

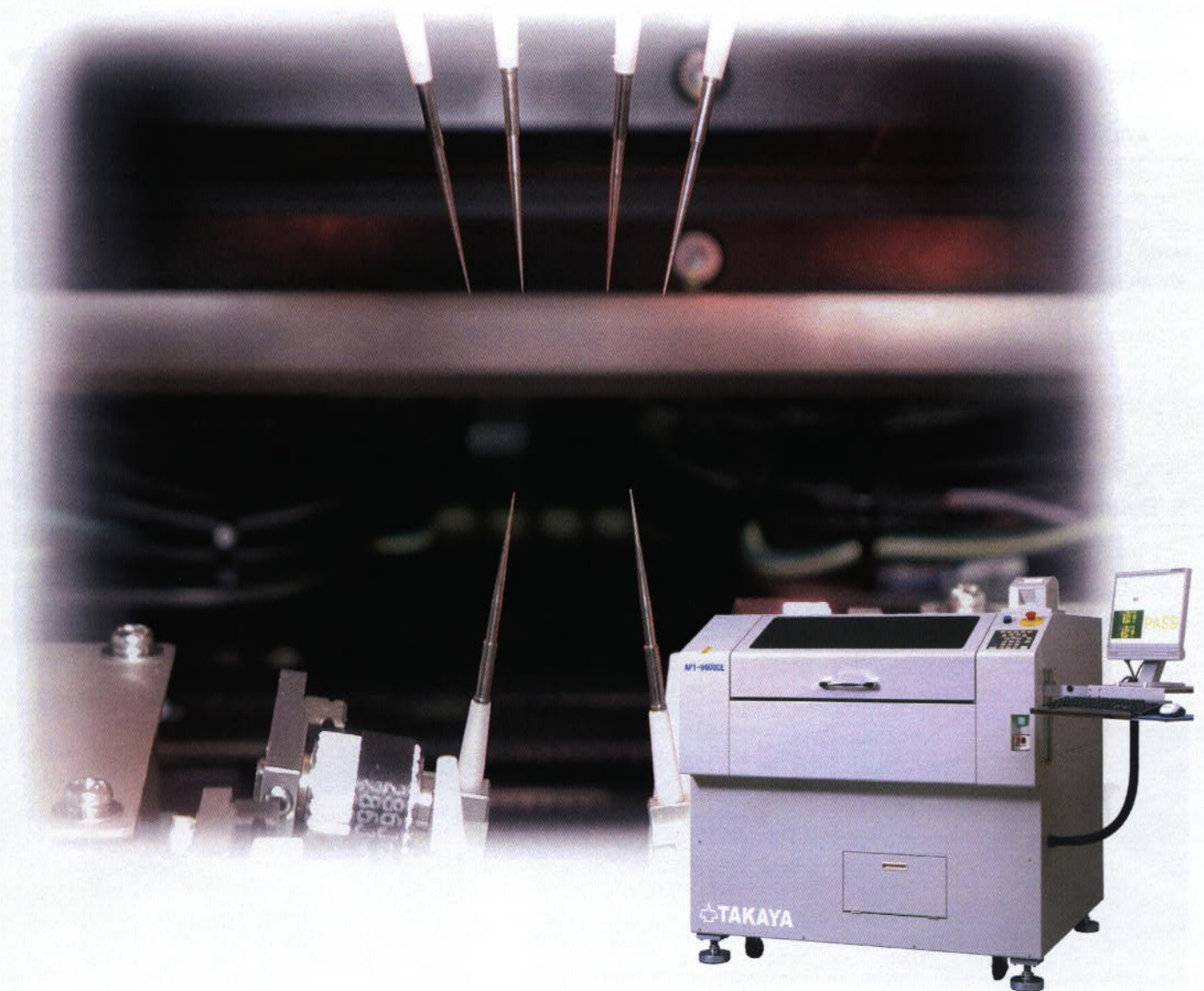
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FIXTURELESS TESTER

