INTERNATIONAL PRODUCT CATALOG
Volume 1

DALE TECHNOLOGY

Number one in value.

ABOUT US

In a small basement in Westchester County, New York, Dale Technology was formed. Dale Technology began in October, 1972, by a young engineer who noticed the medical-device-industry focus on electrical-leakage currents. Medical-device manufacturers were required to adhere to stringent guidelines regarding maximum-allowable electrical-leakage currents for their devices. The power cord on most medical devices was a significant contributor to high levels of electrical-leakage currents. Dale Technology responded with the introduction of the Dale Low-Leakage Power Cable.

Dale Technology sold over one million feet of this special low-leakage power cable in the first twelve months of business! Dale's Low-Leakage Power Cable was truly a unique product offering in the medical-device market. At that time, the company was being operated from the basement of a privately owned home in Hartsdale, NY, in Westchester County (hence the company name "Dale"). It all started with a very simple business model: Listen to your customers, give them what they need, and make a modest profit.

Over the years, producing low-leakage cable evolved to measuring leakage current, a natural extension of the business. Resulting from customer demand, the Dale Electrical Safety Analyzer was born. The product offering later expanded into Patient Simulators and other devices, such as Medical-Grade Isolation Transformers.

Today, Dale Technology is located in Carson City, NV. The Dale Technology product line has expanded considerably and includes test instruments designed to verify the performance and calibration of medical devices. These devices include defibrillators, external pacemakers, infusion pumps, electrosurgical generators, rigid endoscopes, and even radiology equipment. And YES, Dale Technology still offers its Low-Leakage Power Cable. Our product line and market share have grown considerably, but we have not lost sight of our primary mission: to listen to our customers and provide you with what you need. This is both the legacy and the future of Dale Technology. We will always find new ways to bring you value.

DALE TECHNOLOGY

NUMBER ONE IN VALUE.

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DALE601 CE

Electrical Safety Analyzer

Solid reliability for comprehensive testing.

The DALE601 makes electrical safety testing a breeze. With features such as universal ECG-lead connects, selectable AAMI or IEC test load, and international function labeling, you perform functions more easily with the DALE601 than with other instruments. Besides its simple operation, the DALE601 provides the accuracy you require in a portable and reasonably priced package.

Measures:

- Mains voltage
- Current consumption
- Earth/chassis resistance
- Enclosure-leakage current
- Earth-leakage current
- Patient-lead-leakage current
- Patient-auxiliary-leakage current
- Mains on applied part
- Transducer-isolation current
- External-voltage gradient
- Point-to-point resistance
- Wall-outlet polarity

DALE601E CE

Electrical Safety Analyzer

Same great features in a 230 VAC package.

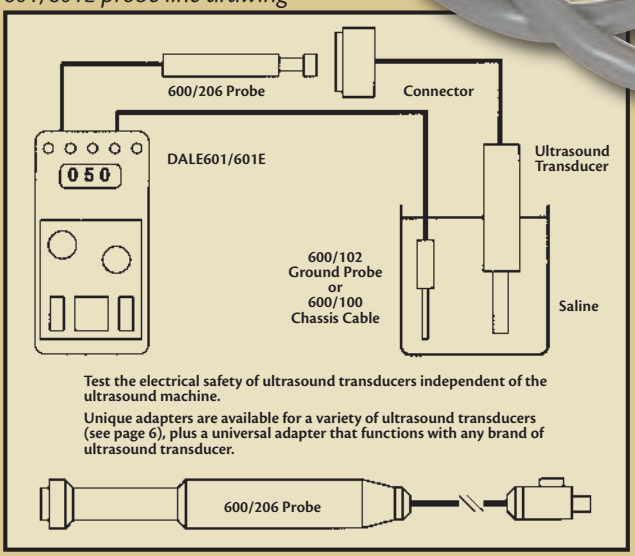
The DALE601E offers all of the same great features as the DALE601, but in a 230 VAC version. A variety of international power-connector configurations are available, including the following:

USA
Schuko (Europe)
United Kingdom
Switzerland
Italy
Australia

Call the factory for additional connector styles for countries other than those listed above.

