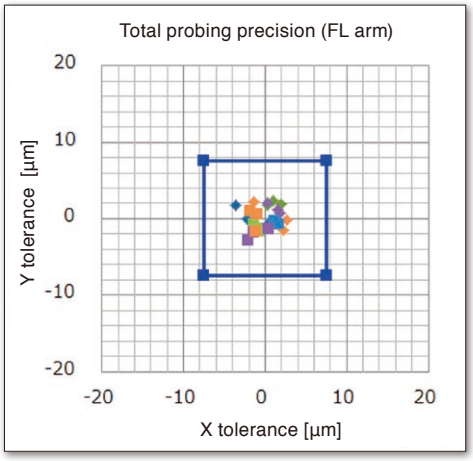
Tension clamps let you get to work testing strip boards with a thickness of 0.16 mm right away. A horizontal transport format lets you choose from commercially available Loader/unloader, making it easy to build a low-cost automated testing line.

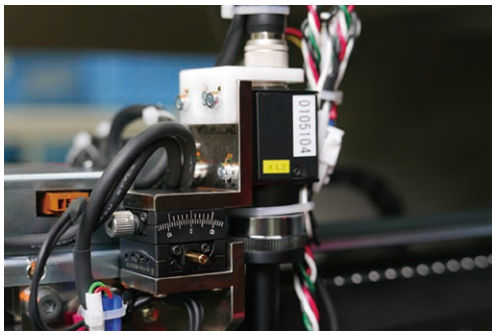
Offline model (without automatic board transport): FA1283-01
Automatic transport model (with automatic board transport): FA1283-11



Automatic transport model: FA1283-11

High-precision Probing Function FA1971-01 (option)

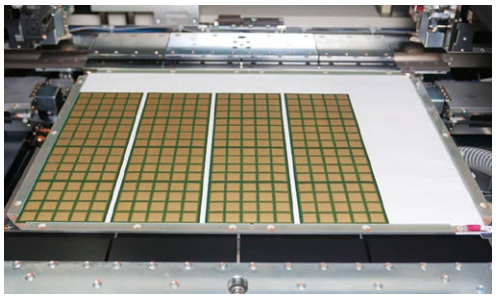




Unit is specially designed to minimize misalignment between the each alignment camera's optical axis and its probe's stroke.

Vacuum Unit for Capacitance Test (option)

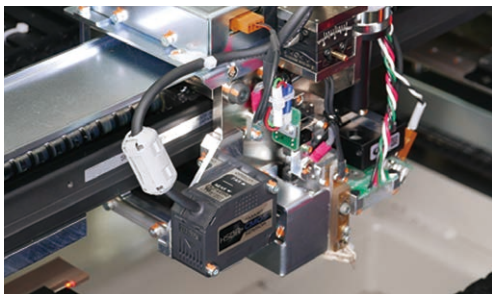
The E4001 Vacuum Unit for Capacitance Test lets the FA1283 perform open/short testing using the capacitance method in a way that frees the testing process from the effects of board profile, allowing stable performance regardless of board shape and thickness.



Vacuum Unit for Capacitance Test E4001

Laser Board Thickness Compensation Unit (standard equipment)

Measure the position of the board surface with a laser and adjust each probe's contact stroke accordingly to maintain uniform probe force on the board. As a result, the size of probing marks can be minimized without sacrificing test speed.



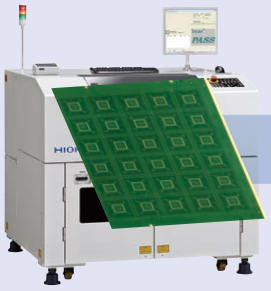
Functionality for testing embedded devices

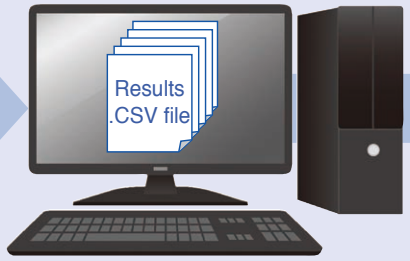
The FA1283 is a next-generation bare board tester that draws on the expertise in component measurement that Hioki has gained from populated board testing. In addition to the ability to measure basic components like MLCCs, the system provides guarding functionality for measuring composite circuits as well as measurement functionality that goes beyond that of in-circuit testers, for example to perform phase-separation measurement. In addition, the FA1283 provides dedicated modes for LSI reliability testing, including current consumption testing and leakage current testing. In this way, the system goes beyond the capabilities of LCR meters to deliver state-of-the-art functionality for testing boards with embedded devices.

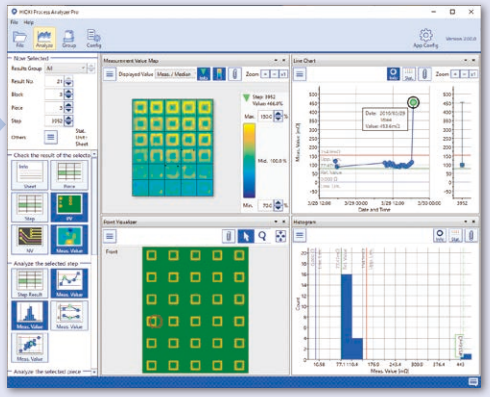
Identify board anomalies at a glance

Process Analyzer Pro (UA1801)

Analyze test results with Process Analyzer Pro





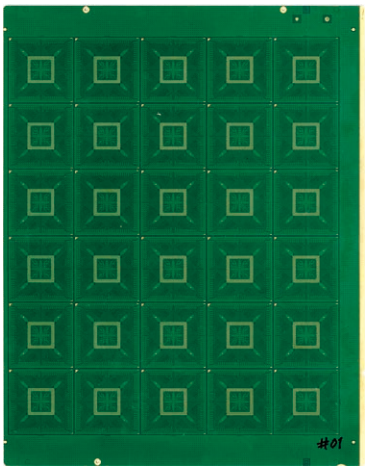


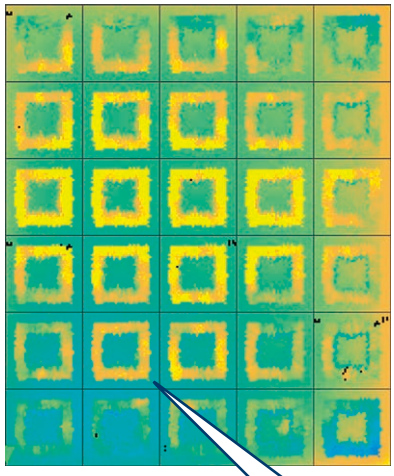
Supported products

1116	1117
1270	1271
FA1116	FA1283
FA1811	FA1816
FA1817	FA1813

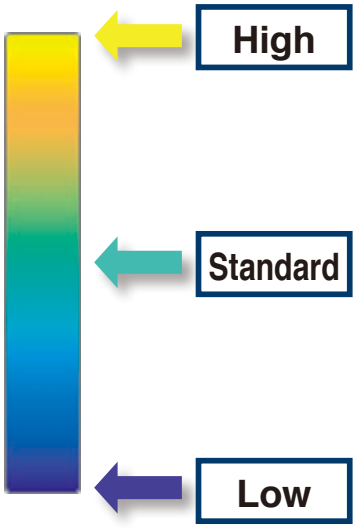
Display test step results using histograms, distribution maps, and other tools

