

INDUCTOR BIAS CURRENT AUTOMATIC TEST MACHINE MODEL 1871B

Chroma 1871B is an automatic test system specifically designed for bias current testing of chip-type inductors. In response to the strict safety standards of the global automotive market, it offers a comprehensive test solution for functions and specifications of electronic components used in automotive products.

The Chroma 1871B bias current test system primarily focuses on quality testing of chip inductors. When the inductor's production line testing process includes a bias current test, the inductor will be unable to return to its zero point due to the momentary changes in the B-H magnetic area, which are caused by remanence. This will briefly affect the inductor's Ls/Q value, which will generally recover after tapping, resting at a high temperature or resting for an extended period of time. Therefore, if the bias current test capability is integrated into the inductor test and packaging machinery and is routinely performed, the Ls/Q value gets insufficient rest time after excitation from the bias current test, which in turn can cause production issues. This means that a test setup which combines a bias current test and an Ls/Q test into one automatic test and packaging machine is unsuitable for certain inductors. Thus, it is necessary to dedicate an independent machine toward testing the bias current specifications.

Chroma 1871B has a maximum production efficiency of 1,200 units per minute. It can perform tests using five bias current test stations at a time, meeting the demands of fast and high-capacity mass production. Another option is to match just two bias current test stations and perform additional pre-testing specifically for products with bias current test requirements. This enables meeting specific testing requirements with less equipment, providing a cost-effective solution for smaller production volumes.

Chroma 1871B uses a vibratory bowl feeder to transport small parts at high speeds, which is faster and saves more space than conventional linear reciprocating feeders. Furthermore, Chroma 1871B's test area is designed with closed indexing table architecture to avoid spilling of parts at high speeds, in addition to being more stable and faster than traditional designs.

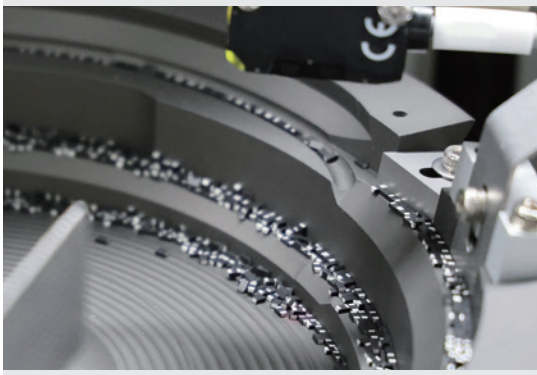
Chroma 1871B features dedicated software that monitors test status in real time during production and collects and saves test data for each individual product. This real-time monitoring function helps to reduce production risks and unnecessary man-hours. The data collection function can assist R&D and quality assurance units in product analysis or quality control. The software can also perform data analysis, leading to improved quality and increased profits.

Chroma has more than 30 years of experience in the field of precision testing instruments. Not only do we specialize in precision electronics testing technology, we can also tailor the fixtures used in automatic test systems to your needs, completing and perfecting your automation equipment.

MODEL 1871B

KEY FEATURES

- Application size:
  1.0 x 0.6 mm ~ 3.2 x 2.5 mm
  Height≦2mm
- Test frequencies (5 stations):
  600 ~1200 (ppm)
- Bias current test judgment functions:
  - Unbiased current inductance value
  - Inductance ratio of pre- and post-bias current
- Choose between 2 or 5 test stations
- Indexing table design prevents parts spillage
- Pair with Chroma 11050 for test frequencies up to 10MHz
- Test fixture with high current withstand (>20A)
- Each test station has its own defective product collection box
- Proprietary data collection software designed to monitor product quality in real-time
- Perform zero calibration with included software
- English/Japanese/Chinese operation interface
- Equipment is fast, stable and safe