# **APT-9600 CE**

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Dual-sided flying probes





# Fixtureless Tester APT-9600CE

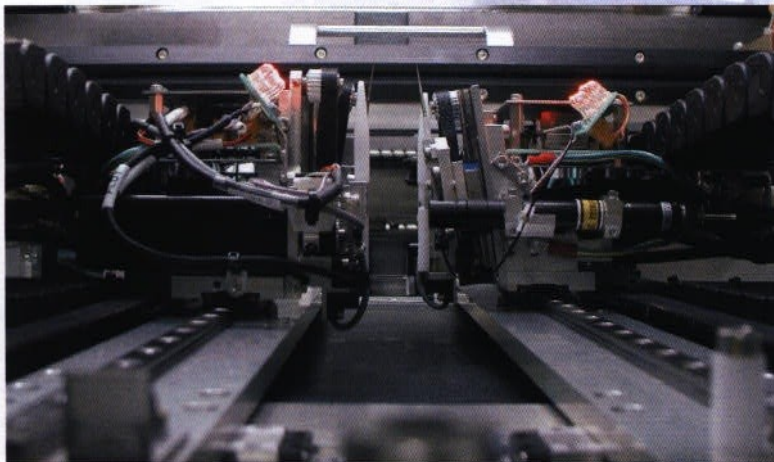
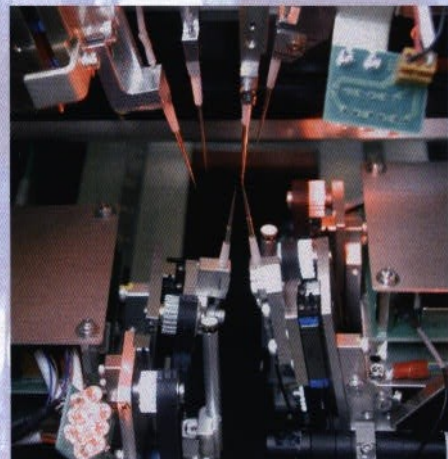
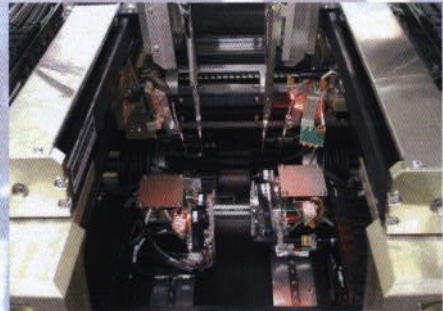
The most-advanced APT-9600CE, designed for small to medium-sized PC boards, has a total of six flying probes which flexibly move over and under the boards at the same time. The XY moving mechanisms at the top are inherited from the existing APT-9411 series that ensures high precision and stable probing contact at high speed. The advantages of using the APT-9600CE is two flying probes and a CCD camera newly added to the bottom side. Because, the boards are contacted by the flying probes simultaneously from both sides, so that you will get around the difficulties on testing the SMT boards where test points are available on the bottom surface only and improve efficiency of your work in the test process.

## ■ Top side mechanisms for achieving ultra-precision and high-speed test

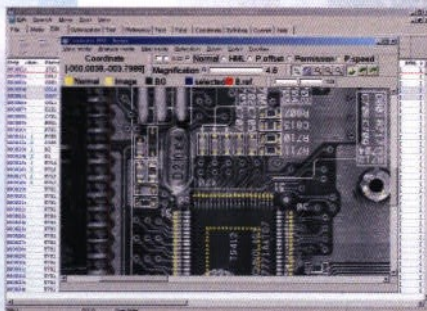
The positioning accuracy and the moving speed of the flying probes at the top are the same as the APT-9411 series and are the highest level in the world. The tester's XY stage is made of highly polished native granite, whose surface accurate remains unchanged eve after years of prolonged use. Thus testing the SMT boards is always made through stable and accurate probing contact and the combination measurement using the bottom flying probes ensures a steady implementation of saving test time and enhancing test coverage.