Visualize resistance values using colors (Pro feature)

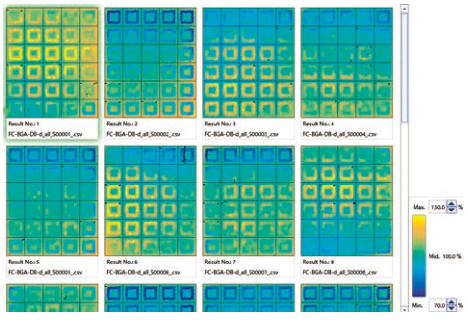




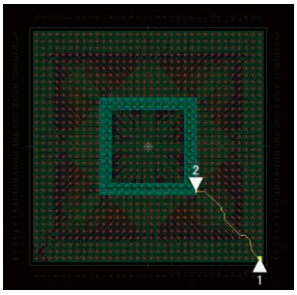
Display resistance values using color mapping



Check individual differences by displaying multiple boards at the same time



Check the wiring pattern at the selected location



Step 1
Free version

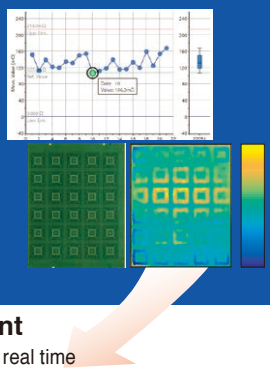
Process Analyzer
- Make subjecting test results to statistical analysis the new normal

NEW
Step 2
Premium version

Process Analyzer Pro
- Identify board anomalies at a glance

NEW
Step3
Premium application

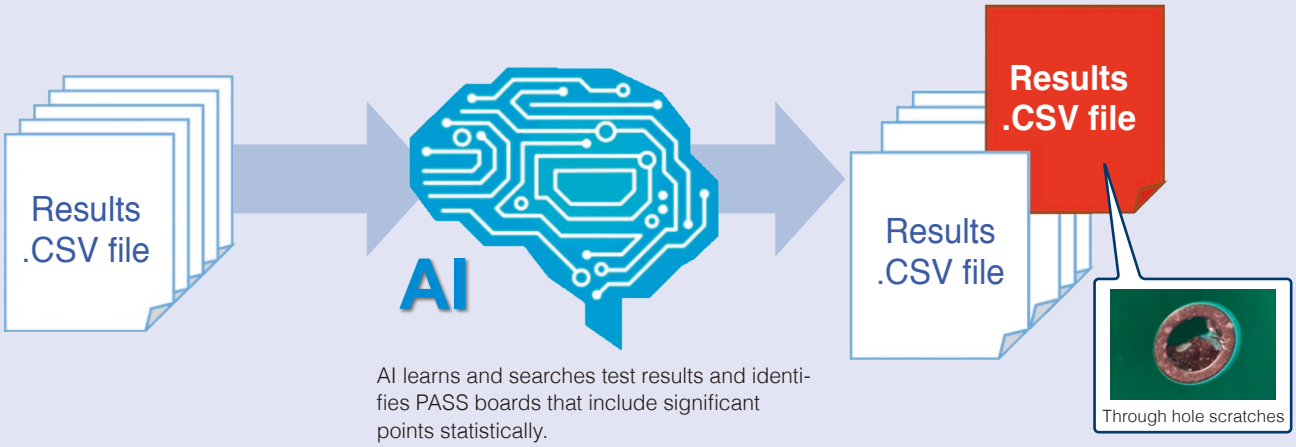
Process Analyzer Client
- Monitor statistical anomalies in real time (Provide model feedback to testing systems)



An advanced software to analyze your high precision test tool data

The application performs statistical analysis based on accumulated test results to detect latent defects that cannot be identified solely by board resistance measurement to help improve the quality of production and design processes.

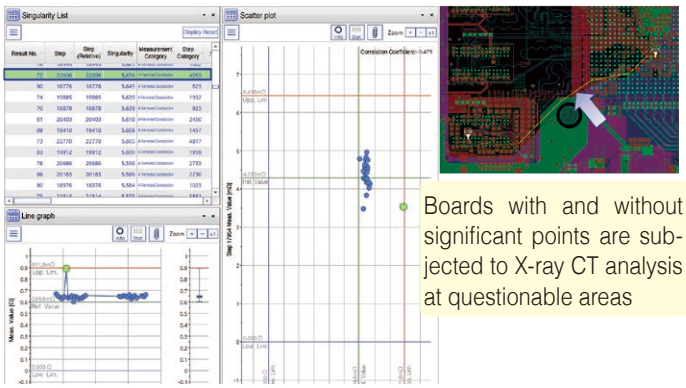
Detect significant points using AI technologies (Pro feature)



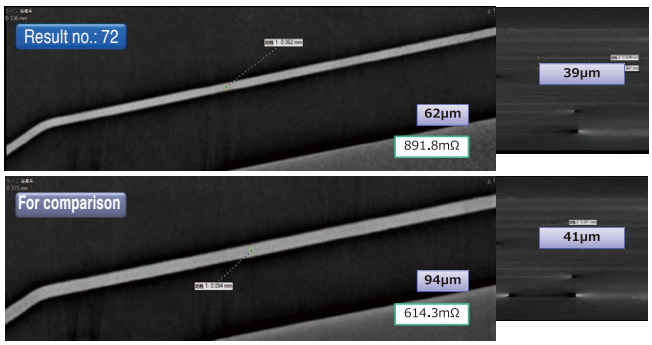
AI learns and searches test results and identifies PASS boards that include significant points statistically.