DALE601

601/601E probe line drawing



LT544D^{PLUS}

DALE612S

LT544D^{LITE} CE

Electrical Safety Analyzer

Simple and easy to use.

The LT544D^{LITE} is a basic electrical safety analyzer that measures both chassis- and earth-leakage currents, as well as chassis resistance. The large display and robust switches make the LT544D^{LITE} easy to operate. A universal power supply allows operation with both 115 V and 230 V devices. Use the LT544D^{LITE} to perform incoming inspections, final inspections, and routine preventive maintenance.

Measures:

- Earth/chassis resistance
- Chassis-leakage current
- Earth-leakage current

LT544D^{PLUS} CE

Electrical Safety Analyzer

With added features that really "measure up."

The LT544D^{PLUS} performs the tests found in the LT544D^{LITE}, with the added capabilities of measuring wall-outlet polarity, line voltage, and instrument current of the test device. It is particularly useful in dialysis clinics, labs, home healthcare organizations, service groups, and for technicians who test and maintain medical devices without ECG leads. The portability, flexibility, and price of the LT544D^{PLUS} make it the ideal companion for technicians who service multiple locations.

Measures:

- Line voltage
- Instrument current
- Earth/chassis resistance
- Earth-leakage current
- Chassis-leakage current
- Wall-outlet polarity

DALE612S & 612SE

Electrical Safety Analyzers

Benchmark instruments that extend Dale's tradition of function and value.

The DALE 612S and DALE 612SE bench-model electrical safety analyzers retain the operating features of our portable models, with the capabilities required to test the electrical safety of all types of medical equipment. A built-in ECG simulator provides ten performance waveforms for testing ECG equipment. Normal sinus rhythm, square, sine, and triangle waveforms with adjustable rates are included. Universal connectors allow for the simultaneous connection of ten leads.

Measures:

- Line voltage
- Instrument current
- Earth/chassis resistance
- Chassis-leakage current
- Earth-leakage current
- Lead-to-ground current
- Lead-to-lead current
- Lead-isolation current

Waveforms

Heart rate: 30, 60, 120, 240 BPM
Sine: 10, 50, 100 Hz
Square: 0.125, 2.0 Hz
Triangle: 2.0 Hz

LT544D^{LITE}

Electrical Safety Analyzers

Standard Accessories

Chassis cable, coil cord with clamp (8 ft)
Operating manual
Certificate of Calibration (traceable to the NIST)
Soft-sided carrying case

Optional Accessories

Chassis cable, coil cord with clamp (16 ft)
Chassis ground probe, coil cord (8 ft)
External-leakage cable, coil cord with clamp (8 ft)
External-leakage cable, coil cord with clamp (16 ft)
Universal ultrasound probe adapter (for 601 and 601E only)

