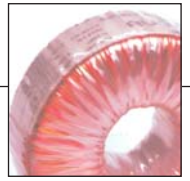
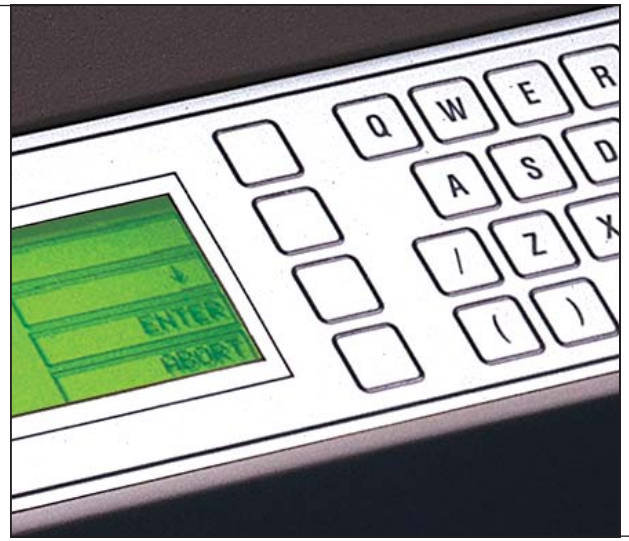
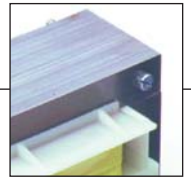
Voltech





