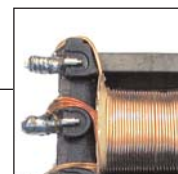
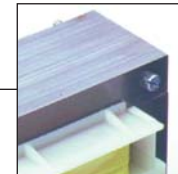
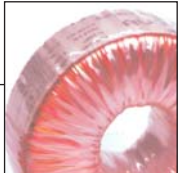


# Voltech



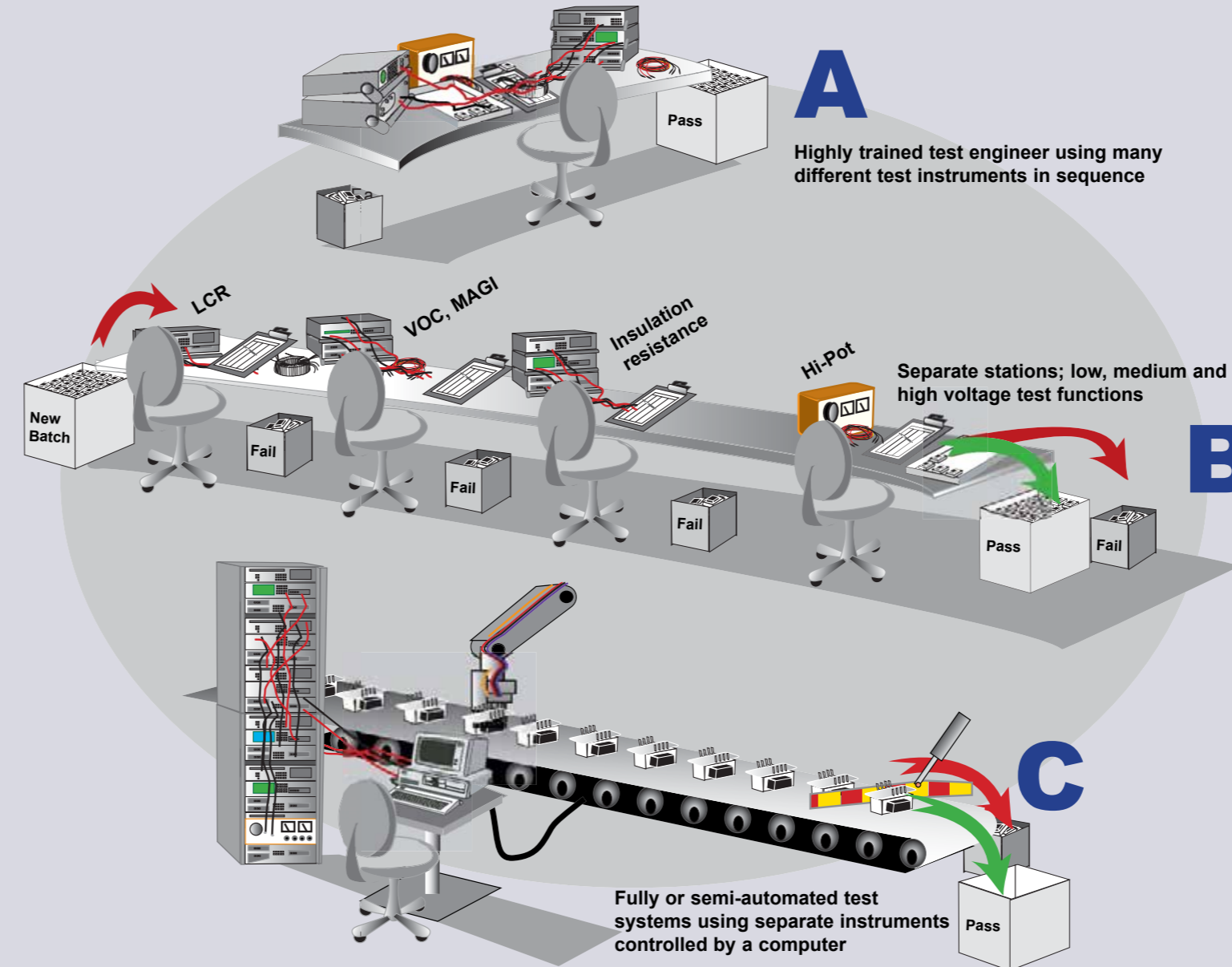
**AT3600: THE SOLUTION TO WOUND COMPONENT TESTING**

## TRADITIONAL TESTING METHODS

Transformers are an essential component in almost all electrical and electronic products made today. The manufacture of transformers and other wound components is a complex process with many opportunities to introduce functional or safety-related faults. Testing has therefore always been an essential part of the production process to ensure the performance, safety and reliability of wound components.