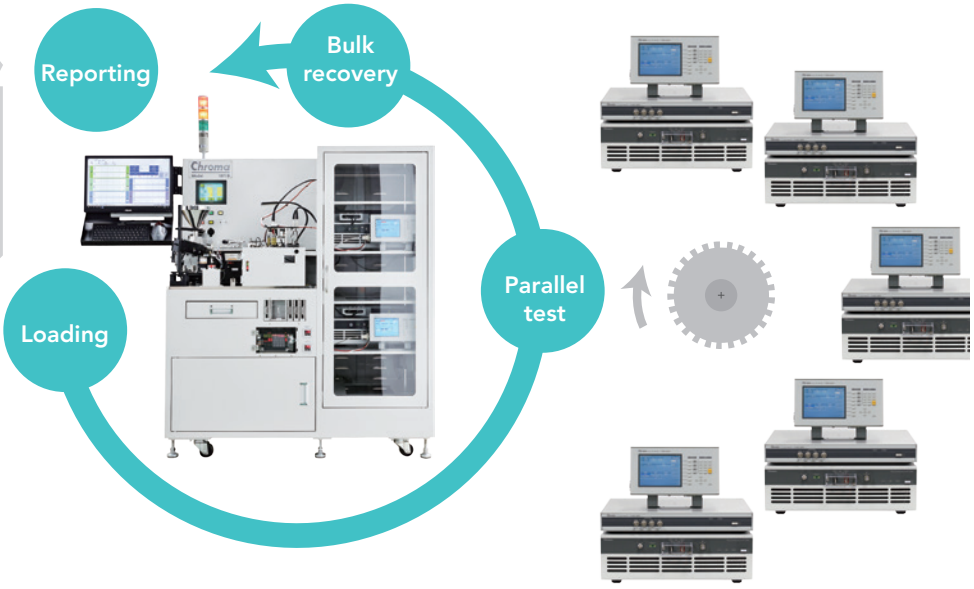


Chroma

Product Applications

Unbiased current inductance test

Inductance ratio of pre- and post-bias current test



Two bias current test stations for R&D and QA batch verification

R&D and QA units can conduct specific bias current tests to analyze defective products. For this reason, the inspection also needs to collect test data, and then further analyze the quality and related data of the product.

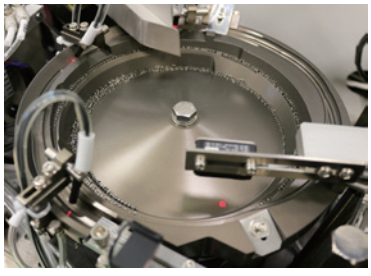
Five bias current test stations for high-speed production lines

The production line can be equipped with 5 bias current test stations, which can perform tests in tandem to shorten the test time for high-speed mass production. Test status can be monitored and data can be collected simultaneously.

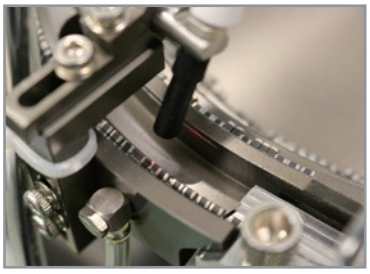
Equipment Features

Vibratory bowl feeder

The parts feeder is the first component in line that affects the efficiency of overall production. Among feeder types, the vibratory bowl feeder counts among the fastest and most stable. To solve problems with orientation of the DUTs, traditional designs use linear feeders with additional detection and overturning mechanisms along the line, slowing down production and requiring more space. The advantages of vibratory bowl feeders are their spiral track and their ability to align DUTs with their fiber-optic sensor and air blower. They can fix the feed direction using little space and without needing complex rotation mechanisms, providing a fast, stable and aligned feeding solution.



Vibratory bowl feeder

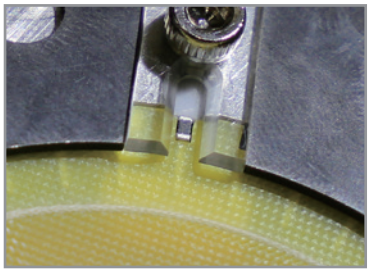


Feeder with fiber-optic sensor

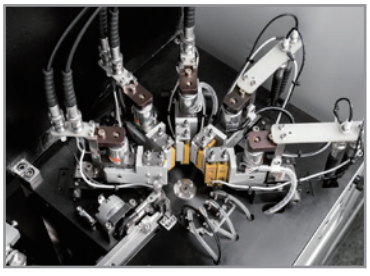
Indexing table loading

Traditional reciprocating and turret-type feeders use suction nozzles to move materials for testing. This easily causes misalignment or spilling due to the inertia or centrifugal force generated during linear or circular transfer of materials. The 1871B improves on this design with:

- ☑ Closed indexing table design which prevents material spillage
- ☑ Fixed spacing for easy contact
- ☑ Stable and rapid transfer



Closed indexing table design

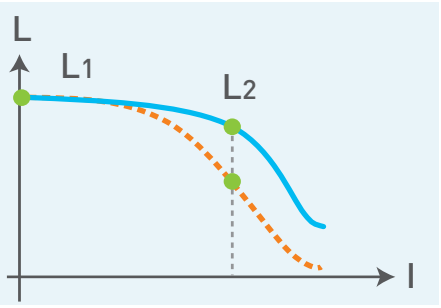


Five test stations

Bias Compare Mode

Bias compare mode is designed to calculate the percentage drop in inductance when a bias current is run through a magnetic component. Compared with the conventional absolute value judgment method, the percentage drop method is more effective in screening out inductors with poor saturation characteristics.





