

High-speed multifunction testing of populated boards

Compact modular in-circuit tester FA1220



Multichannel high-speed short/open testing

Embeddable short/open tester FA1221

- Significant increase in the number of pins per unit of installation volume to 1024
- Global-ready: CE Mark and KC Mark compliant
- Combine with other testing processes to streamline multiple processes into a single workflow
- Ideal for embedding in reduced-manpower or unmanned automated systems



FA1220/FA1221 shared features

High-speed, multichannel testing

Digital signal processing has been redesigned from Hioki's legacy 1220-50 series. Processing capacity has been increased 16% compared to legacy models.

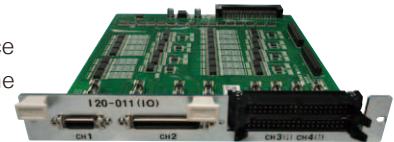
Easy-to-use interface

Your testing line computer can be used to configure test conditions for, and control, both the FA1220 and FA1221. (Subject to limitations imposed by the recommended operating specifications.) The test tool can coexist with your existing computer applications, which can be used to control the FA1220/FA1221 control application.

In addition, the FA1220/FA1221 uses a general-purpose LAN connection, simplifying the wiring process inside your testing system.

I/O allocation function

When embedding the FA1220/FA1221 in an existing tester, an I/O interface is essential. Since you can assign the necessary signals to the connector pin numbers you specify using the FA1220/FA1221's I/O board (option), the system can be easily upgraded.



FA1220 features

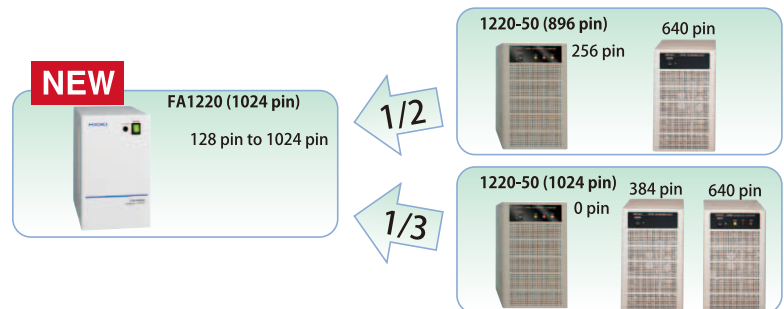
More channels

The FA1220 provides more channels per unit of installation space than Hioki's legacy models.

Legacy 1220-50: Up to 320 pins per rack

New FA1220: Up to 1,024 pins per rack

Since you can save space when using numerous channels (measurement pins), it's easier than ever before to embed the product in existing equipment.



Streamlining of testing processes

Since the FA1220 is the size of a mini-tower computer (200 [W] × 323 [H] × 298 [D] mm), it can be embedded in existing automated equipment, saving installation space and additional costs.

Ideal design for embedding in reduced-manpower or unmanned automated equipment

Electronic control units (ECUs) for electric vehicles (EVs) and motor drive circuits for industrial robots are often used in mission-critical devices where malfunctions are unacceptable. As a result, electronic circuit boards must deliver both high quality and high reliability.

Demand for the ability to quickly and accurately test large quantities of electronic circuit boards is increasing, and the production lines of the future will require smart factories, as evidenced by initiatives such as Society 5.0 (Japan) and Industry 4.0 (German). In this context, the compact, modular FA1220, which can be embedded in existing automated equipment to perform high-quality, high-reliability measurement, is ideal.



Embed Electronic Circuit Board Component, Mounting Status, and Function Testing into Existing Equipment

IN-CIRCUIT TESTER FA1220



Computer and peripherals not included in FA1220. A separate control computer is required in order to use the FA1220 on a standalone basis. FA1220 Main unit

- Functionality has been consolidated in a single, desktop tower that can be easily embedded in existing equipment
- Extensive function testing
- Electrolytic capacitor and IC reverse insertion detection
- Macro-testing function to increase test efficiency
- Four-terminal low-resistance measurement for stable measurement of low resistance

Model No. (Order Code) **FA1220** (Main unit only)

- Data from the legacy 1101 and 1102 cannot be converted for use by the 1220 (FA1220) because Hioki is unable to supply computers that can run the 1137 Support Software.
- Data compatibility between the FA1220/FA1221 and legacy products (1220-00-01/-02/-11/-50/-51/-52/-55): Although data created for legacy products can be used, such data is not fully compatible with the FA1220/FA1221. It may be necessary to perform stray capacitance acquisition, wiring resistance acquisition, S/O data acquisition, IC data acquisition, and component test debugging. In particular, it may be necessary to reacquire stray capacitance in applications that involve measurement of minuscule capacitance values.