## Traditional methods of testing transformers



For many years, test instrumentation available to the transformer market has limited manufacturers to one of these testing methods. Unfortunately, these methods may have a number of problems:

- The need for highly trained test staff.
- Possibility of errors occurring between test stations that make zero-error testing impossible.
- Many instruments are required to provide complete functional and safety testing.
- A large amount of component handling during test.
- Speed of testing is limited. So, sample testing or reduced function testing may be required to match production output.
- Changing from one transformer type to another can be time consuming.
- Maintenance/calibration of many separate instruments.

With an ever increasing complexity of transformer design, manufacturers around the world are facing pressure to provide lower cost components that are fully tested to ensure zero defects.

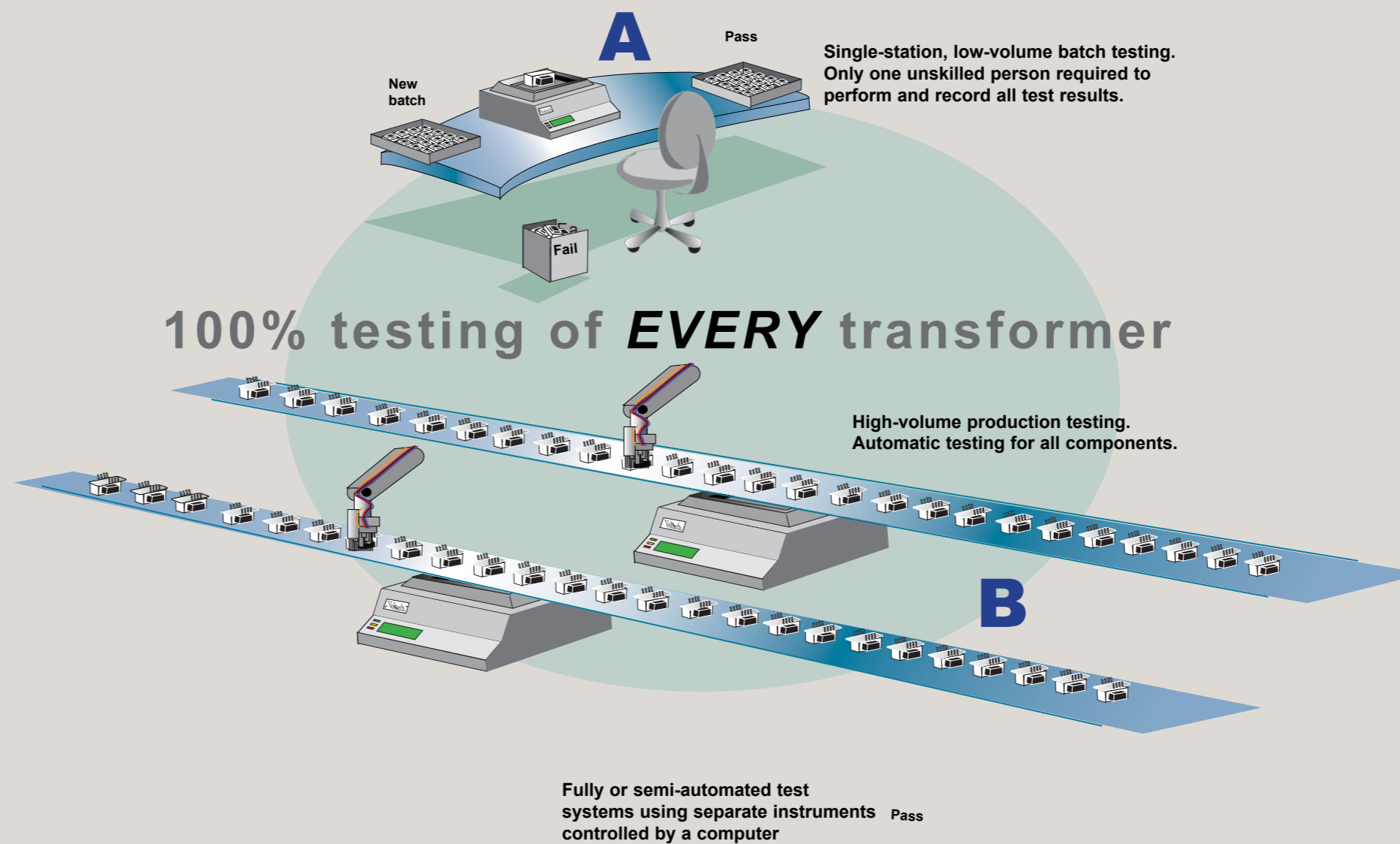
## INTRODUCING A NEW SOLUTION

Using techniques patented\* by Voltech, the AT3600 introduces a fast, reliable and flexible test solution for all small to medium size wound components. Offering 100% testing of production output for 100% of the required functional and safety tests, the AT3600 provides complete assurance of zero-defect components. Whether used for testing manually or with automatic handling systems, the AT3600 will guarantee output quality, minimize test times and reduce costs.



\* International patents: UK 2261957B, Europe 0621953B, USA US5500598

## Accurate and cost effective...



### Available tests:

CTY	Continuity
R	DC Resistance
R2	DC Resistance Match
LS	Inductance Series
LP	Inductance Parallel
Q	Quality Factor
D	Dissipation Factor (tanδ)
RLS	Equivalent Series Resistance