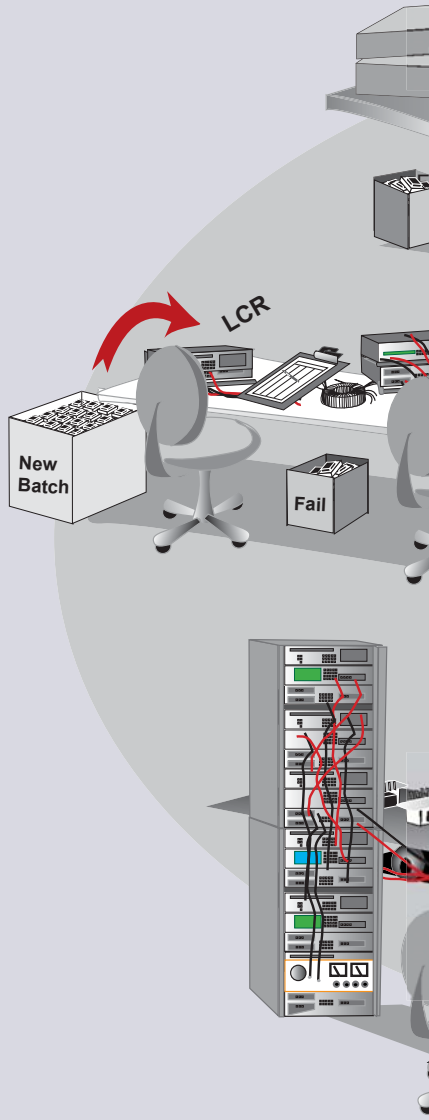


AT3600: THE SOLUTION TO WOUND COMPONENT TESTING

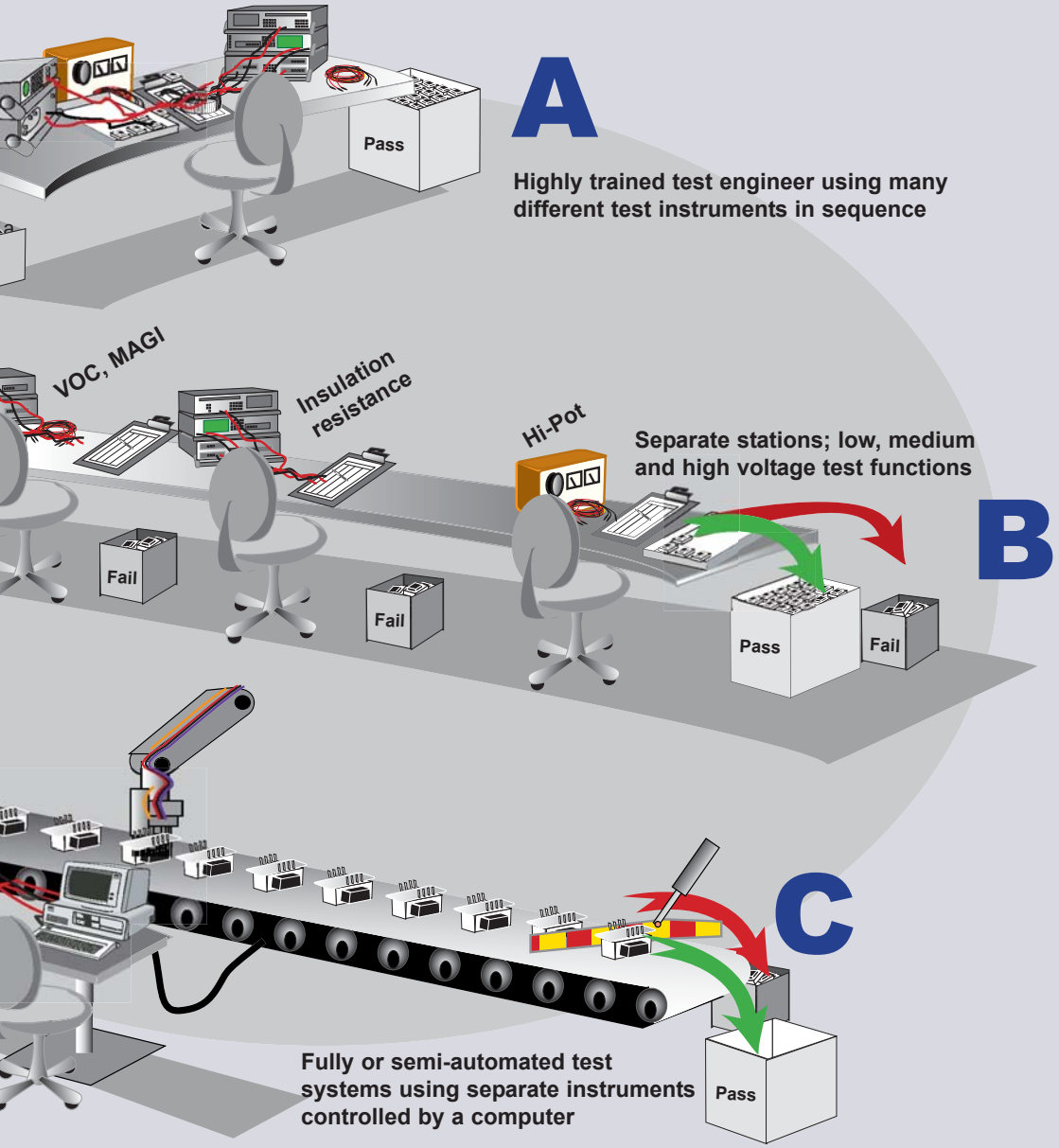
Traditional testing methods

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.

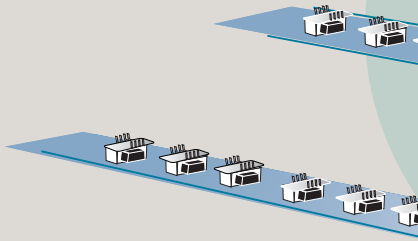
INTRODUCING A NEW SOLUTION

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.