## ■ Bottom side mechanisms with excellent cost performance

The XY moving mechanisms at the bottom employs a silent belt-driven system. With an effective combination of AC servo motor, the APT-9600CE can achieve smooth operation of the bottom flying probes and ensure the positioning accuracy that poses no problem on practical side.







## ■ Bottom support system

Users can choose the flying support bar (option) that runs up and down on an electric motor if he wants to stabilize the probing contact while cutting down warpage and oscillating motion of PC boards caused by the probing contact from the top. The distance of up and down movement of the flying support bar is user-configurable to be optimal according the board thickness.

## ■ Simplified dual AOI function

The APT-9600CE incorporates a high performance image processing unit that ensures reliable and accurate automatic optical test and a CCD camera and the LED lighting system at both sides. Coupled with the image processing software based upon advanced algorithms, the tester inspects missing, misalignment, or reversed components on both sides of the board at the same time.

## ■ Dual IC Open test system

The IC open sensors are available as option for both sides. Accordingly the APT-9600CE can detect unsoldered IC leads in the bus circuits on the bottom side as well.

## ■ Real image map function (Now applying for patent)

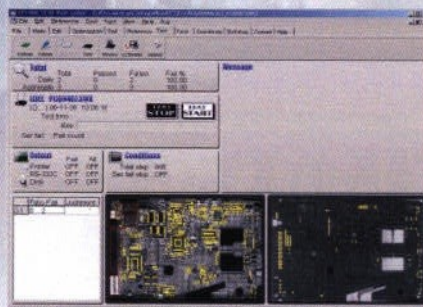
After each area on a PC board was scanned by the CCD camera by turns automatically, the software merge numbers of photos into a complete real image. Accordingly, Virtual camera function (under development) facilitates process operation of such data check and change easily on the real image, without moving the CCD camera any more. In addition, the fail analysis after test will be displayed clearly on the real image, which works on reducing the time to analyze and repair the faulty points.

## ■ Easy programming

Users just have to load two programs for both sides which were converted for the APT-9000 series by CAD data converters that well-known software manufacturers are selling in the market, in order to generate a program which use optimized probe access and is tested from both sides. In addition, the program debug can be complete in a short time due to the Real image map function and versatile auto-configuration functions.

## ■ Powerful options

To suit the needs or preferences of the user, the APT-9600CE is provided with an interface used for connecting other test systems and extensive options that enhance the test coverage. In addition, an in-line unit can be built-to-order to establish full automatic operation.