RLP	Equivalent Parallel Resistance
LSB	Inductance Series + Bias
LPB	Inductance Parallel + Bias
L2	Inductance Match
LL	Leakage Inductance
LLO	Leakage Inductance + Offset
C	Capacitance
C2	Capacitance Match
TR	Turns Ratio and Phasing
TRL	Turns Ratio by Inductance
MAGI	Magnetizing Current
VOC	Voltage Open Circuit
IR	Insulation Resistance
HPDC	Hi-Pot (DC)
HPAC	Hi-Pot (AC)
WATT	Wattage
STRW	Stress Watts
SURG	Surge Stress
ILK	Leakage Current
GBAL	General Longitudinal Balance
LBAL	Longitudinal Balance
ILOS	Insertion Loss
RLOS	Return Loss
RESP	Frequency Response
Z	Impedance
ZB	Impedance + Bias
PHAS	Interwinding Phase
ANGL	Phase Angle of Impedance
LVOC	Low Voltage Open Circuit
ACRT	Hi-Pot Ramp (AC)
DCRT	Hi-Pot Ramp (DC)
ACVB	Voltage Break-Down (AC)
DCVB	Voltage Break-Down (DC)
OUT	Output to User Port
TRIM	Loop on Test to Adjust Value

External dc Bias tests up to 250A  
External ac Source tests up to 600V, 10A.



# AT3600 COMPLETE PACKAGE

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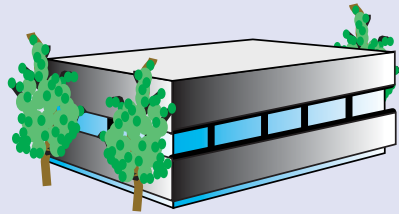
The AT3600 is the most cost-effective solution for all transformer and wound component testing requirements.

The unique design of the AT3600 integrates different test signal sources, measuring circuits and a 20-node connection matrix together with a versatile fixture system to bring you benefits that no other instrument can offer.



# CAN WE HELP YOU?

The AT3600 has been designed to meet the needs of all transformer testing requirements with a VA rating of 2KVA or less. Using proven design techniques, the AT3600 can be configured with any combination of tests from a list of over 30 test functions. In addition, versatile interface ports plus easy-to-use Windows® software supplied as standard make the AT3600 suitable for use in all production test environments.