Universal ultrasound probe adapter

Chassis cable

External-leakage cable

Electrical Safety Analyzer Comparison

	LT544D^{LITE}			LT544D^{PLUS}			DALE601/601E			DALE612S/612SE		
Display	LCD 3 1/2 digits			LCD 3 1/2 digits			LCD 3 1/2 digits			LCD 3 1/2 digits		
Controls												
Function switch	2 positions			4 positions			9 positions			9 positions		
Neutral switch	Closed/open			Closed/open			Closed/open			Closed/open		
Polarity switch	Normal/off/reversed			Normal/off/reversed			Normal/off/reversed			Normal/off/reversed		
Leakage switch	Chassis/earth			Chassis/earth			M.A.P./off/lift ground			ISO test/lift ground		
Lead selector	N/A			N/A			6 positions			11 positions		
ECG simulator	N/A			N/A			N/A			10-position waveform selector		
Measurements	**Accuracy**	**Resolution**	**Range**	**Accuracy**	**Resolution**	**Range**	**Accuracy**	**Resolution**	**Range**	**Accuracy**	**Resolution**	**Range**
Line voltage	N/A			2%	1 V	82 to 265 V	2%	1 V	601: 117 V±10% 601E: 230 V±10%	2%	1 V	612S: 117 V±10% 612SE: 230 V±10%
Instrument current	N/A			5%	10 mA	0 to 19.99 A	5%	10 mA	0 to 19.99 A	5%	10 mA	0 to 19.99 A
Earth/chassis	1%	10 mΩ	0 to 1.99 Ω	1%	10 mΩ	0 to 1.99 Ω	1%	10 mΩ	0 to 1.99 Ω	1%	10 mΩ	0 to 1.99 Ω
resistance	2%	10 mΩ	2 to 19.99 Ω	2%	10 mΩ	2 to 19.99 Ω	3%	10 mΩ	2 to 19.99 Ω	2%	10 mΩ	2 to 19.99 Ω
Leakage current	1%	1 µA	0 to 1999 µA	1%	1 µA	0 to 1999 µA	1%	1 µA	0 to 1999 µA	1%	1 µA	0 to 1999 µA
Wall-outlet polarity	N/A			5 conditions			5 conditions			N/A		
Test load	ANSI/AAMI ES1-1993			ANSI/AAMI ES1-1993			ANSI/AAMI ES1-1993 or IEC601-1			ANSI/AAMI ES1-1993		
Power supply												
Input	85 to 265 VAC, 50/60 Hz			85 to 265 VAC, 50/60 Hz			601: 115 VAC, 50/60 Hz 601E: 230 VAC, 50/60 Hz			612S: 115 VAC, 50/60 Hz 612SE: 230 VAC, 50/60 Hz		
Rating	15 A for 30 min, 20 A for 2 min			15 A for 30 min, 20 A for 2 min			15 A for 30 min, 20 A for 2 min			15 A for 30 min, 20 A for 2 min		
Dimensions (L x W x H)												
(in)	3.5 x 7.0 x 1.5			3.5 x 7.0 x 1.5			4 x 7.8 x 1.6			8.5 x 11.5 x 4		
(cm)	8.9 x 17.8 x 3.8			8.9 x 17.8 x 3.8			10.2 x 19.8 x 4.1			21.6 x 29.2 x 10.2		
Weight	2 lbs (907 g)			2 lbs (907 g)			3 lbs (1.4 kg)			5 lbs (2.3 kg)		

DALE601CS

DALE601CS
DALE601CSE
Current Sources

Meet your IEC testing requirements with these add-ons.

The DALE601CS and 601CSE 1-Amp current sources are designed to work hand-in-hand with the DALE601 and 601E Electrical Safety Analyzers. The 601CS comes standard with a 115 VAC U.S. power cord that interfaces directly with the DALE601. The 601CSE has a 230 VAC Schuko power cord that interfaces directly with the DALE601E. These add-on current sources facilitate testing according to IEC601 requirements, where 1 A current requirements are present for ground-continuity testing. The 601CS is available only with the standard U.S.-power-plug configuration, while the 601CSE is available with the following power connectors:

- U.S.A.
- Schuko (Europe)
- United Kingdom
- Switzerland
- Italy
- Australia

The 601CS and 601CSE work on a simple "push-to-test" basis. Actual ground-resistance readings are taken from the electrical safety tester display. An LED on the current source indicates valid test data or warns of out-of-range measurements. There are no external power requirements other than the connection to the electrical safety tester.

See page 28 for available power connector configurations.

Specifications

Power
Universal power supply
(85 VAC – 264 VAC 50/60 Hz)

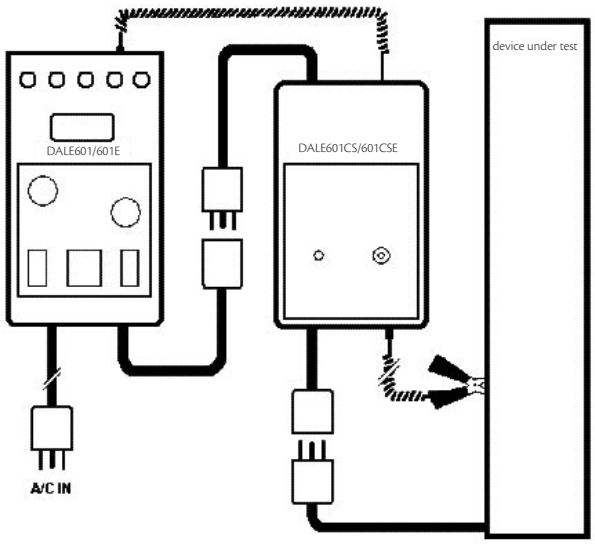
Resistance Range
0 to 3.00 Ω (above 3 Ω an LED flashes to indicate out of range)