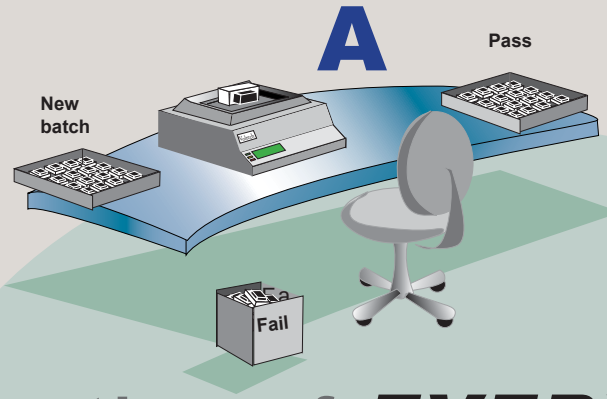
* International patents: UK 2261957B, Europe 0621953B, USA US5500598

Accurate

100%

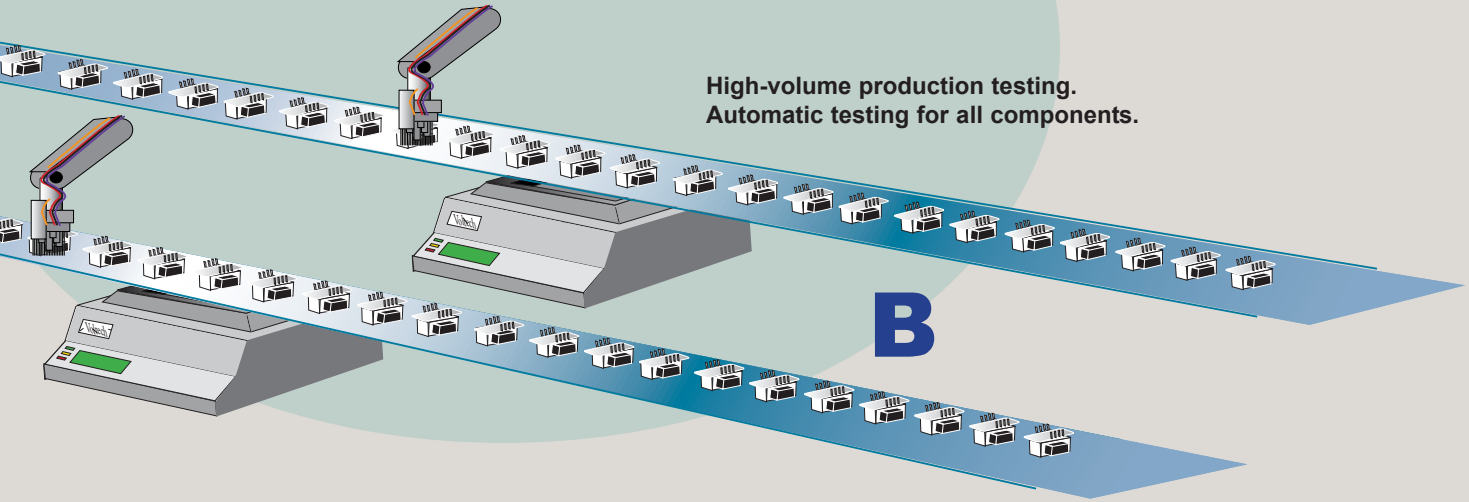


and cost effective...



Single-station, low-volume batch testing.
Only one unskilled person required to perform and record all test results.

testing of ***EVERY*** transformer



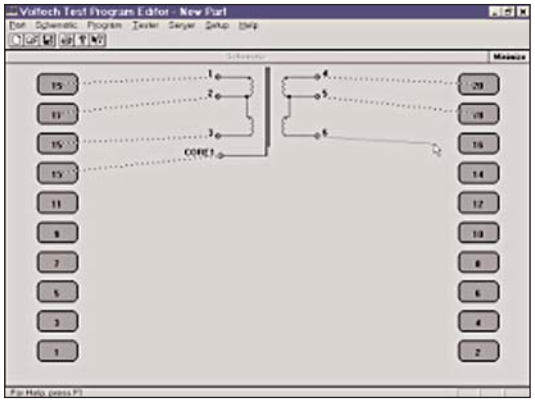
High-volume production testing.
Automatic testing for all components.

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
OUT	Output to User Port
TRIM	Loop on Test to Adjust Value

FAST AND EASY

Windows® editor software



Setting up, storing and using test programs could not be easier. Drop windings/cores/screens onto the editor window and connect them up to any of the AT3600's 20 test nodes by dragging the mouse.