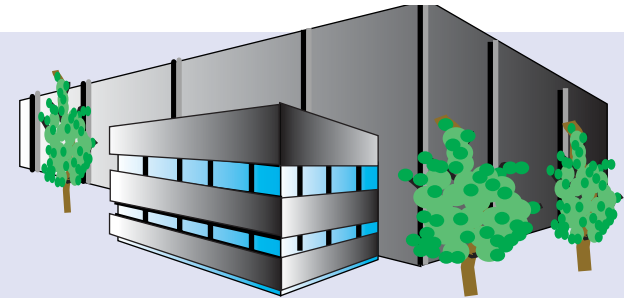
## Up to 15 Employees, small batch production

### Old method

Test engineers: 1 x full-time skilled.  
Reading results from separate test equipment.  
Manually recording results.  
Set-up time between transformer types  $\geq 30$  minutes.

### AT3600 method

Test engineers: 1 x part-time (20%) unskilled.  
Simple pass/fail validation for 100% test.  
All results stored electronically.  
Set-up time between transformer types  $< 1$  minute.



## >50 Employees, small batch production

### Old method

Test engineers: 6 x full-time skilled.  
Semi-automated with low-voltage ATE and separate Hi-Pot.  
PC results via IEEE488 from different test instruments.  
Set-up time between transformer types  $\geq 30$  minutes.

### AT3600 method

Test engineers: 1 or 2 x unskilled.  
Simple pass/fail validation for 100% test.  
All results stored electronically.  
Set-up time between transformer types  $< 1$  minute.

**TYPICALLY 70% REDUCTION IN TIME AND COSTS**

## AN ESTABLISHED PRODUCT

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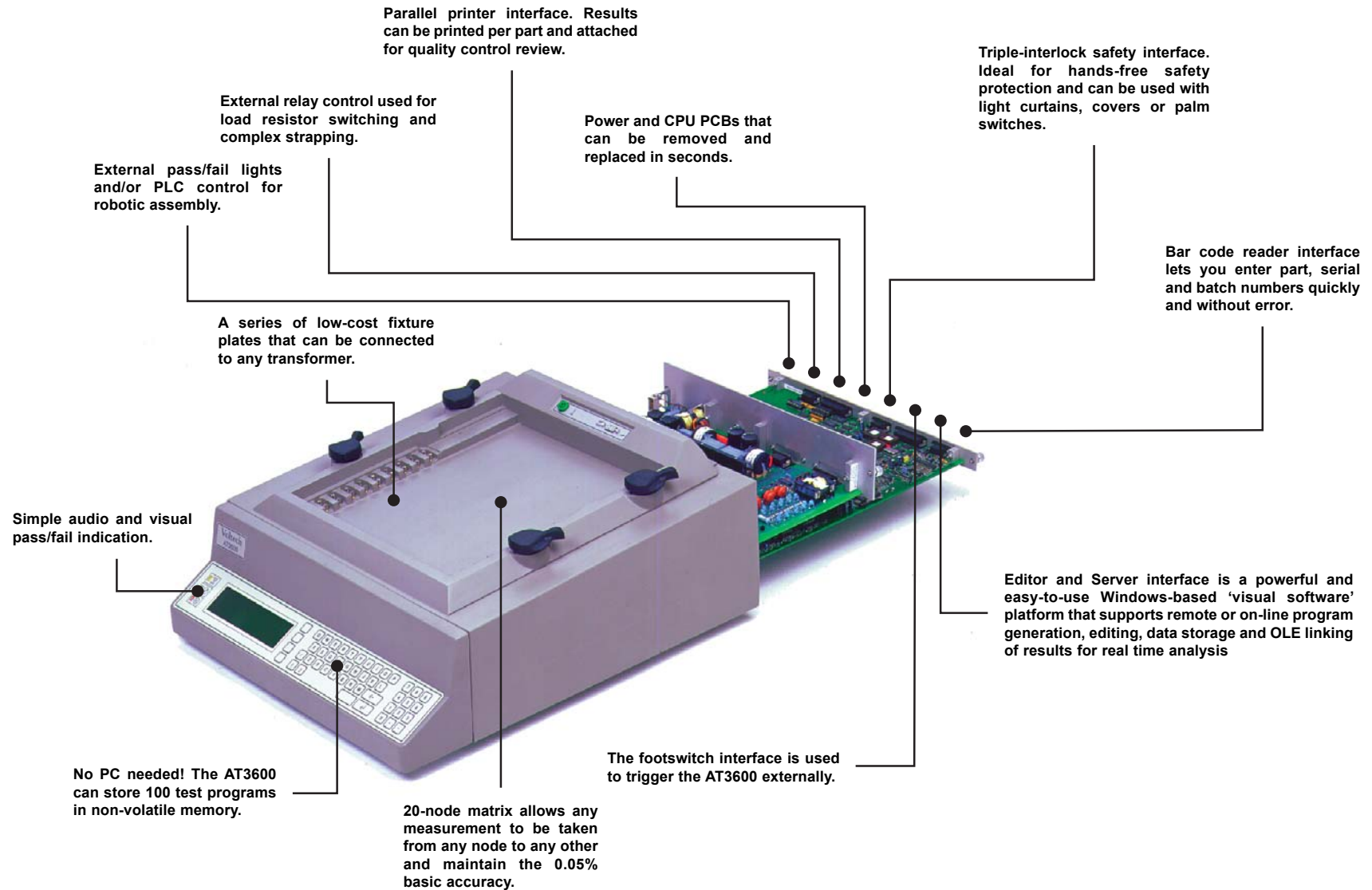