FA1220 Specifications

Number of test points	Max. 1024 pins (Can be added in blocks of 128 pins.) Standard : 0 pins (Scanner boards are sold as options.)
Number of test steps	Round-robin short/open data : 1024 pins Component data : Max. 10000 steps Macro data : 1024 pins/1024 steps (regardless of number of pins) IC data : 500 steps (max. 1024 pins/step) Charge data : 40 sets Pin contact data : 1024 pins Group data : 255 groups
Test parameters and measurement ranges	Round-robin short/open : 4 Ω to 400 kΩ (Default: 40 Ω) Macro testing (impedance) : 1 Ω to 10 MΩ Component tests : Possible IC reverse insertion detection : Possible
Component tests	Resistance : 400 μΩ to 40 MΩ Impedance : 1 Ω to 10 MΩ Capacitor (capacitance) : 10 pF to 400 mF Coil (inductance) : 1 μH to 1 H Diode/transistor : 0 V to 25 V Zener diode : 0 V to 25 V Digital transistor : 0 V to 25 V MOSFET on-resistance : 0 Ω to 1000 Ω JFET drain current N ch : 0 A to 20 mA JFET drain current P ch : -20 mA to 0 mA Photocoupler test : 0 V to 25 V DC voltage : 0 V to 25 V Open : 4 Ω to 4 MΩ Short : 400 mΩ to 400 kΩ Discharge : Possible Capacitor reverse insertion detection : Possible

Test signals	DC constant voltage : -200 mV / 100 mV / 400 mV / 10 V: 4 ranges DC constant current : 200 nA to 20 mA, 11 ranges AC constant voltage : 160 Hz 0.1 Vrms, 1.6 kHz 0.1 Vrms, 0.2 Vrms to 2.0 Vrms / 0.1 V steps 16 kHz 0.1 Vrms, 160 kHz 0.1 Vrms, 0.2 Vrms to 2.0 Vrms / 0.1 V steps Macro test : 0.2 to 0.5 Vrms / 0.1 V steps (ATG step testing) 0.2 to 2.0 Vrms / 0.1 V steps (testing between specified pins) Frequency: 1.6 kHz, 160 kHz
Measurement unit	DC voltmeter : 800 μV f.s. to 25 V f.s., 8 ranges DC ammeter : 100 nA f.s. to 250 mA f.s., 9 ranges AC ammeter : 10 μArms f.s. to 10 mA rms f.s., 4 ranges Macro test : Ammeter 10 μ / 100 μ / 1 m / 10 m Arms, 4 ranges
Scanner unit*2	Software used : Analog switch (Scanner board E4201, E4202) Number of channels : 128 channels/board (2-/4-terminal switchable) Input protection : ±15 V/±0.5 V (Batch-configurable, Scanner Board E4201/E4202 only)
Judgment range	-99.9% to +999.9% or absolute value
Measurement times	Round-robin short/open : From approx. 0.8 ms per pin Component : From approx. 0.9 ms per step Macro : From approx. 2.0 ms per step IC test : From approx. 1.0 ms per pin Charge : From approx. 3.0 ms per set Pin contact test : From approx. 1.0 ms per pin
Guarding	Max. 5 points / step
Self-test function	Execution method: Separate (manual) / at startup / at automatic test Test items: AD function, DC function, AC function, scanner boards, fixture
Statistics functionality	Defect rate tabulation and graph display by pin, test, group, and overall; component test histogram; operating time cumulative and subtotal displays
Automatic data creation function	ATG function (automatic acquisition of reference data and automatic configuration of guarding points), reference value acquisition, wiring resistance cancellation, stray capacitance cancellation, group specification
External I/O *2	Using I/O Board E4220*1 : 60 inputs, 56 outputs *1 Hioki plans to update the FA1220/FA1221 to provide functionality for configuring the I/O Board E4220. *2 Sold separately.
Operating environment	Location of use : Indoors, Pollution Level 2, maximum elevation of 2000 m Op. temp. /humidity range : Temperature: 23°C ±10°C, 75% RH or less (non-condensing) Storage temp./humidity range : Temperature: 10°C to 43°C, 75% RH or less (non-condensing) Environment : Do not use in a setting where the product would be exposed to dust, vibration, corrosive gases, etc.. Vibration : Avoid use in locations with excessive vibration. Standard compliance : Safety EN 61010-1:2010, EMC: EN 61326-1:2013 Class A
Control unit	External computer (sold separately) System requirements: Operating system: Windows 10 64-bit Japanese or English version; memory: 4 GB or more; hard disk: At least 20 GB of available space on install drive FA1220: Real-time operating system, LAN for PC connectivity (10 / 100 ×1 port)
Functionality	Retry, retry with switched polarity, or retest at defective contact; FAIL stop; test jump; test hold; test results output (printer/file); FAIL map display; mask pin setting; surplus test; consecutive FAIL stop; password protection; loading/conversion of existing model data (1105 or text data); test data switching (A/B data); point viewer; prevention of fixture raising at FAIL; barcode support; network connectivity (option); pin search with audio guidance; overall PASS/FAIL stamp (option)
Power supply	100 to 240 V AC (±10%), single-phase, 50 Hz / 60 Hz, max. 260 W (with full 1024 pins of scanner boards)
Dimensions and mass	200 mm (7.87 in) W × 323 mm (12.72 in) H × 298 mm (11.73 in) D, 10 kg (352.7 oz)
Accessories	Instruction manual ×1, Test leads ×1, Power cord ×1, Metal fittings ×1, Installation CD ×1