Example of significant point detection using an actual board (Pro feature)

Example detection 1

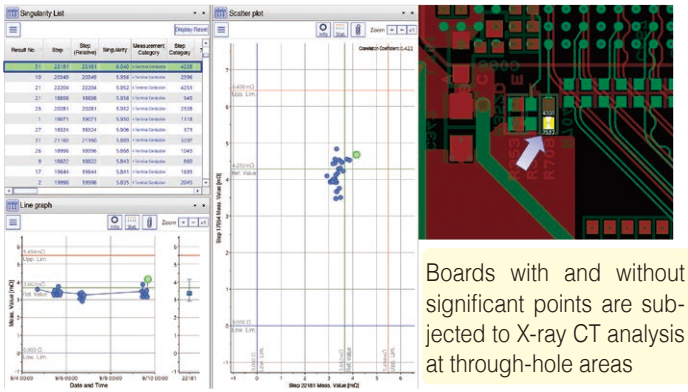


Boards with and without significant points are subjected to X-ray CT analysis at questionable areas

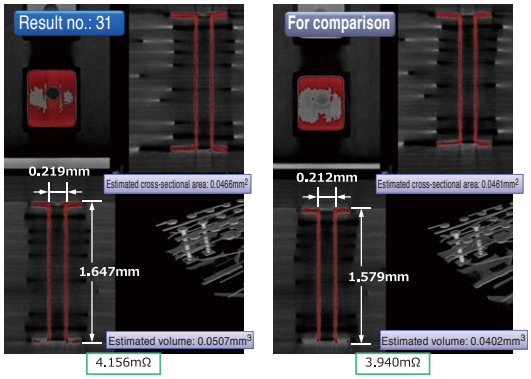


Thinning of inner layer pattern identified

Example detection 2



Boards with and without significant points are subjected to X-ray CT analysis at through-hole areas



Despite very little difference in through-hole diameter, substantial differences in through-hole thickness and volume were found

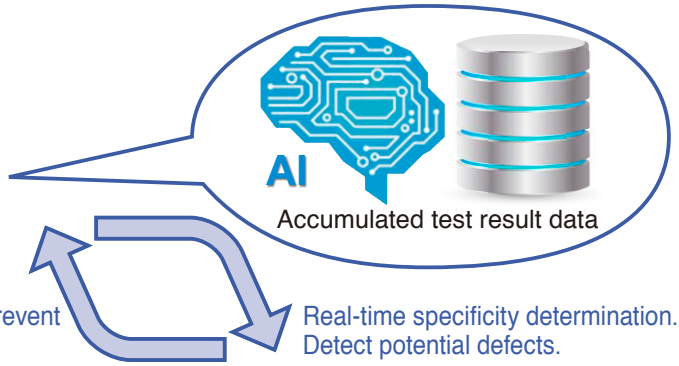
Real-time anomaly monitoring

Process Analyzer Client (E4781)

Client

Adding Process Analyzer Pro's Singularity Detection Function to Inspection Equipment

Detects latent defects in real time at the same time as normal inspection.



Supported Products
FA18XX Series

Retest function to prevent false alarms.

Real-time specificity determination. Detect potential defects.

Cont. | Ins. | 4WCont. | Component | ☐ Multiselection

4WCont. Piece 1 Step 1 Filter All 4624

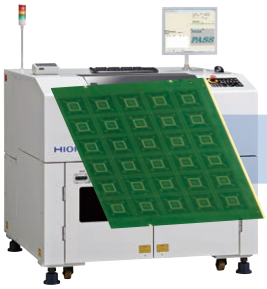
Step	Judg.	Stat. Judg.	StOrg Judg.	J	Mode	R	Reference	Measure	Upp.Lim.	Low.Lim.	S.D.	H Point Point	H Point Net	H Point 4W	H Point 2A
1	PASS	PASS	PASS	☐	R-CC	3	68.34 mΩ	54.97 mΩ	30.0 %	-30.0 %	1.357	418	1	☑	☐
2	PASS	PASS	PASS	☐	R-CC	3	12.73 mΩ	13.39 mΩ	30.0 %	-30.0 %	1.904	2380	1	☑	☐
3	PASS	PASS	PASS	☐	R-CC	3	427.4 mΩ	444.5 mΩ	30.0 %	-30.0 %	1.608	2379	1	☑	☐
4	SDL	SDL	PASS	☐	R-CC	3	486.9 mΩ	503.9 mΩ	30.0 %	-30.0 %	-5.200	2378	2	☑	☐
5	PASS	PASS	PASS	☐	R-CC	3	142.0 mΩ	152.3 mΩ	30.0 %	-30.0 %	-1.764	423	2	☑	☐
6	PASS	PASS	PASS	☐	R-CC	3	335.2 mΩ	330.2 mΩ	30.0 %	-30.0 %	0.353	424	2	☑	☐
7	SDH	SDH	PASS	☐	R-CC	3	385.8 mΩ	367.9 mΩ	30.0 %	-30.0 %	5.700	291	3	☑	☐
8	PASS	PASS	PASS	☐	R-CC	3	459.5 mΩ	500.8 mΩ	30.0 %	-30.0 %	-0.347	2376	3	☑	☐
9	PASS	PASS	PASS	☐	R-CC	3	139.7 mΩ	130.7 mΩ	30.0 %	-30.0 %	2.865	2375	3	☑	☐
10	PASS	PASS	PASS	☐	R-CC	3	113.8 mΩ	110.4 mΩ	30.0 %	-30.0 %	-1.358	2374	4	☑	☐

Defect analysis application (free version)

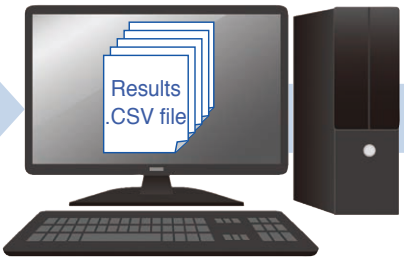
Process Analyzer

Analyze test results with Process Analyzer

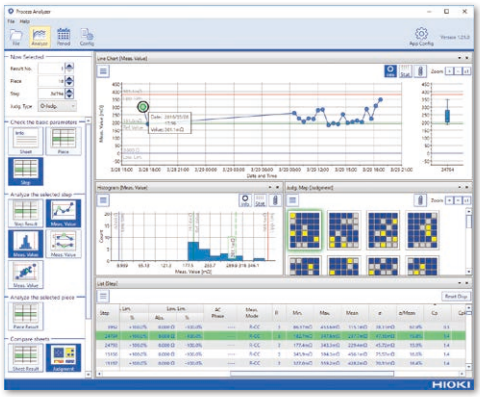
(Download the free basic Power Analyzer from the Hioki website)
https://www.hioki.com/e/lp/2020fa1817_pa/



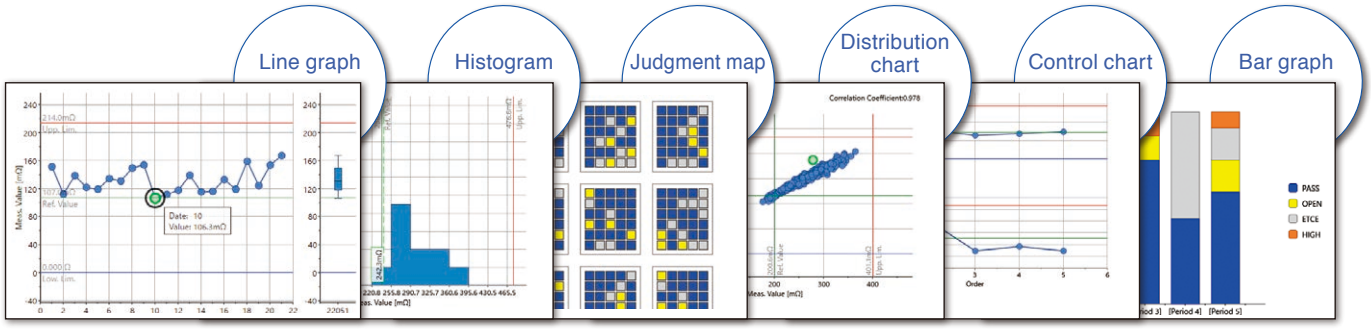
Output inspection results with HIOKI's flying probe tester.