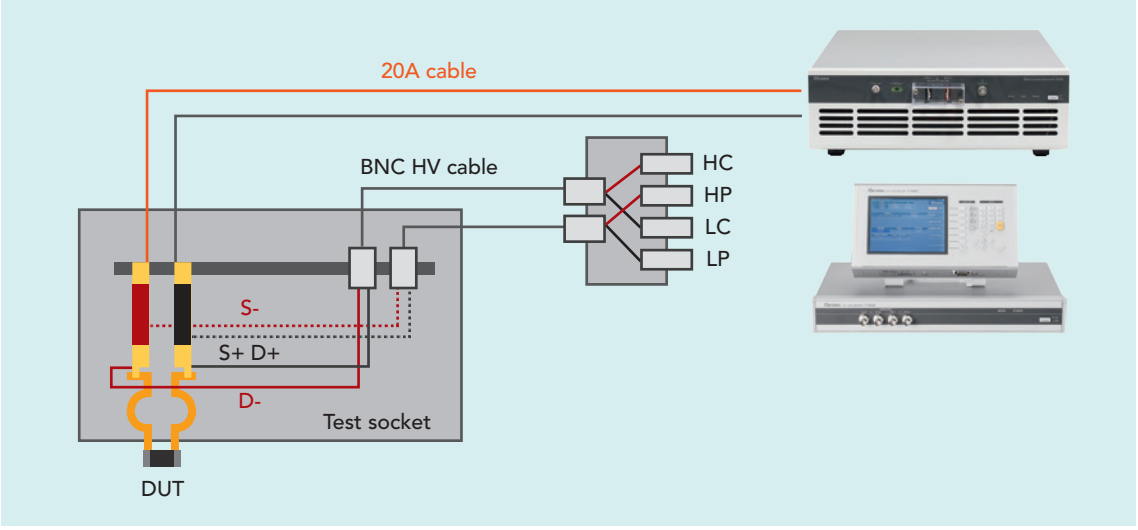
$$\text{Variance \%}\ (L_1, L_2) = \frac{L_2 - L_1}{L_1} \times 100\%$$

Pass/ fail judgment and count

Test station with large current withstand

Chip-type inductors are very small in size and are thus easily affected by wiring and fixtures during bias current testing. As an extra bias current is applied to the DUT during the test, the entire test station must be equipped with a test probe and conductor configuration designed to withstand large currents.

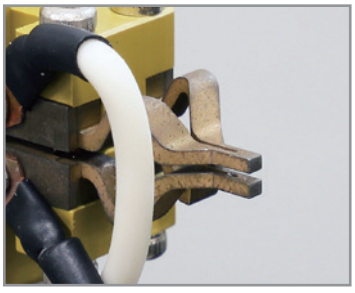
The Chroma 1871B Inductor Bias Current Automatic Test Machine is specifically designed with a test socket and test probe that can withstand currents up to 20A. The accurate and fast precision measurement instruments Chroma 11050 Series HF LCR Meter and Chroma A110505 Bias Current Source are incorporated into the system for increased test reliability and stability.



1871B bias current test socket

Stable and durable dedicated test piece

General solutions tend to use a probe to connect the test fixture to the inductor. However, the spring inside the probe may fail and cause testing errors. The Chroma 1871B test fixture uses a test piece to connect the test wire directly without using a spring. The contact area of the test piece and inductor is larger than that of a probe and offers better connectivity. The test pieces also have a longer lifespan and are easier to maintain.



Dedicated test piece

Independent NG (No Good, i.e. defective) product collection box for each station

Chroma 1871B comes equipped with 5 sets of Chroma 11050 + A110505 with identical testing purposes. To facilitate analysis, the NG (No Good, i.e. defective) products are collected separately according to different testing criteria with clear classification. Various defects can be analyzed to improve product quality.

User-friendly interface

The touch panel interface can be set to English, Chinese, or Japanese. It features a count function for production line use, and displays error messages directly on the interface to facilitate efficient troubleshooting.