SCANNER BOARD E4201
Semiconductor scanner board with guarding; 128 channels per board *Cannot be combined with other scanner/relay boards.

SCANNER BOARD E4202
Semiconductor scanner board without guarding; 128 channels per board *Cannot be combined with other scanner/relay boards.

I/O BOARD E4220
E4220 configuration functionality will be launched later.

INTERNAL POWER SUPPLY E4230
Internal 24 V power supply for external control use; adds outlet to rear of main unit; requires I/O Board E4220

PERSONAL COMPUTER UNIT 1913-01
Computer, LCD, miniprinter, LAN cable, 1220 computer application (FA1221 control computer is an option.)

UNINTERRUPTIBLE POWER SUPPLY UNIT 1913-02
For computer and LCD

LAN CONNECT UNIT 1913-03
For connecting computer to an external network

CALIBRATION UNIT FOR MEASUREMENT SECTION 1330

1220 DATA COMPOSITION SOFTWARE 1137-05
Create data on a general-purpose computer

SHIELDED SCANNER CABLE E4232
64 pins, single-sided angled type, 2 m (6.56 ft) length

CONTROL CABLE E4240
E4220-compatible I/O connector, 64-channel MIL connector, 2 m (6.56 ft) length

RECORDING PAPER 1197
58 mm (2.28 in) × 30 m (98.43 ft), 10 rolls/set

Factory-installed options

Options

FA1221 features

Specifically designed for resistance testing

Designed specifically for short/open and resistance testing of flexible printed circuit boards, harnesses, connectors, semiconductor probers, welds, distribution panel wiring, and other targets to deliver exceptional cost performance.

For reliability testing of electronic components, cables, and connectors

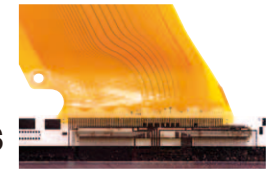
The FA1221 enables flexible, computer-based operation. It provides functionality that will be useful in testing applications, for example measurement of long-term trends in resistance values. (Cable bend durability testing, semiconductor solder overload degradation testing, relay contact durability testing, etc.)