Display test step results using histograms, distribution maps, and other tools.



Facilitate high-yield board production by analyzing defective boards and providing feedback to board design and manufacturing processes.



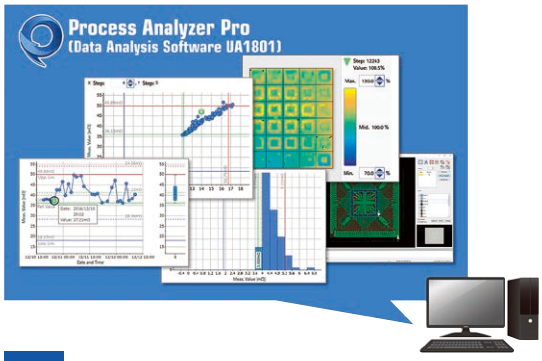
Software Products

Note: Please purchase hardware such as PC and monitor separately.

Data Analysis Software for Detecting Latent Defects on PASS Boards

Process Analyzer Pro **UA1801**

- Perform statistical analysis using the latest AI technologies
- Detect significant points that can cause latent defects
- Provide feedback to improve quality in board production and design processes



Free version Download the free version of Process Analyzer here.
https://www.hioki.com/e/lp/2020fa1817_pa/

Note: The Pro and free versions use the same application file.
To access Pro features, you must purchase a license key.

■ Specifications Overview

License contents	License key (USB) only *Note: Please purchase computer, display and other hardware separately and download the installer and documentation from Hioki's website.
Supported test equipment	FA1817, FA1816, FA1811, FA1282-01, FA1282-11, FA1283-01, FA1283-11, 1281, 1281-11, 1281-12, 1281-50, FA1116-03, 1116, 1116-01, 1116-02, 1116-12, 1116-21, 1116-22, 1116-23, 1116-24, 1116-32, 1116-41, 1116-42, 1116-43, 1116-44, 1116-45, 1116-51, 1116-52, 1116-53, 1116-54, 1116-62, 1116-71, 1116-72, 1116-73, 1116-74, 1116-75, 1270, 1271
Operating environment	Operating system: Windows 10 Pro 64-bit; CPU: x64 processor running at 1.0 GHz or better (2.0 GHz or better recommended); memory: 2 GB or better (4 GB or better recommended); other software: Microsoft .NET Framework 4.6 and appropriate language pack
Supported languages	English, Japanese, Simplified Chinese, Traditional Chinese, Korean

Model No. (Order Code) **UA1801-01** (Limited 1-year license)
UA1801-02 (Unlimited license)

Compatible products(As of Mar. 2022.)

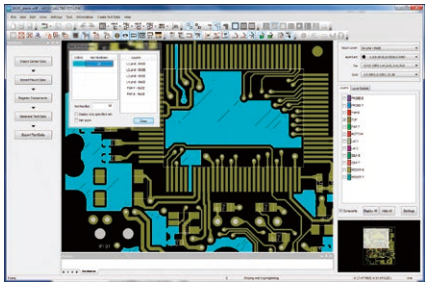
FLYING PROBE TESTER

1/2 Data Generation Time With New Platform, 3-in-1 Editing Software for Bare Board Testing

FEB-LINE INSPECTION DATA CREATION SYSTEM **UA1781**

Gerber editing software that embodies the know-how for substrate testing Built-in commands eliminate need for special know-how

- Easily generate test points even on the inner layer for cavity structures (One-point test-point generation)
- Expanded touch panel functions for printed boards (Optional E7001)
- Support for built-in component boards
- High-precision relay-point deletion functionality that reliably delete only the unnecessary relay-points
- Supported in English



■ Specifications Overview

License content	Install CD, license key (USB), instruction manual *Note: Please purchase hardware such as PC and monitor separately.
Operating environment	Windows 10 Pro 64-bit
Data entry function	Gerber file, aperture file, drill file, U-ART database, DXF (optional E7001)
Test data generation function	Net information generation, part test data generation, test point generation, relay-point deletion
Test data output format	SFD, SFDX, NND, IND, CON, COT, COTX, PRTX, LAYOUT

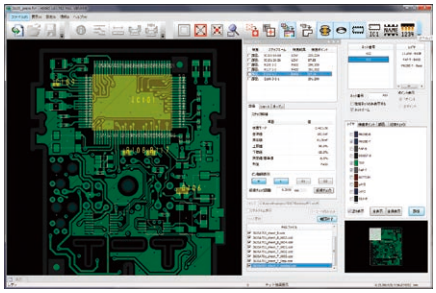
Model No. (Order Code) **UA1781** (Permanent license version)

Robust Support for Repair Work Using Simple Operations and Assistive Functionality for both Bare Board and Populated Board

FAIL VISUALIZER **UA1782**

The Fail Visualizer UA1782 is a dedicated visualization software for Hioki electrical testing equipment and data creation systems.

- Visualize test results from flying-probe testers
- Pinpoint components and patterns from test result files
- Display the probing positions of test fixtures or test heads for both ICT and bare board testers
- Search for components and nets on device embedded bare board



■ Specifications Overview

License content	Install CD, license key (USB), instruction manual *Note: Please purchase hardware such as PC and monitor separately.
Database import	Load UA1780 and U-ART databases
Operating environment	Windows 10 Pro 64-bit
Net highlighting	Display user-specified nets with color highlighting. Select whether to display all layers or only top and bottom layers.
Fail list loading with real-time monitoring	Monitor a test result output folder for a testing system at a specified interval and automatically load new test data as it becomes available.