Since 1986, Voltech have produced world leading test instruments for the electrical and electronic industry.

Dedicated to power analysis and wound component testing, Voltech products are used throughout the world. Customers include major household names and leading industrial companies in Asia, Europe and the USA.

Thousands of AT3600 transformer testers are already in use around the world, with companies ranging from low-volume, small-batch production to full automation operating twenty-four hours a day.

# AT3600 OVERVIEW







# AT3600 SPECIFICATIONS

Test	Measurement Range		Test Signal		Test Frequency		Basic Accuracy
Continuity	10kΩ	10MΩ	n/a	n/a	n/a	n/a	n/a
DC resistance	10μΩ	10MΩ	n/a	n/a	n/a	n/a	0.1%
DC resistance match	1:1000	1000:1	n/a	n/a	n/a	n/a	0.2%
Inductance (series and parallel circuit)	1nH	1MH	1mV	5V	20Hz	3MHz	0.05%
Inductance match	1:10000	10000:1	1mV	5V	20Hz	3MHz	0.1%
Quality factor	0.001	1000	1mV	5V	20Hz	3MHz	0.5%
Equivalent ac resistance (series and parallel)	10μΩ	10MΩ	1mV	5V	20Hz	3MHz	0.05%
Leakage inductance	1nH	1kH	20μA	100mA	20Hz	3MHz	0.1%
Dissipation factor (tanδ)	0.001	1000	1mV	5V	20Hz	3MHz	0.5%
Leakage inductance with user offset	1nH	1kH	20μA	100mA	20Hz	3MHz	0.1%
Interwinding capacitance	100fF	1mF	1mV	5V	20Hz	3MHz	0.1%
Capacitance match	1:1000	1000:1	1mV	5V	20Hz	3MHz	0.2%
Turns ratio and phase (+ or -)	1:100k	100k:1	1mV	5V	20Hz	3MHz	0.1%
Turns ratio by inductance	100:1	1:100	1mV	5V	20Hz	3MHz	0.1%
Interwinding phase	-360°	+360°	1mV	5V	20Hz	3MHz	0.05°
Magnetizing current	1μA	2A (3Apk)	1V	270V	20Hz	1.5kHz	0.1%
Open circuit voltage	100μV	650V	1V	270V	20Hz	1.5kHz	0.1%
Leakage current	1μA	10mA	1V	270V	20Hz	1.5kHz	0.5%
Insulation resistance	1MΩ	100GΩ	100V	7kV	DC	DC	1%
Hi-pot (DC)	1μA	3mA	100V	7kV	DC	DC	3.2%
Hi-pot (AC)	10μA	10mApk	100V	5.5kV	50Hz	1kHz	3.0%
Inductance with bias (series and parallel)	1nH	1MH	1mV	5V	20Hz	3MHz	0.05%
Wattage	1mW	40W	1V	270V	20Hz	1.5kHz	0.3%
Surge stress test	1mV-s	1KV-s	100V	5kV	n/a	n/a	3.0%
Stress wattage	1mW	40W	1V	270V	20Hz	1.5kHz	1%
General longitudinal balance	0dB	100dB	1mV	5V	20Hz	3MHz	0.5dB
Longitudinal balance	0dB	100dB	1mV	5V	20Hz	3MHz	0.5dB
Insertion loss	-100dB	100dB	1mV	5V	20Hz	3MHz	0.5dB
Return loss	-100dB	100dB	1mV	5V	20Hz	3MHz	0.2%
Frequency response	-100dB	100dB	1mV	5V	20Hz	3MHz	1.0dB
Impedance	1mΩ	1MΩ	1mV	5V	20Hz	3MHz	0.2%
Impedance with bias	1mΩ	1MΩ	1mV	5V	20Hz	3MHz	0.2%
Phase angle of impedance	-360°	+360°	1mV	5V	20Hz	3MHz	0.05°
Low voltage open circuit	100μV	650V	1mV	5V	20Hz	3MHz	0.1%
Magnetizing Current (External Source)	50mA	10A	1V	600V	20Hz	5kHz	0.1%
Open Circuit Voltage (External Source)	100V	650V	1V	600V	20Hz	5kHz	0.1%
Wattage (External Source)	1mW	6kW	1V	600V	20Hz	5kHz	0.3%
Stress Wattage (External Source)	1mW	6kW	1V	600V	20Hz	5kHz	0.3%
Trimming adjustment	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Output to user port	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Hi-Pot Ramp (AC)	10uA	5mA	100V	5.5kV	50Hz	1kHz	3.0%
Hi-Pot Ramp (DC)	1uA to	3mA	100V to	7KV	n/a	n/a	3.2%
Voltage Break Down (AC)	10uA	5mA	100V	5.0kV	50Hz	1kHz	3.0%
Voltage Break Down (DC)	1uA to	3mA	100V to	7KV	n/a	n/a	3.2%