Choose from a list of available functions, select the winding(s) to be analyzed, then enter the test conditions into a screen and the test is complete.

Testing

At the press of a front-panel button or a remote switch, an unskilled operator can 100% test wound components in seconds with simple PASS or FAIL lights and an audible signal.

Print results

iron

1	R	1.6755 kOhm	PASS	0000
2	R	27.628 Ohm	PASS	0000
3	R	31.776 Ohm	PASS	0000
4	MAGI	18.241 mA	PASS	0000
5	VOC	24.354 V	PASS	0000
		POL +	PASS	
6	VOC	24.354 V	PASS	0000
6	VOC	24.349 V	PASS	0000
		POL +	PASS	
7	WATT	978.79 mW	PASS	0000
8	IR	5.0000	PASS	0000
9	HPAC	22.422 uA	PASS	0000

RUN TIME 3.44 sec

ferrite

1	CTY	199.53 mOhm	PASS	0000
2	R	220.14 mOhm	PASS	0000
3	R	129.38 mOhm	PASS	0000
4	R	242.36 mOHM	PASS	0000
5	R	219.43 mOhm	PASS	0000
6	LS	548.28 uH	PASS	0000
7	LL	39.471 uH	PASS	0000
8	C	70.597 pF	PASS	0000
9	TR	4.9829	PASS	0000
		POL +	PASS	
10	TR	1.0031	PASS	0000
		POL +	PASS	
11	TR	4.9839	PASS	0000
		POL +	PASS	
12	QL	49.598	PASS	
13	SURG	13.509 mVsec	PASS	0000
14	IR	5.0000 GOhm	PASS	0000
15	HPAC	94.545 uA	PASS	0000

RUN TIME 2.03 sec

Store results remotely

All results can be printed directly to a printer and/or stored on a Windows® PC for archiving or reporting.

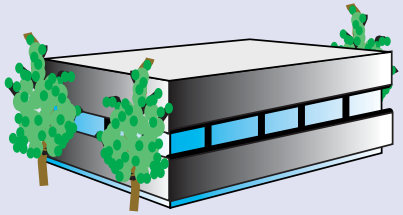
AT3600 COMPLETE PACKAGE

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 ≥ 30 minutes.

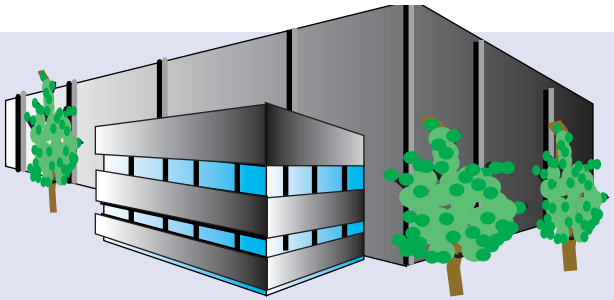
AT3600 method

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 ≥ 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