Model No. (Order Code) **UA1782** (supports UA1780 database input)
UA1782-01 (supports IPC-D-356 format input)
UA1782-02 (supports CAN & ADR format input)

FLYING PROBE TESTER **FA1813**

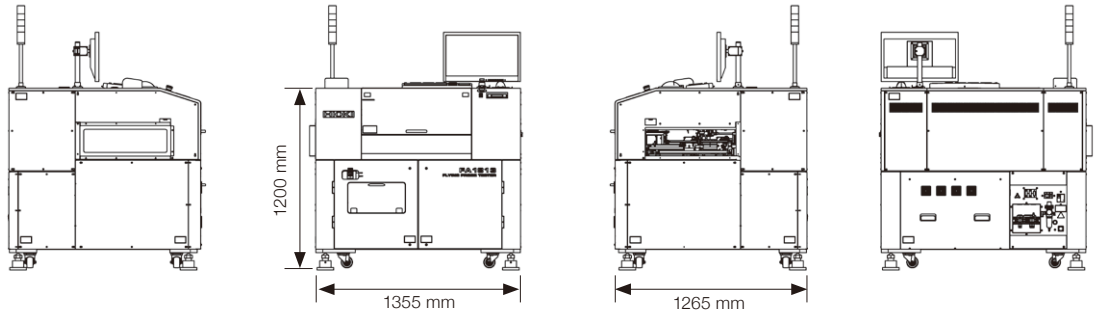
- Four-terminal measurement with a minimum pad diameter of 28 µm
- Reduce probe marks in combination with the latest probes
- Fault analysis using newly developed “Process Analyzer”

Model No. (Order Code) **FA1813** (Horizontal double sided)

■ Specifications Overview

Number of arms	4 (2 each, top and bottom)	
Compatible probes	1172 series, CP1072 series, CP1073 series	
Number of test steps	999,999 steps	
Test parameters and measurement ranges	DC constant-current continuity measurement:	400.0 µΩ to 400.0 kΩ
	DC constant-current resistance measurement:	40.00 µΩ to 400.0 kΩ
	DC constant-voltage resistance measurement:	4.000 Ω to 40.00 MΩ
	Insulation resistance measurement:	1.000 kΩ to 100.0 GΩ
	AC constant-voltage capacitance measurement:	100.0 fF to 10.00 µF
	Leakage current measurement :	1.000 µA to 10.00 mA
	High-voltage resistance measurement :	1.000 kΩ to 100.0 GΩ
	Capacitor insulation measurement :	1.000 kΩ to 10.00 MΩ
	Open measurement :	4.000 Ω to 4.000 MΩ
	Short measurement :	400.0 mΩ to 40.00 kΩ
<Embedded device board test>	LSI Connection test:	0.000 V to 12.00 V
	LSI Consumption current test:	100.0 nA to 100.0 mA
	AC constant-voltage resistance measurement:	10.00 Ω to 10.00 kΩ
	AC constant-voltage capacitance measurement:	10.00 pF to 100.0 µF
	AC constant-voltage inductance measurement:	1.000 µH to 1.000 mH
Judgment range	-99.9% to +999.9% or absolute value	
Movement resolution	XY: 0.1 µm / pulse; Z: 1 µm / pulse	
Minimum pad pitch	Top surface: 32 um (with CP1075-09) Bottom surface: 44um (with CP1075-09)	
Minimum pad size	Top surface: 2 um (with CP1075-09) Bottom surface: 14um (with CP1075-09)	
Measurement speed	Max. 76 points/sec. (0.5 mm movements, 4-arm simultaneous probing, capacitance measurement)	
Testable board size	Thickness : 0.1 mm to 2.5 mm (0.10 in) Outer dimensions : 50 mm (1.97 in) W × 50 mm (1.97 in) D to 400 mm (15.75 in) W × 330 mm (12.99 in) D	
Maximum testable area	398 mm (15.67 in) W × 304 mm (11.97 in) D	
Clamp method	2-side holder	
Power supply	200 V, 220 V, 230 V, 240 V AC single phase (specified at time of order), 50 Hz/ 60 Hz, Maximum power consumption: 5 kVA	
Dimensions and weight	1355 mm (53.35 in) W × 1200 mm (47.24 in) H × 1265mm (49.8 in) D (excluding protruding parts), 1130 kg (39860 oz)	

Appearance and dimensions (reference diagram)



Options for FA1813 *See the last page of this catalog for a list of probe options that apply to all models.

Model No. (Order Code)	Name	Remarks
Factory options		
E4600	THERMAL MINI-PRINTER	
FA1395	RECOVERY DISC	

Model No. (Order Code)	Name	Remarks
Other options		
1134-02	SCRATCHSHEET	2 sheets/176 pieces per box
1350-02	OFFSET BOARD	2-sided, t=2 mm (0.08 inch)
E4502	MEASUREMENT SECTION CALIBRATION UNIT	R: Up to 500 MΩ, C, L: All
1330-06	MEASUREMENT SECTION CALIBRATION UNIT	R: 200 MΩ to 100 GΩ
FA1350-05	OFFSET BOARD	2-sided, t=1 mm (0.04 inch)
Software		
E4310	OFFLINE SOFTWARE	Data creation system
UA1781	FEB-LINE INSPECTION DATA CREATION SYSTEM	Data creation system
UA1782	FAIL VISUALIZER	Supports UA1780 database input
UA1782-01	FAIL VISUALIZER	Supports IPC-D-356 format input
UA1782-02	FAIL VISUALIZER	Supports CAN & ADR formats input
UA1801-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
UA1801-02	DATA ANALYSIS SOFTWARE	Unlimited license
E4781-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
E4781-02	DATA ANALYSIS SOFTWARE	Unlimited license

FLYING PROBE TESTER **FA1816**

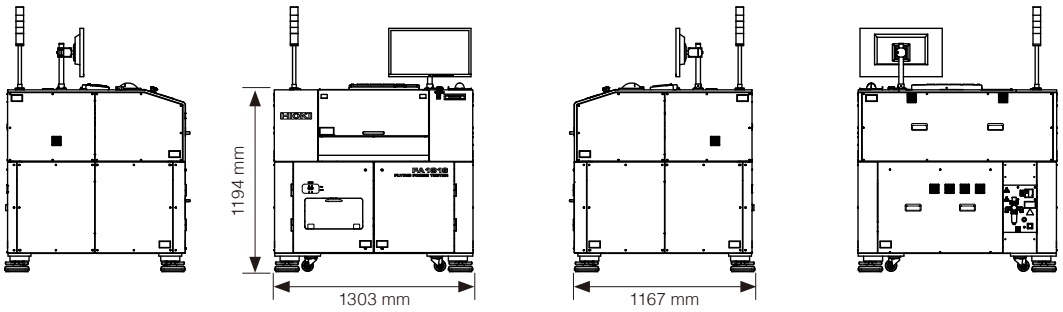
- High-speed pattern testing using the capacitive measurement method
- Reduce probe marks in combination with the latest probes
- Significantly improved operability

Model No. (Order Code) **FA1816** (Horizontal single sided)

