

**ULTRAFAST SPEED & HIGH PERFORMANCE
DUAL-SIDE FLYING PROBE TESTER**

APT-1600FD Series



The APT-1600FD Series is a dual-sided flying probe test system that deploys the flying probes to both sides of a UUT. Owing to the dual-sided probing contact, the APT-1600FD Series can contribute to a marked increase in test coverage and also assures the shortest amount of test time.

In addition, the APT-1600FD Series has world-level advantages in test speed and positioning accuracy and is equipped with a wealth of extraordinary test functionalities, so that your SMT boards can be tested with ease and precision in a short amount of time.

FLYING PROBE TESTER

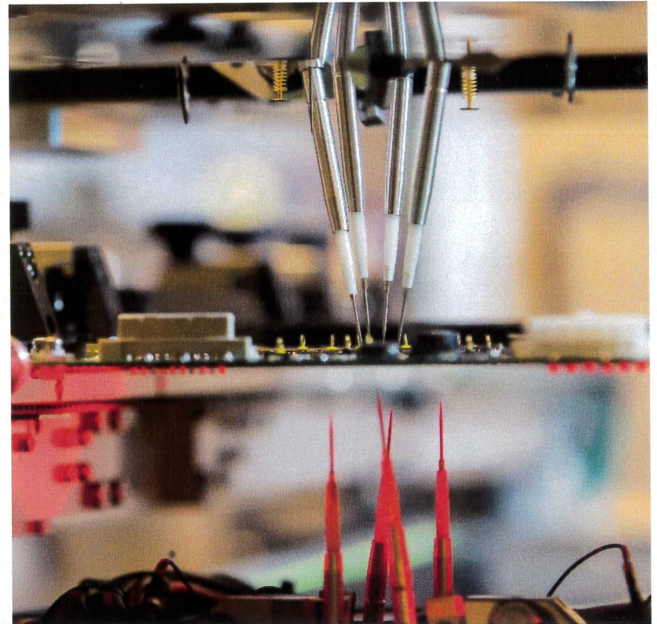
APT-1600FD Series

SAFE AND HIGHLY ACCURATE MEASUREMENT SYSTEM

The APT-1600FD series incorporates 16-bit DC 4-quadrant sources & measurement system and AC programmable generator which is also finding uses as a function generator in the measuring unit so that the tester is capable of applying the best-suited measuring signals according to the specification of each electronic component and the circuit conditions and realizes the circuit test and dynamic characteristics test. Also, the dedicated measuring mode for very small capacitance and the high measuring accuracy circuit give aid to detect a wide range of assembly faults.

ULTRAFAST TEST SPEED !!

The high power & fast-moving rotary motor system, which has superior performance in practical moving distance, and the new high-speed communication control contribute to speed up test 30 ~ 50% faster than the conventional models. Also, combination tests performed by using the flying probes on the bottom side make the test time even shorter.

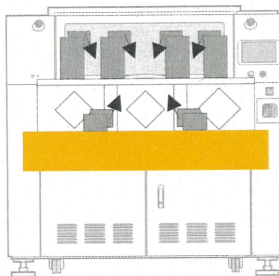


ATTENUATING CONTACT PRESSURE OF PROBES

The APT-1600FD series has outstanding ability in controlling the probing speed just before it contacts. This enables to minimize the probing marks on small and sensitive test lands without compromising on test speed.

BREAKTHROUGH 4-HEADS & 6-FLYING PROBES ON TOP, 2-HEADS & 4-FLYING PROBES ON BOTTOM

In addition to the standard moving probes which are installed diagonally to the UUT, vertical Z-axis units (option) where either probe or IC-open test probe can move up and down vertically are also available on both top side and bottom side. The vertical Z-axis units enable to get access to the test points where are hard for the standard flying probes. Besides, it's possible to directly contact the through-holes and the head of connector pins by using different types of probes, resulting in increased test coverage.

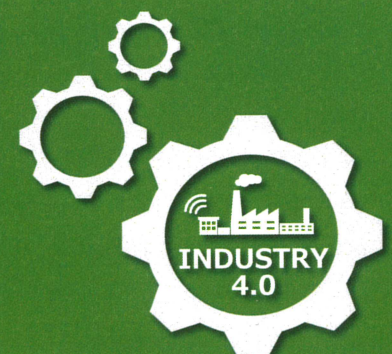


HIGH ACCURACY ENSURED BY RIGID XY STAGE

The tester's XY stage, crucial to stable and accurate probe contact, is made of highly polished native granite, as well as the APT-9xxx series which is thought of as the global standard model of the flying probe testers. Also, the positioning accuracy is finely tuned tester by tester. Therefore, the APT-1600FD series ensures superfast probe movement and increased positioning accuracy by 25% compared to the conventional models.