User Interface – count screen



Product collection boxes



High Frequency LCR Meter and DC Bias Current Source

The Chroma 11050 Series HF LCR Meter is a precision test instrument designed to accurately measure and evaluate passive components at high speeds. With frequency ranges of 1kHz~10MHz, 60Hz~5MHz and 75kHz~30MHz, the instrument is suitable for analyzing component characteristics at a wide range of testing frequencies. 0.1% basic measurement accuracy ensures stable and highly reliable results. In addition, the fast 7ms measurement speed substantially increases productivity when operating in an automated environment.

The compatible Chroma A110505 DC Bias Current Source needs to be controlled via the 11050 Series HF LCR Meter to adjust the current output. It can deliver a bias current of 0~20A at a frequency of 100kHz~10MHz. When combining the HF LCR Meter with the DC Bias Current Source, the A110504 Bias Current Protection Box should be applied at the same time to prevent damage to the LCR Meter due to large voltages caused by transient current. Therefore, if you opt to use the A110505 DC Bias Current Source, we suggest also using the A110504 Bias Current Protection Box.



11050 Series HF LCR Meter



A110505 DC Bias Current Source



A11050 Bias Current Protection Box

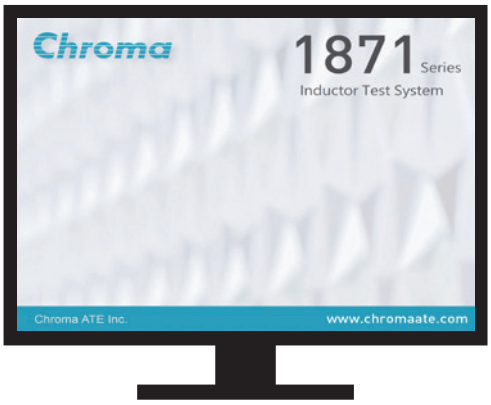
Software Interface – Testing, Monitoring and Data Collection

Chroma 1871B's data collection software A187100 is specifically designed for factory use. In addition to basic data collection, the software features real-time X-bar and R control charts and test parameter setup functions to fulfill the needs of R&D, production and QA units.

Software features

- ☑ Test parameter setup, save and recall
- ☑ Real-time test monitoring
- ☑ Test data collection
- ☑ Production report query
- ☑ Statistical analysis
- ☑ System authorization management
- ☑ Supports barcode scanning
- ☑ Zero calibration of test fixture

A187100 Data collection software



Test parameter setup, save and recall

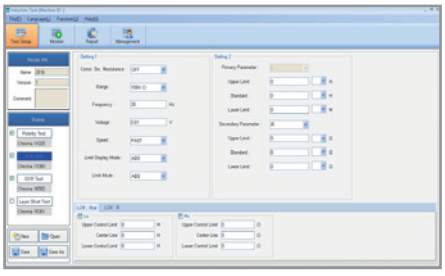
Chroma 1871B can perform zero calibration of test fixtures with the A187100 software platform. Parameters and judgment conditions can be set on all instruments in the test setup at once without the need to operate them individually. Moreover, the test parameters can be saved to a PC and recalled swiftly to test different products.

Real-time test monitoring

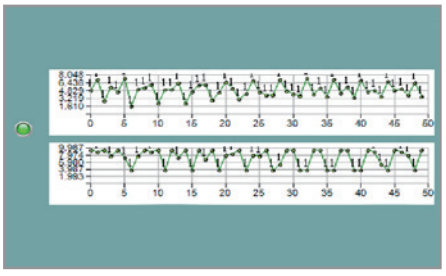
The Chroma A187100 data collection software has a real-time monitoring function that includes number of inputs, good product count, defective product count, production yield, and good/defective statistics for each station. The additional X-bar and R charts real-time monitoring function assists production units in product quality control and checking for abnormalities.