■ Specifications Overview

Number of arms	2 (top surface × 2)
Compatible probes	1172 series, CP1072 series
Number of test steps	999,999 steps
Test parameters and measurement ranges	Resistance measurement : 40.00 μΩ to 40.00 MΩ Insulation measurement : 1.000 kΩ to 500.0 MΩ Capacitance measurement : 100.0 fF to 10.00 μF Leakage current measurement : 1.000 μA to 10.00 mA High-voltage resistance measurement : 1.000 kΩ to 500.0 MΩ Capacitor insulation measurement : 1.000 kΩ to 10.00 MΩ Open measurement : 4.000 Ω to 4.000 MΩ Short measurement : 400.0 mΩ to 40.00 kΩ
Judgment range	-99.9% to +999.9% or absolute value
Minimum pad pitch	40 um (with CP1075-09)
Minimum pad size	10 um (with CP1075-09)
Measurement speed	Max. 100 points/sec. (0.1 mm movements, 2-arm simultaneous probing, capacitance measurement)
Testable boards	50 mm (1.97 in) W × 50 mm (1.97 in) D to 610 mm (24.02 in) W × 510 mm (20.08 in) D, Thickness 0.1 mm (0.004 in) to 3.2 mm (0.13 in)
Maximum testable area	610 mm (24.02 in) W × 510 mm (20.08 in) D
Power supply	200 V, 220 V, 230 V, 240 V AC single phase (specified at time of order), 50 Hz/ 60 Hz, Maximum power consumption: 3 kVA
Dimensions and weight	1303 mm (51.30 in) W × 1194 mm (47.01 in) H × 1167 mm (45.94 in) D (excluding protruding parts), 900 kg (31746 oz)

Appearance and dimensions (reference diagram)



Options for FA1816 *See the last page of this catalog for a list of probe options that apply to all models.

Model No. (Order Code)	Name	Remarks
Factory options		
E4600	THERMAL MINI-PRINTER	
E4601	LASER HEIGHT ADJUSTMENT UNIT	
E4602	CAMERA HEIGHT ADJUSTMENT UNIT	For 2 arms
E4603	DOT MARKING FUNCTION	Knock-type oil marker
E4604	MLCC MEASUREMENT FUNCTION	MLCC measurement
E4605	MICRO ARC DETECTION FUNCTION	
E4608	CAMERA LENS	For 2 arms, 2× zoom
E4612	COAXIAL EPI-ILLUMINATION UNIT	For 2 arms, red
E4613	COAXIAL EPI-ILLUMINATION UNIT	For 2 arms, blue
FA1395	RECOVERY DISC	

Model No. (Order Code)	Name	Remarks
Other options		
1134-02	SCRATCHSHEET	2 sheets/176 pieces per box
1330-03	MEASUREMENT SECTION CALIBRATION UNIT	R: Up to 500 MΩ, C, L: All
1355-01	VACUUM PUMP	
FA1350-05	OFFSET BOARD	2-sided, t=1 mm (0.04 inch)
1350-02	OFFSET BOARD	2-sided, t=2 mm (0.08 inch)
Software		
E4610	OFFLINE SOFTWARE	For FA1816 and similar products
UA1781	FEB-LINE INSPECTION DATA CREATION SYSTEM	Permanent license version
UA1782	FAIL VISUALIZER	Supports UA1780 database input
UA1782-01	FAIL VISUALIZER	Supports IPC-D-356 format input
UA1782-02	FAIL VISUALIZER	Supports CAN & ADR formats input
UA1801-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
UA1801-02	DATA ANALYSIS SOFTWARE	Unlimited license
E4781-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
E4781-02	DATA ANALYSIS SOFTWARE	Unlimited license

FLYING PROBE TESTER **FA1817**

- Optimization of probe movement reduces inspection time by up to 20%
- Reduce probe marks in combination with the latest probes
- Fault analysis using newly developed “Process Analyzer”

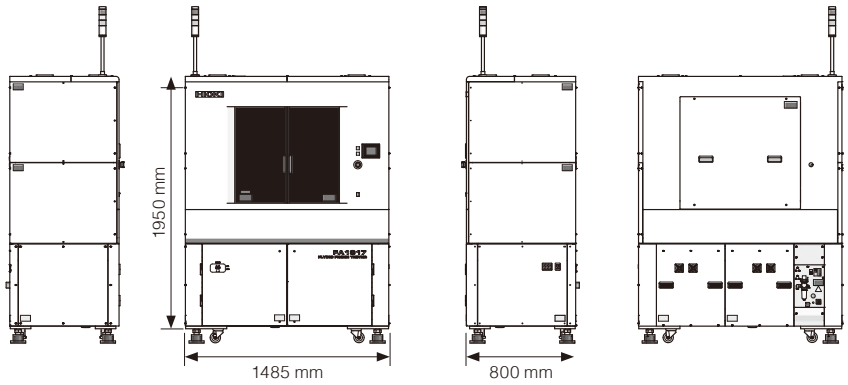
Model No. (Order Code) **FA1817** (Vertical double sided)

■ Specifications Overview

Number of arms	4 (front × 2, rear × 2)
Compatible probes	1172 series, CP1072 series
Number of test steps	999,999 steps
Test parameters and measurement ranges	Resistance measurement : 40.00 μΩ to 40.00 MΩ Insulation measurement : 1.000 kΩ to 100.0 GΩ Capacitance measurement : 100.0 fF to 10.00 μF Leakage current measurement : 1.000 μA to 10.00 mA High-voltage resistance measurement : 1.000 kΩ to 100.0 GΩ Capacitor insulation measurement : 1.000 kΩ to 10.00 MΩ Open measurement : 4.000 Ω to 4.000 MΩ Short measurement : 400.0 mΩ to 40.00 kΩ
Judgment range	-99.9% to +999.9% or absolute value
Minimum pad pitch	45 um (with CP1075-09)
Minimum pad size	15 um (with CP1075-09)
Measurement speed	Max. 67 points/sec. (0.15 mm movements, 4-arm simultaneous probing, capacitance measurement)
Testable boards	Standard specification: 50 mm (1.97 in) W × 50 mm (1.97 in) H to 610 mm (24.02 in) W × 510 mm (20.08 in) H, Thickness 1.0 mm (0.04 in) to 3.2 mm (0.13 in) Pneumatic board clamp (option): 50 mm (1.97 in) W × 70 mm (2.76 in) H to 610 mm (24.02 in) W × 510 mm (20.08 in) H, Thickness: 0.6 mm (0.02 in) to 6.0 mm (0.24 in)
Maximum testable area	604 mm (23.78 in) W × 504 mm (19.84 in) H
Power supply	200 V, 220 V, 230 V, 240 V AC single-phase (specify at time of order), 50 Hz/ 60 Hz, Maximum power consumption: 3 kVA
Dimensions and weight	1485 mm (58.46 in) W × 1950 mm (76.77 in) H × 800 mm (31.50 in) D, (excluding protruding parts), 1070 kg (37742.5 oz)

Installation area: FA1817 can inspect boards (610 × 510 mm) of the same size as the conventional Model 1271, but the installation area for the equipment is even smaller than the conventional Model 1270 (inspection board size is smaller than on the 1271), contributing to space saving measures. In addition, a back door is available as an option, supporting easier maintenance.