TEST ABILITY IN A CONSTANT STATE OF EVOLUTION

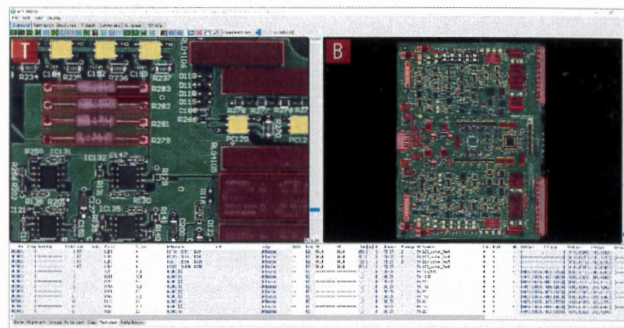
The APT-1600FD series serves its customers with versatile option boards and software that achieves their particular needs, such as the LED color test system that measures hue, saturation and luminance of LED devices on the board under test, the component height test based on laser ranging, the Boundary testing, and the Functional testing. Also, the tester will have even more advantages to enhance its test coverage and speed up test although they are currently under development.



Support

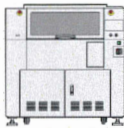
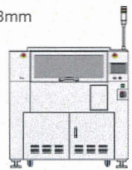
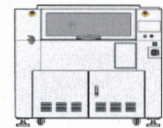
COLORED VISION SYSTEM AND REAL MAP

The APT-1600FD series is equipped with new vision test system TOS-7F corresponding to color images as standard on both top and bottom side. Owing to the megapixel color digital camera and the ring illuminations with high-intensity white LED, the TOS-7F can import sharp color image to detect missing, wrong orientation and positioning error on the spot. Besides, the TOS-7F can not only read the barcodes (including 2D codes) but also offer color identification test and Library function which are supported by the optional software. Also, the APT-1600FD series is equipped with the colored Real map function which is of remarkable help to check and modify the contact points during debugging the programs.



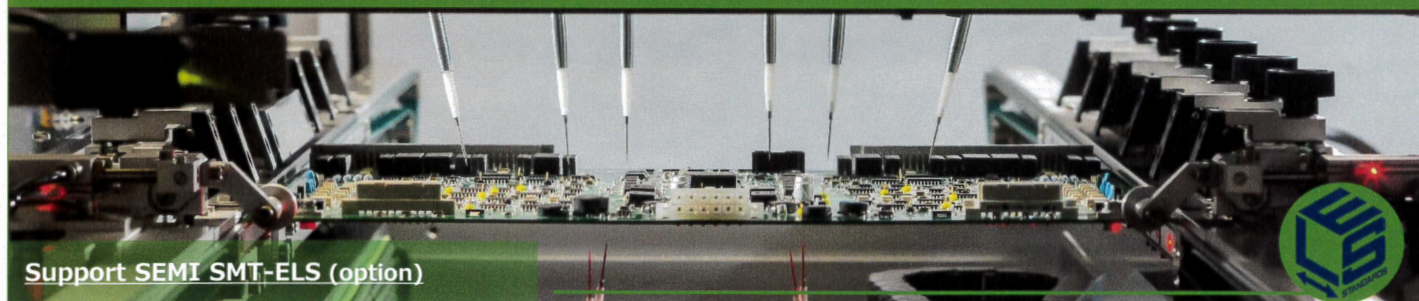
LARGER TEST AREA & AUTO TRANSFER

The "-SL" series, which provides 48% larger test area, and the "-A" series, which enables to transfer UUT automatically, are also available for selection to fit user needs.

Standard size		Large size (-SL series)
OFFLINE model	INLINE model (-A series)	OFFLINE model
Test area L540 x D483mm  W1400 x D1500 x H1400mm 1450kg APT-1600FD	Test area L540 x D483mm  W1400 x D1500 x H1400mm 1450kg APT-1600FD-A	Test area L635 x D610mm  W1520 x D1620 x H1400mm 1600kg APT-1600FD-SL

AUTOMATED CONVEYOR SYSTEM

An automated conveyor system model can be built-to-order to establish a fully automated operation in your production line or rack-to-rack system. To meet various user's needs, it's possible to provide a buffer station with conveyor installed to cut down transport time as much as possible and an auto-conveyor width adjustment unit, as well as a shutter unit that operates when the conveyor carries a PCB in and out.



Board specifications

	APT-1600FD	APT-1600FD-A	APT-1600FD-SL
● Board size	L50 x D50mm to L540 x D483mm		L50 x D50mm to L635 x D610mm
● Board Thickness	0.6mm to 5.0mm		
● Component height (max.)	Top side 60mm		
	Bottom side 60mm including board thickness		
● Component-free area	3mm or more from front and rear edges (for board clamp)		
● Board weight (max.)	5kg	3kg	8kg

Automated conveyor specifications (Inline model only)

● Transfer speed and belt (Speed selectable)	200 to 667mm/sec. (6 ranges) Timing belt (anti-static type)	
● Transfer direction / height	Direction selectable, FL 900mm (-15/+65mm)	
● Conveyor width adjustment	Front side - fixed, Rear side - auto-adjustment with correction mechanism of parallelism	

Specifications

Speed & accuracy

	APT-1600FD / APT-1600FD-A	APT-1600FD-SL
● Test time (at 2.5mm pitch movement)	Combination test : Max. 0.02 - 0.03sec. / step Single test : Max. 0.05 - 0.06sec. / step	Combination test : Max. 0.03 - 0.04sec. / step Single test : Max. 0.07 - 0.08sec. / step
● Positioning repeatability of flying probe (XY)	±25 to ±40μm in the high precision mode, approx.	±30 to ±40μm in the high precision mode, approx.
● Minimum pad size for flying probes	60 to 80μm in the high precision mode, approx.	80 to 100μm in the high precision mode, approx.