Test monitoring window



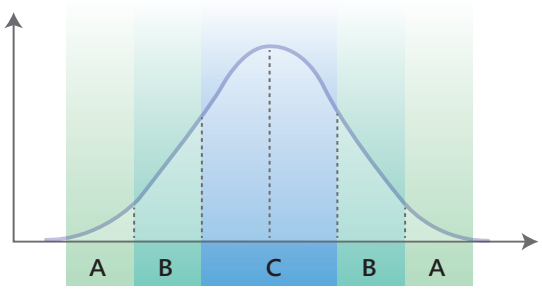
Parameter setup window



X-bar and R-charts

Control chart pattern recognition

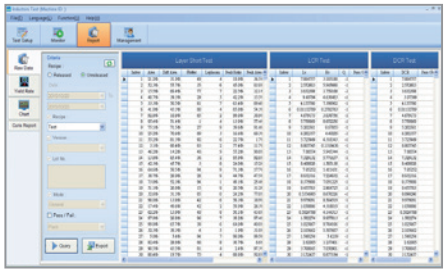
- ☑ 1 dot exceeds control limits (outside 3 Sigma)
- ☑ 2 out of 3 consecutive dots in zone A or over zone A (X-bar chart only)
- ☑ 4 out of 5 consecutive dots in zone B or over zone B (X-bar chart only)
- ☑ 6 consecutive dots rise and fall
- ☑ 8 consecutive dots not in zone C (X-bar chart only)
- ☑ 9 consecutive dots on the same side of center line
- ☑ 14 consecutive dots alternate rise and fall
- ☑ 15 consecutive dots in zone C (X-bar chart only)



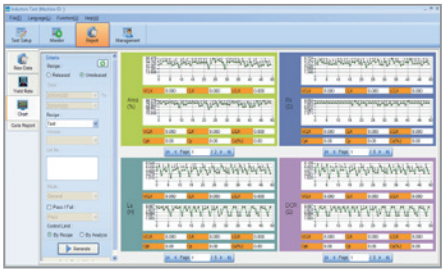
Normal distribution

Production report query and statistical analysis

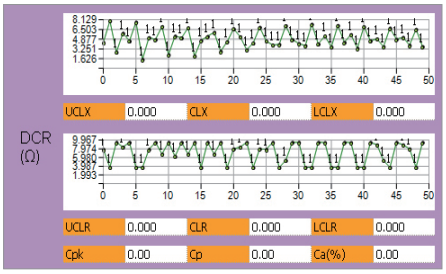
The software can query the test data for basic information, production yield, and control charts. It can also analyze the test data from the queried control charts, automatically calculate control limits, and set the judgement conditions in the test monitoring function.



Basic information query window



Control chart query window



Control limits calculated with test data

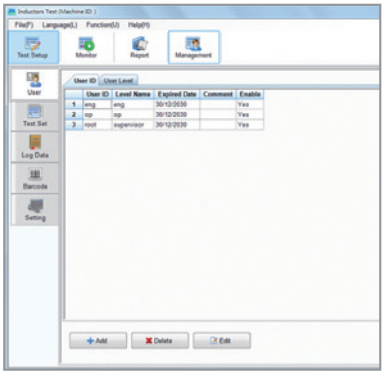
System authorization management

The system authorization management is divided into three levels:

- ☑ Administrator
- ☑ Engineer
- ☑ Operator

The benefits of this authorization system are:

- ☑ Convenient equipment management
- ☑ Prevention of production losses caused by human error