Appearance and dimensions (reference diagram)



Options for FA1817 *See the last page of this catalog for a list of probe options that apply to all models.

Model No. (Order Code)	Name	Remarks
Factory options		
E4700	THERMAL MINI-PRINTER	
E4701	VACUUM UNIT FOR CAPACITANCE TEST	
E4702	CAMERA HEIGHT ADJUSTMENT UNIT	FL and FR arms only
E4703	DOT MARKING FUNCTION	Knock-type oil marker
E4704	EMBEDDED BOARD TEST UNIT	AC low power, MLCC measurement, LSI connection reliability testing
E4705	MICRO ARC DETECTION FUNCTION	
E4706	AIR-TYPE BOARD LOCKING UNIT	Cannot be selected with standard board clamp.
E4708	CAMERA LENS	For 4 arms, 2× zoom
E4711	REAR SAFETY COVER	With rear internal lighting
E4712	COAXIAL EPI-ILLUMINATION UNIT	For 4 arms, red
E4715	OFFSET STATION	
E4716	OFFSET STATION	When selecting E4706
E4717	OFFSET STATION	When selecting E4708 Test board thickness: 0.6 to 3.6 mm (0.02 to 0.14 inch)
E4718	OFFSET STATION	When selecting E4708 Test board thickness: 3.6 to 6.0 mm (0.14 to 0.24 inch)
E4720	THIN BOARD LOCKING UNIT	250 × 180 mm (9.84 × 7.09 inch)
E4721	THIN BOARD LOCKING UNIT	500 × 300 mm (19.69 × 11.81 inch)
E4722	THIN BOARD LOCKING UNIT	510 × 365 mm (20.08 × 14.37 inch)
FA1395	RECOVERY DISC	

Model No. (Order Code)	Name	Remarks
Other options		
1134-02	SCRATCHSHEET	2 sheets/176 pieces per box
1350-02	OFFSET BOARD	2-sided, t=2 mm (0.08 inch)
1330-03	MEASUREMENT SECTION CALIBRATION UNIT	R: Up to 500 MΩ, C, L: All
1330-06	MEASUREMENT SECTION CALIBRATION UNIT	R: 200 MΩ to 100 GΩ
1355-01	VACUUM PUMP	For the E4701
1949-10	UNINTERRUPTIBLE POWER SUPPLY UNIT	
FA1350-05	OFFSET BOARD	2-sided, t=1 mm (0.04 inch)
Software		
E4710	OFFLINE SOFTWARE	For FA1817 and similar products
UA1781	FEB-LINE INSPECTION DATA CREATION SYSTEM	Permanent license version
UA1782	FAIL VISUALIZER	Supports UA1780 database input
UA1782-01	FAIL VISUALIZER	Supports IPC-D-356 format input
UA1782-02	FAIL VISUALIZER	Supports CAN & ADR formats input
UA1801-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
UA1801-02	DATA ANALYSIS SOFTWARE	Unlimited license
E4781-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
E4781-02	DATA ANALYSIS SOFTWARE	Unlimited license

FLYING PROBE TESTER **FA1283**

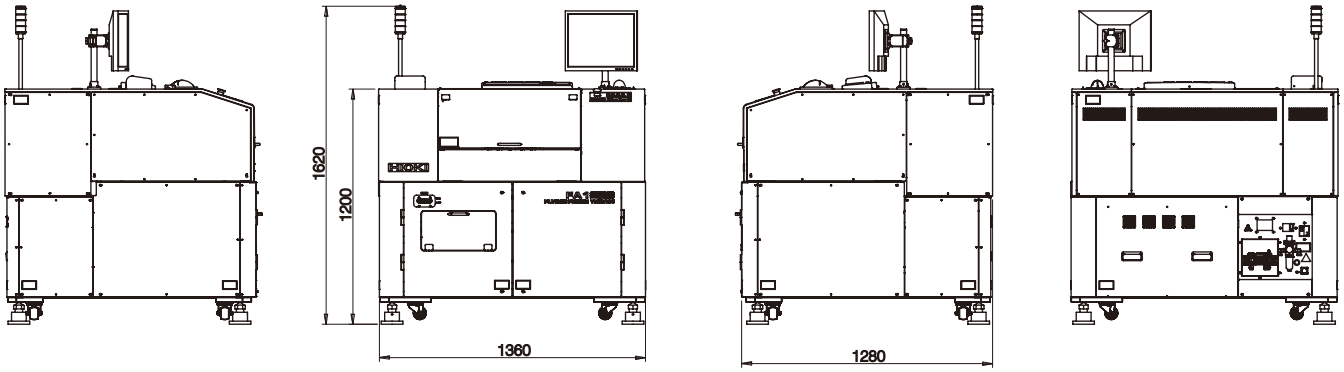
- 15 µm square high precision contact and high speed probing
- Max.100 points/s ultra-high speed inspection
- Inspect general bareboards to fine and high density substrates such as flexible substrate and CSP
- Full lineup of functions including capacitance measurement and testing of diodes and other embedded components

Model No. (Order Code)		
	FA1283-01	(without board-carrier)
	FA1283-11	(with board-carrier)

■ Specifications Overview

Number of arms	4 (2 each, top and bottom)	
Mountable probes	1172 series	
Number of test steps	Max. 900,000 steps	
Measurement parameters and measurement ranges	Resistance :	40.00 µΩ to 100.0 MΩ
	Capacitance :	10.00 fF to 40.00 mF
	Inductance :	10.00 µH to 100.0 mH
	Diode VZ measurement :	0.000 V to 25.00 V
	Insulation resistance :	200.0 Ω to 100.0 GΩ
	Capacitance Insulation resistance :	200.0 Ω to 10.00 MΩ
	High voltage resistance :	200.0 Ω to 25.00 GΩ
	High voltage short resistance :	400.0 mΩ to 400.0 kΩ
	Leak current measurement :	100.0 nA to 10.00 mA
	Zener diode VZ measurement :	0.000 V to 25.00 V
	Digital transistor measurement :	0.000 V to 25.00 V
	Photo couplers measurement :	0.000 V to 25.00 V
	Continuity test :	400 mΩ to 1.000 kΩ
	Open test :	4.000 Ω to 4.000 MΩ
	Short test :	400.0 mΩ to 40.00 kΩ
	DC voltage measurement :	40.00 mV to 25.00 V
Judgment range	-99.9% to +999.9% or absolute value	
Minimum pad pitch	35 um (with CP1075-09)(with FA1971-01 installed) 40 um (with CP1075-09)	
Minimum pad size	5 um (with CP1075-09)(with FA1971-01 installed) 10 um (with CP1075-09)	
Measurement speed	Max. 100 points/ s (X-Y movements of 0.1 mm, 2-arm simultaneous probing, when capacitance measurement)	
Testable board size	Thickness : 0.1 mm to 2.5 mm (0.10 in) Outer dimensions : 50 mm (1.97 in) W × 50 mm (1.97 in) D to 400 mm (15.75 in) W × 330 mm (12.99 in) D	
Maximum testable area	400 mm (15.75 in) W × 324 mm (12.76 in) D	
Board clamping	Board 2-side chuck method (with tension function)	
Power supply	200 V, 220 V, 230 V, 240 V AC single-phase (specify upon order), 50/60 Hz, 5 kVA	
Dimensions and weight	1360 mm (53.54 in) W × 1200 mm (47.24 in) H × 1280 mm (50.39 in) D, (Excluding protruding parts), 1,100 kg (38,800.7 oz)	

Appearance and dimensions (reference diagram)



Options for FA1283 *See the last page of this catalog for a list of probe options that apply to all models.