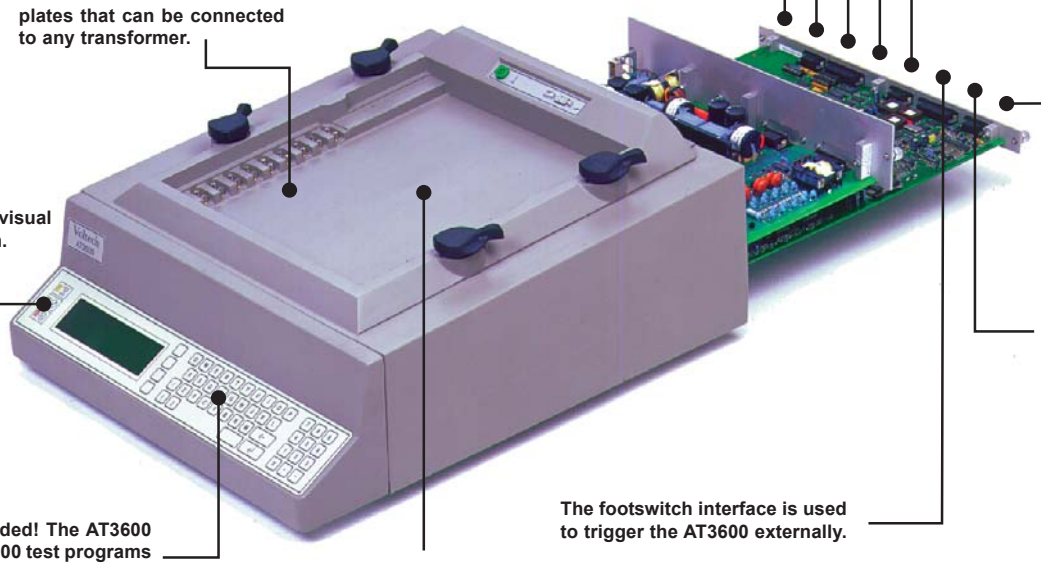
An established product

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



Parallel printer interface. Results can be printed per part and attached for quality control review.

External relay control used for load resistor switching and complex strapping.

Power and CPU PCBs that can be removed and replaced in seconds.

Triple-interlock safety interface. Ideal for hands-free safety protection and can be used with light curtains, covers or palm switches.

External pass/fail lights and/or PLC control for robotic assembly.

Bar code reader interface lets you enter part, serial and batch numbers quickly and without error.

A series of low-cost fixture plates that can be connected to any transformer.

Simple audio and visual pass/fail indication.

Editor and Server interface is a powerful and easy-to-use Windows-based 'visual software' platform that supports remote or on-line program generation, editing, data storage and OLE linking of results for real time analysis

The footswitch interface is used to trigger the AT3600 externally.

No PC needed! The AT3600 can store 100 test programs in non-volatile memory.

20-node matrix allows any measurement to be taken from any node to any other and maintain the 0.05% basic accuracy.

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 circuit)	1nH	1MH	1mV	5V	20Hz	3MHz	0.05%
Inductance (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 series resistance	10μΩ	10MΩ	1mV	5V	20Hz	3MHz	0.05%
Equivalent parallel resistance	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)	1nH	1MH	1mV	5V	20Hz	3MHz	0.05%
Inductance with bias (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%
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

Environmental Conditions

Line input

IEC 3-pin socket

90 to 265V ac, 48Hz to 65Hz @ 200VA

Fuse 3.15AT

Dielectric strength

2kV ac 50Hz for 1 minute, line input to case.

Storage Temperature

-40° to +70°C

Operating temperature

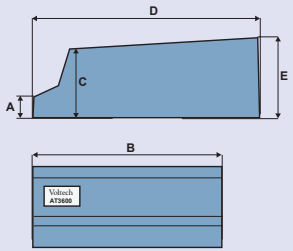
0° to 40°C

Humidity

10 to 90% RH non-condensing

Mechanical

Weight: approx. 23kg



A	=	50mm	height of front edge
B	=	442mm	full width
C	=	155mm	front height
D	=	545mm	full length
E	=	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.

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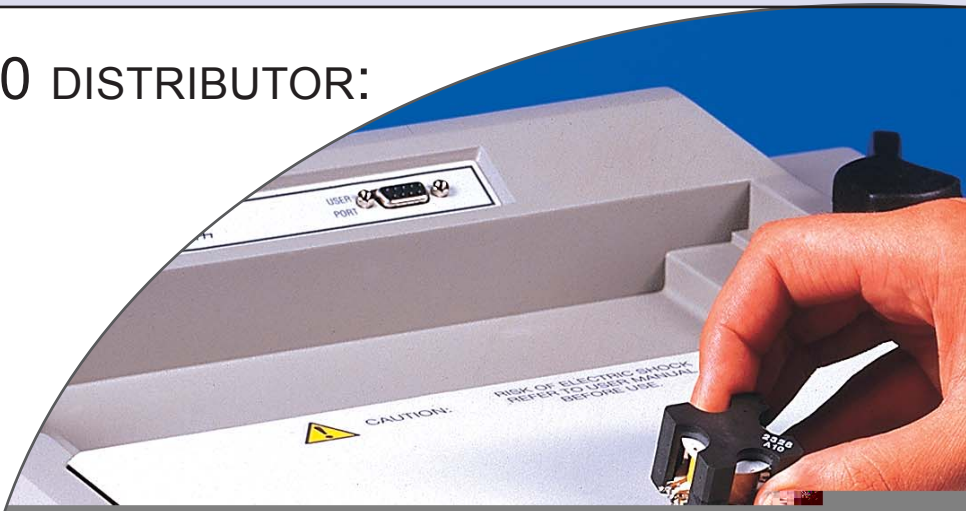