For resistance testing of welds in fuel cell batteries

Fuel cell batteries consist of multiple cells. Since high tab weld resistance in cells leads to battery degradation, weld resistance testing is a key quality control metric, creating demand for systems that can perform efficient, highly reliable testing across large numbers of channels.



Battery module
(Consisting of multiple cells)



Battery pack
(Consisting of multiple modules)

Multichannel Short/Open Tester that can be Embedded in Your Test Equipment

SHORT-OPEN TESTER FA1221



- Functionality has been consolidated in a single, desktop tower that can be easily embedded in existing equipment
- Specifically designed for short/open testing
- Four-terminal low-resistance measurement for stable measurement of low resistance

Model No. (Order Code) **FA1221** (Main unit only)

Options				
	1220 DATA COMPOSITION SOFTWARE 1137-05 Create data on a general-purpose computer	SHIELDED SCANNER CABLE E4232 64 pins, single-sided angled type, 2 m (6.56 ft) length	CONTROL CABLE E4240 E4220-compatible I/O connector, 64-channel MIL connector, 2 m (6.56 ft) length	RECORDING PAPER 1197 58 mm (2.28 in) × 30 m (98.43 ft), 10 rolls/set

Factory-installed options						
	I/O BOARD E4220 E4220 configuration functionality will be launched later.	INTERNAL POWER SUPPLY E4230 Internal 24 V power supply for external control use; adds outlet to rear of main unit; requires I/O Board E4220	PERSONAL COMPUTER UNIT 1913-01 Computer, LCD, miniprinter, LAN cable, 1220 computer application (FA1221 control computer is an option.)	UNINTERRUPTIBLE POWER SUPPLY UNIT 1913-02 For computer and LCD	LAN CONNECT UNIT 1913-03 For connecting computer to an external network	CALIBRATION UNIT FOR MEASUREMENT SECTION 1330

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

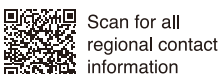
FA1221 Specifications Overview

Number of test points	128 pins (during 4-terminal measurement, up to 32 sets)	
Number of test steps	Round-robin short/open : 128 pins	
	Component data : Max. 10000 steps	
	Charge data : 40 sets	
	Pin contact data : 128 pins	
Test parameters and measurement ranges	Round-robin short/open :	4 Ω to 400 kΩ (Default: 40 Ω)
	Component tests :	Possible
Component tests	Resistance :	400 μΩ to 40 MΩ
	Open :	4 Ω to 4 MΩ
	Short :	400 mΩ to 40 Ω
Test signals	DC constant voltage :	100 m / 400 mV : 2 ranges
	DC constant current :	2 m / 20 mA, 2 ranges
Measurement unit	DC ammeter :	Ammeter 80 μ / 800 μ / 4 m / 40 m Arms, 4 ranges
	DC ammeter :	250 n / 2.5 μ / 25 μ / 250 μ / 2.5 m / 25 m A f.s., 6 ranges
Scanner unit	Analog software : 128 channels/board (2-/4-terminal switchable, no guarding)	
Judgment range	-99.9% to +999.9% or absolute value	
Measurement times	Round-robin short/open : From approx. 0.8 ms per pin	
	Component : From approx. 0.9 ms per step	
Statistics functionality	Defect rate tabulation and graph display test, group, and overall; component test histogram; operating time cumulative and subtotal displays	
External I/O *2	Using I/O Board E4220*1 : 60 inputs, 56 outputs	
	*1 Hioki plans to update the FA1220/FA1221 to provide functionality for configuring the I/O Board E4220. *2 Sold separately.	
Power supply	100 to 240 V AC (±10%), single-phase, 50 Hz / 60 Hz, max. 130 W	
Dimensions and mass	200 mm (7.87 in) W × 323 mm (12.72 in) H × 298 mm (11.73 in) D, 10 kg (352.7 oz)	
Accessories	Instruction manual ×1, Test leads ×1, Power cord ×1, Metal fittings ×1, Installation CD ×1	

HIOKI
HIOKI E. E. CORPORATION

DISTRIBUTED BY

HEADQUARTERS
81 Koizumi,
Ueda, Nagano 386-1192 Japan
<https://www.hioki.com/>



Scan for all regional contact information