General (all models)

● Flying probes and sensors	Top side	Standard type : 4 tilted contact probes Standard with single vertical Z type : 4 tilted contact probes, 2 vertical contact probes or 2 IC-open test probes (changeable) Standard with dual vertical Z type : 4 tilted contact probes, 2 vertical contact probes, 2 IC-open test probes LED color test sensors : 2 sensors (option)
	Bottom side	Standard type : 2 tilted contact probes Standard with single vertical Z type : 2 tilted contact probes, 2 vertical contact probes or 2 IC-open test probes (changeable) LED color test sensors : 2 sensors (option)
● Specifications of contact probes	Type : High precision spring probe, Current rating : 2A, Tip form : Needle, small 4-crown, etc.	
● Motors system for flying probes (XYZ axes)	High speed AC servo motors & control system	
● Positioning resolution of flying probes	X and Y axes : 1.25μm Z axis : 5μm	
● Minimum pad pitch for flying probes	150 to 190μm in use of needle probes (high precision mode)	

Test (all models)

● Signal sources for board test	DC Voltage / Current generator -1 : Four-quadrant source & measure system, max. ±20V/±1A ^{(*)1} DC Voltage / Current generator -2 : Four-quadrant source & measure system, max. ±20V/±1A ^{(*)1} DC Voltage / Current generator -3 : Four-quadrant source & measure system, max. ±80V/±1A (option) AC Constant Voltage generator : max. 20Vpk / 100mA _{pk} , f=1Hz to 0.5MHz (sine, square or triangle wave)
● Measuring range	DC Voltage, Current : ±125V, ±1A ^{(*)1} (max.±40V) or ±1A (max. ±80V, option) AC Voltage : 150mV to 75Vrms, f = 10Hz to 0.5MHz Frequency : 1Hz to 20MHz / 2V to 20Vp-p Resistors : 5mΩ to 50MΩ Capacitors : 0.5pF to 200mF Inductors : 0.5μH to 500H Impedance / phase angle : 2.5Ω to 3.3MΩ / ±90° Transformers : Inductance, detection of winding, transmission ratio Forward voltage of PN junction : 0.1V to 40V Zener voltage : 0.1V to 40V (max.80V, option) Isolation test : Threshold is programmable from 5Ω to 50MΩ Continuity test : Threshold is programmable from 1Ω to 500KΩ Diodes / Transistors / FETs : Forward voltage of PN junction, ON test, Gain, Static characteristics Relays / Opti couplers / SW devices : ON test Open fault detection of IC leads : Forward voltage measure of PN junction, or IC-open test probes Lighting color of LED (option) : Hue, saturation and luminance measured by LED color test sensor
● Judgment tolerance set	-999.9% to +999.9% or absolute value
● Test steps	Max. 350,000 steps

Vision test system TOS-7F (all models)

● Video camera	1/3" CCD mega-pixel color digital type, View field :10 × 8mm approx. (dual side)
● Light source	Ring-shaped white LED with 256 levels of brightness adjustable
● Application	Coordinates alignment, simple vision test, reading of barcode & 2D code, color real-map, etc.
● Vision test item	Non-mounted components, components shifting, missing components, polarity, color inspection of parts, etc.
● Image registration	Max. 2,000 scenes (top and bottom total)

Laser Displacement measurement system TLS-1

● Light source	Red semiconductor laser (top side)
● Measurement method	Light / reflective type (laser displacement)
● Laser beam diameter	0.25 × 2.65mm to 0.40 × 2.75mm (changes by the height of the measurement point)
● Measuring range	-0.5mm to + 50.0mm
● Repeatability	±100μm or less
● Measuring time	1ms / point (XY movement time not included)
● Application	Coordinates alignment by automatic generation of 3D-mapping Non-mounted components, floating components, missing component, etc.

Usage environment (all models)

● Embedded PC & OS	Windows® PC (with DVD drive, HD drive, keyboard, mouse) OS : Windows 10
● Display & Printer	LCD : 1920 × 1080 resolution Printer : Small thermal type (USB connection)
● Power & Air supply	Power : AC200 to 240V(single phase), 50/60Hz, max. 4.0KVA Air : 0.6 to 0.8Mpa (dry clean air)
● Operating environment	Temperature : 16 to 30°C (60 to 86°F) Humidity : 30 to 75% (no condensation) Altitude : Below 1000m

Options

- Laser displacement measurement system for bottom side
- LED color test system
- DC ±80V/±1A programmable source & measurement unit
- Function scanner board
- Power relay board
- Marking unit
- Vacuum Unit
- CMD Line execution function
- NSW test function, etc.

*1 The maximum current can be increased to 2A by using function scanner board (option).

* The technology and the options under development are included in specifications as of January, 2021.

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