Belgium
Air-Parts B.V.B.A.
Jean Marie Bonnet
Tel: +32 (0)2241 6460
Fax: +32 (0)2241 8130

Denmark
Cyncrona AB
Sixten Wikberg
Tel: +46 (0)8 531 94 300
Fax: +46 (0)8 531 94 310

Finland
Cyncrona AB
Sixten Wikberg
Tel: +46 (0)8 531 94 300
Fax: +46 (0)8 531 94 310

France
BFi OPTiLAS S.A.
Marc Bringue
Tel: +33 (0)160 79 89 08
Fax: +33 (0)160 79 89 03

Germany
KUST Messgeräte GmbH
Gerhard Stenger
Tel: +49 6441 30001
Fax: +49 6441 30002

Hong Kong
Chinatech Corporation
Joseph Hao
Tel: +852 2755 9773
Fax: +852 2755 1127

India
Technical Trade Links
Rajesh Sawant
Tel: +91 2285 02412
Fax: +91 2285 06719

Italy
Power Tech S.r.l.
Davide Fraconti
Tel: +39 371 211137
Fax: +39 371 217019

Japan
TSJ Corporation
H. Sato
Tel: +813 5466 9093
Fax: +813 5466 9213

Korea
Newtronix Co. Ltd.
Kyung-Hyun Cho
Tel: +82 2652 4663
Fax: +82 2652 4662

Luxembourg
Air-Parts B.V.B.A.
Jean Marie Bonnet
Tel: +32 (0)2241 6460
Fax: +32 (0)2241 8130

Netherlands
Air-Parts B.V.
Robert Daems
Tel: +31 172 422 455
Fax: +31 172 421 022

Norway
Cyncrona AB
Sixten Wikberg
Tel: +46 (0)8 531 94300
Fax: +46 (0)8 531 94310

Shenzhen (China)
Chinatech Corporation
Joseph Hao
Tel: +867 55226 5091
Fax: +867 55242 5638

Singapore
Schaffner EMC Pte Ltd.
Poon Khai Loon
Tel: +65 3773 283
Fax: +65 3773 281

Sweden
Cyncrona AB
Sixten Wikberg
Tel: +46 (0)8 531 94 300
Fax: +46 (0)8 531 94 310

Switzerland
Emitec AG
Mario Christen
Tel: +41 417 486010
Fax: +41 417 486011

Taiwan
Chinatech Corporation
Grover Lin
Tel: +886 22916 0977
Fax: +886 22912 6641

United Kingdom
Voltech Instruments Ltd.
Leigh Jacobs
Tel: +44 (0)1235 834555
Fax: +44 (0)1235 835016

United States
Voltech Instruments Inc.
Jeff Roffee
Tel: +1 919 431 0015
Fax: +1 919 431 0090

Voltech Instruments Ltd.

148 Sixth Street, Harwell International Business Centre, Didcot, Oxon, OX11 0RA, UK

Tel: +44 (0)1235 834555, Fax: +44 (0)1235 835016, E-mail: sales@voltech.co.uk

Voltech Instruments Inc.

2725 East Millbrook Road, Suite 121, Raleigh, NC 27604, USA

Tel: +1 919 431 0015, Fax: +1 919 431 0090, E-mail: sales@voltech.com