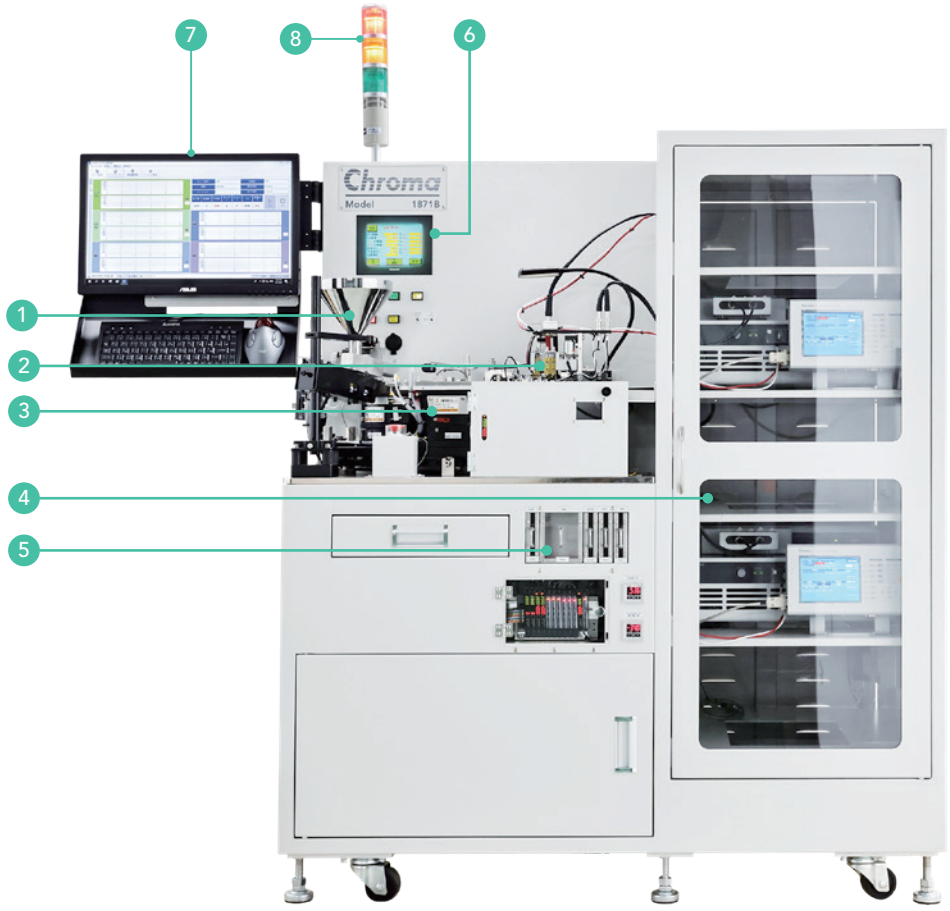
User authorization window

Barcode scanner support

- ☑ Use a barcode scanner to scan the inductor model and lot number
- ☑ Automatically recall previously saved test parameter profiles

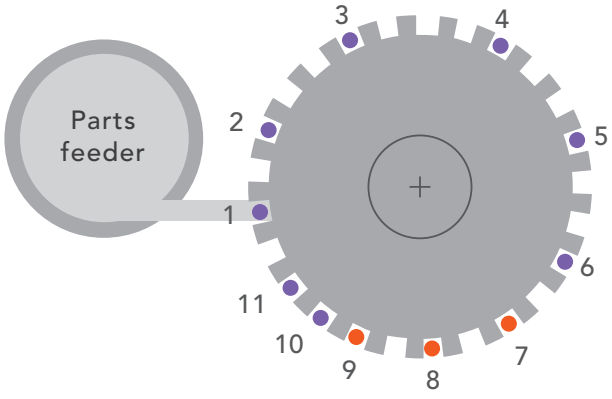


Equipment Overview



1. Storage hopper
2. Indexing table
3. Parts feeder
4. Instruments cabinet
5. Parts collection box
6. User interface
7. Display and software control
8. Signal lights

Test Area and Stations





1871B Stations

1. Orientation check
2. Bias current test station 1
   (works with Chroma 11050+A110505)
3. Bias current test station 2
   (works with Chroma 11050+A110505)
4. Bias current test station 3
   (works with Chroma 11050+A110505)
5. Bias current test station 4
   (works with Chroma 11050+A110505)
6. Bias current test station 5
   (works with Chroma 11050+A110505)
7. Defective products discharge 1
8. Defective products discharge 2
9. Defective products discharge 3
10. Good products collector
11. Clean remaining products

* Test stations 3 to 5 are reserved when only 2 stations are employed.
* Defective products are divided into Open, Short and Isat. Different categorizations are possible if required.

SPECIFICATIONS

1871B Application Size Maximum Productivity (5 test stations)										Unit : pcs/min
WxD (mm)	3.2 x 2.5		2.5 x 2.0		2.0 x 1.6 / 2.0 x 1.2			1.6 x 0.8		
H (mm)	1.2	1.0	1.2	1.0	1.2	1.0	0.8	1.0	0.8	0.6
Single-sided electrode	600	600	800	800	800	800	800	800	800	800
Five-sided electrode	900	900	1,100	1,100	1,200	1,200	1,200	1,200	1,200	1,200

* The maximum productivity listed above is calculated using the average test speed of the LCR meter and the bias current source.

General Specifications	
Power requirement	Single phase 220V; frequency 60Hz / 2.0kW
Air pressure system	CDA pressure 5~6 kg/cm^2 , CDA flow 150~200 L/min.
Operating environment	8~38℃, < 70%RH
Weight	Approx. 500 kg
Dimensions (W x H x D)	1280 mm x 1495 mm x 900 mm

*All specifications are subject to change without notice.

ORDERING INFORMATION

1871B: Inductor Bias Current Automatic Test Machine
11050 Series: HF LCR Meter
A110504: Bias Current Protection Box
A110505: Bias Current Source
IPC (optional): Industrial Personal Computer
A187100 (optional): Data Collection Software

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