APT - 9600 CE	
Model	
Contact probes	4 flying probes ( top side), 2 flying probes ( bottom side )
Sensor probes for IC open test ( option )	4 flying sensor probes ( top side: 2 probes, bottom side: 2 probes )
PCB support-pin unit ( option )	2 flying support-pin unit ( bottom side )
Motors for flying probes	AC servo motor ( XYZ axis of top side and XY axis of bottom side ), stepping servo motor ( Z axis of bottom side )
Positioning resolution	1.25 $\mu$ m ( X and Y axis ), 50 $\mu$ m ( Z axis, approx. )
Positioning XY repeatability	+/- 35 $\mu$ m or less ( top side ), +/- 120 $\mu$ m or less ( bottom side )
Min. probe contact pitch ( in use of needle probe )	0.18 ~ 0.20mm ( top side ), 0.40 ~ 0.50mm ( bottom side )
Min. probe contact pad size	120 ~ 150 $\mu$ m ( top side ), 400 ~ 500 $\mu$ m ( bottom side )
Flying probe specifications	Tip form : Needle / small 4-crown / pyramid, Admit current : Max. 3A
Test speed ( at 2.5mm pitch movement )	Top side : Max. 0.08 ~ 0.10S / step ( single test ), Max. 0.03 ~ 0.05S / step ( combination test ) Bottom side : Max. 0.18 ~ 0.20S / step ( single test )
Internal measurement signal source	DC constant voltage, DC constant current, AC constant voltage
Measuring ranges	Low value resistance : 40m $\Omega$ ~ 400 $\Omega$ ( in 4-wire Kelvin measurement ) Resistors : 0.4 $\Omega$ ~ 40M $\Omega$ Capacitors : 4pF ~ 40mF Inductors : 4 $\mu$ H ~ 400H Impedance : 33 $\Omega$ ~ 330K $\Omega$ Diodes / transistors : 0.1V ~ 2.5V ( VF ) or ON test Zener diodes : 0.4V ~ 40V DC voltage : 0.08V ~ 80V AC voltage : 0.08V ~ 50Vrms ( f = 2KHz or less ) DC current ( option ) : 0.1A ~ 1A Short / open : 1.0 $\Omega$ ~ 400 $\Omega$ ( programmable ) Transistor with built-in resistor : ON Test Opto couplers : ON Test Digital transistors / FETs : ON Test Gain measurement ( option ) : Transistors, Opto couplers, etc. Relays / switching devices ( option ) : ON Test ( max. driving voltage : DC24V / 1A ) IC-lead in bus-circuit ( option ) : Open Test
Test steps	320,000 steps ( max. )
Guarding	Max.4 points / step
Reference data input for judgment	From good sample board(s), automatic generation based on nominal value, or absolute value
Judgment tolerance set	-99% ~ +999% or over/less reference value
Vision test system	Processing system : TOS-5, TOS-4 or TOS-41 ( User-selectable ) B/W CCD camera : Top side camera x 1, Bottom side camera x 1, Top side 2nd camera ( option ) x 1 Lighting system : Red / blue LEDs ( top side ), red LEDs ( bottom side ) Application : Coordinates alignment, simple vision test, reading of barcode & Data matrix ( TOS-5 ) Simple vision test items : Missing, misalignment, position, polarity, etc. Image registration : 500 scenes ( max. )
Programming method of XY coordinates	CAD data, Digitizer, Teaching
Testable PCBs specifications	Test area ( max. ) : W535 x D460mm ( top side ), W330 x D255mm ( bottom side ) Thickness ( max. ) : 4.8mm Top side clearance ( max. ) : 40mm Bottom side clearance ( max. ) : 35mm ( contain board thickness ), 25mm ( IN-Line model, contain board thickness )
PCB hold mechanism	Edges clamping ( front and rear side )
PC specifications	PC / AT compatible ( with CD-ROM drive, keyboard, mouse ), OS : Windows® XP
Display ( PC monitor )	17" color LCD ( 1280 x 1024 or higher resolution )
Printer	Thermal type
Power / Air supply	AC200, 220, 240V ( single phase ) 50/60Hz, 2.5KVA / 0.6 to 0.7Mpa ( dry clean air )
Environmental requirements	Temperature : 16 ~ 30°C, Humidity : 35 ~ 75%
Dimensions / Weight	W1375 x D1265 x H1300mm ( excluding display & keyboard ) / 1250Kgs
Options	Vision test system ( TOS-5, TOS-4 or TOS-41, User-selectable ), Top side 2nd camera IC-open test system for top side ( 2-flying sensor probes ) IC-open test system for bottom side ( 2-flying sensor probes, including Z axis and motor ) PCB support-pin unit ( 2 flying support-pins, including Z axis and motor ) Programmable DC power supply board, Programmable DC power supplies for Power-ON test, Power relay board GP-IB USB Controller ( for programmable DC power supplies or external measuring system ), Coaxial scanner board I/O board for external equipment, Pass-stamp unit, so on

※ Windows® is a registered trademark of Microsoft Corporation.

※ Specifications are subject to change without any obligation on the part of the manufacturer.



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