Model No. (Order Code)	Name	Remarks
Factory options		
FA1937-50	EMBEDDED DEVICE BOARD TEST UNIT	AC low power (measurement voltage: 0.1 V) LSI test MLCC measurement Impedance test
FA1938-22	MICRO ARC DETECTION UNIT	Arc detection at 1 µs or greater (Standard specifications: 1 ms or greater)
E4001	VACUUM UNIT FOR CAPACITANCE TEST	
FA1971-01	PRECISION PROBING UNIT	
CP1072-01	LINK PROBE	Reduced-impact type
FA1945-68	COAXIAL EPI-ILLUMINATION UNIT	1 set of probes for 4 arms
FA1945-69	OBLIQUE ILLUMINATION UNIT	1 set of probes for 4 arms

Model No. (Order Code)	Name	Remarks
Other options		
1330-03	MEASUREMENT SECTION CALIBRATION UNIT	R: Up to 500 MΩ, C, L: All
1330-06	MEASUREMENT SECTION CALIBRATION UNIT	R: 200 MΩ to 100 GΩ
FA1350-05	OFFSET BOARD	2-sided, t=1 mm (0.04 inch)
FA1395	RECOVERY DISC	
1944-03	EXTENSION I/O BOARD	
Software		
1139-09	1281 DATA COMPOSITION SOFTWARE	For the FA1283, 1281
UA1781	FEB-LINE INSPECTION DATA CREATION SYSTEM	Permanent license version
UA1782	FAIL VISUALIZER	Supports UA1780 database input
UA1782-01	FAIL VISUALIZER	Supports IPC-D-356 format input
UA1782-02	FAIL VISUALIZER	Supports CAN & ADR formats input
UA1801-01	DATA ANALYSIS SOFTWARE	Limited 1-year license
UA1801-02	DATA ANALYSIS SOFTWARE	Unlimited license

Product Line

FA1813 Four-terminal testing of fine pads

Flagship model for testing package boards

Featuring a dedicated design engineered for high precision

Maximum testable board size:
400 mm (15.75 in) × 330 mm (12.99 in)

FA1816 High-speed open-short testing

Top market share of any capacitance testing model

Vacuum-suction board clamping to accommodate everything from bare boards to flexible, glass, ceramic, and irregularly shaped boards

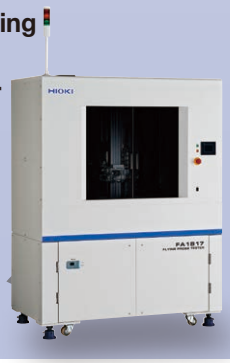
Maximum testable board size:
610 mm (24.02 in) × 510 mm (20.08 in)

FA1817 High-speed, double-sided low-resistance testing

Specially designed for testing plating thickness in targets ranging from build-up boards to small-diameter through-holes

Support for standard bare boards, motherboards, and flexible boards (with optional thin-substrate tension frame)

Maximum testable board size:
610 mm (24.02 in) × 510 mm (20.08 in)



FA1283-01 Testing of boards with embedded devices

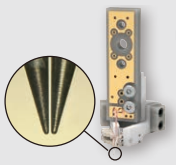
A bare board tester that draws on more than 30 years of populated board testing expertise

Support for automatic transport (FA1283-11)

Maximum testable board size:
400 mm (15.75 in) × 330 mm (12.99 in)

Model No. (Order Code)	Name	Remarks
Shared Probe options for FA1817, FA1816, FA1813, and FA1283		
1172-68	LINK PROBE WITH BLADE	Single blade
1172-69	DOUBLE LINK PROBE WITH BLADE	Kelvin blade
1172-74	PROBE FOR CALIBRATION	For use with Measurement Unit Calibration Unit only
1172-81	LINK PROBE	
1172-82	LINK PROBE	
1172-83	DOUBLE LINK PROBE	35 µm pitch
1172-84	LINK PROBE	1172-82 perpendicular
1172-93	LINK PROBE	1172-81 SR30
1172-96	LINK PROBE WITH BLADE	1172-68 45 deg.
1172-99	DOUBLE LINK PROBE WITH BLADE	1172-69 45 deg.
CP1072-01	LINK PROBE	Reduced-impact type
CP1072-11	KELVIN PROBE	Reduced-impact type, 37 µm pitch
CP1072-12	KELVIN PROBE	Reduced-impact type, 21 µm pitch
CP1072-23	KELVIN PROBE	CP1072-12 16µm pitch SR4
CP1074-02	SINGLE PROBE	1172-81 SR4
CP1074-19	KELVIN PROBE	1172-83 SR20 Au plating
CP1074-25	KELVIN PROBE	1172-83 17 µm pitch SR4
CP1074-36	KELVIN PROBE	1172-83 27 µm pitch SR6
CP1075-09	SINGLE PROBE	
CP1076-04	SINGLE PROBE	1172-66 1172-89 tip
CP1077-22	KELVIN PROBE	1172-99 100 µm pitch
CP1078-07	SINGLE PROBE	For cavities
CP1078-16	KELVIN PROBE	1172-67 45 µm pitch, needle extended 1.2 mm
CP1078-17	KELVIN PROBE	1172-83 60 pitch, for cavity testing (requires modification of the main unit)
Probe options for FA1813		
CP1073-01	SINGLE PROBE	
CP1073-11	KELVIN PROBE	
CP1073-12	KELVIN PROBE	
CP1073-14	PROBE FOR CALIBRATION	

Choose from an extensive range of models to suit the type of board being tested.



For 4-terminal measurement

KELVIN PROBE CP1072-11:
Reduced-impact type, 37 µm pitch
KELVIN PROBE CP1072-12:
Reduced-impact type, 21 µm pitch

For fine pattern use

LINK PROBE CP1072-01 :
Reduced-impact type

For 4-terminal measurement

DOUBLE LINK PROBE
1172-83 : 35 µm pitch

For fine pattern use

LINK PROBE 1172-82

For VIA evaluation

DOUBLE LINK PROBE
WITH BLADE 1172-69

CP1073-01

CP1073-11

CP1073-12

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