Environmental Conditions
<b>Line input</b> IEC 3-pin socket 90 to 265V ac, 48Hz to 65Hz @ 200VA Fuse 3.15AT
<b>Dielectric strength</b> 2kV ac 50Hz for 1 minute, line input to case. Storage Temperature -40° to +70°C
<b>Operating temperature</b> 0° to 40°C
<b>Humidity</b> 10 to 90% RH non-condensing
<b>Mechanical</b> Weight: approx. 23kg
<b>A</b> = 50mm height of front edge <b>B</b> = 442mm full width <b>C</b> = 155mm front height <b>D</b> = 545mm full length <b>E</b> = 210mm rear height

Accuracies based on operating temperature of 23°C ± 5°C. While every care has been taken in compiling the information in this publication, Voltech Instruments cannot accept legal liability for any inaccuracies. Voltech Instruments has an intensive program of design and development that may alter product specification. Voltech Instruments reserves the right to alter specifications without notice and whenever necessary to ensure optimum performance from its product range. © 2009 Voltech Instruments. All rights reserved.

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[WWW.VOLTECH.COM](http://WWW.VOLTECH.COM)

# Voltech

VPN 86-219/6

## The AT Series.

### ATi

Ideal for production testing of transformers, chokes and inductors with ferrite cores such as switching power supply power and control magnetics, telecom transformers (including ADSL filters) and audio transformers.

### AT3600

As ATi **plus** magnetizing current (270V, 2A), Surge and HiPot (5.5kV a.c.). For production testing where a HiPot safety test is required and including tests for steel laminate-cored transformers.

### DC1000

Adds ability to test with dc bias current present (up to 250A) for power supply output transformers and chokes. Integrates seamlessly with ATi or AT3600.

### External Source Interface

Extends the range of the AT3600 up to 600V 10A ac for magnetizing current, open-circuit voltage and watts tests.

### Fixture System

Kits and components for constructing connecting fixtures.

## Voltech Sales and Service Offices

**UK** Tel: +44 1235 834555 Fax: +44 1235 861174 Email: [sales@voltech.co.uk](mailto:sales@voltech.co.uk)  
**USA** Tel: +1 239 437 0494 Fax: +1 239 437 3841 Email: [sales@voltech.com](mailto:sales@voltech.com)  
**China** Tel: +86 513853 00652 Fax: +86 513853 00658 Email: [sales@voltech.com.cn](mailto:sales@voltech.com.cn)