Output Current
1 A

Accuracy
1% ± 1 LSD

Size
3.5" L x 7.0" W x 1.5" H
(9 cm L x 18 cm W x 4 cm H)

Weight
2 lbs (907 g)



Using the DALE601CS with the DALE601/601E

DALE800

Ultrasound transducer adapters

DALE800 Test Kit

DALE800

Ultrasound Probe Leakage Tester

Test the leakage current of your transesophageal (TEE) ultrasound transducers easily and quickly.

The DALE800 tests the electrical safety of ultrasound transducers independent of their ultrasound machines. The test is easy to perform and can be completed quickly. The risk current may be checked between patients during the normal procedure of cleaning the transducer.

Unique adapters allow for the testing of many manufacturers' models of TEE probes. Testing can take place in a cleaning basin.

If a transducer is electronically safe for patient use, the green PASS lamp will light. Should a transducer fail the leakage-current test, the red FAIL lamp will light.

Verify the electrical safety of your ultrasound transducers by making this probe-leakage test part of your routine disinfecting procedure.

Standard Accessories

Ground probe
Operating manual

Optional Accessories

Conductivity cable
Dual conductivity electrode*
Ultrasound transducer adapters for:
- GE YMS/RT
- GE CGR
- GE LogicQ
- HP/Agilent 21369A Transducer*
- HP/Agilent 21364A, 21365A, 21366A, 213617A Transducers*
- Siemens/Acuson/Toshiba
- Hitachi

Hard-sided carrying case*

** Included in the DALE800 Kit*

Specifications

Power
9 V alkaline battery (approximately 1,000 uses per battery)

Conductivity
Limit to pass: greater than 133 µA ± 1%

Leakage
Limit to pass: less than 100 µA ±1%

Environmental
Operating temperature: 15 °C to 40 °C
Storage temperature: 15 °C to 65 °C
Relative humidity: 90% max

Dimensions
6.5" L x 3.8" W x 1.5" H
(17 cm L x 10 cm W x 4 cm H)

Weight
12 oz (340 g)

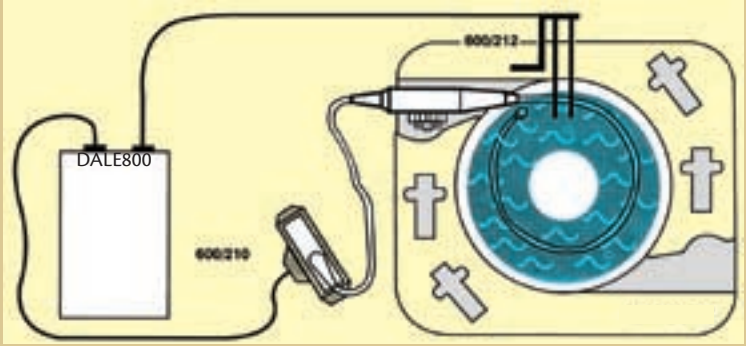
DALE800 Test Kit

Ultrasound Transducer-Leakage-Current Test Kit

No preparation needed.
The DALE800 Test Kit is designed to give users of the most popular HP/Agilent TEE ultrasound probes a "ready-to-test" kit to verify the integrity of their TEE transducers.

DALE800 Ultrasound Transducer-Leakage-Current Test Kit includes:

- DALE800 transducer-leakage-tester
- HP/Agilent transducer adapters (2X)
- Dual-conductivity electrode
- Convenient carrying case



DALE800 setup

DALE301

Broken lense

Dusty lense

Foggy lense

DALE301

Rigid Endoscope Tester

A simple-to-use, quick check for rigid endoscopes.

Finally there is a simple tool for technical and nontechnical personnel to perform a quick evaluation of most rigid endoscopes. With the DALE301, your staff diagnoses problems during incoming inspections, after complaints, pre- and post-service, and as a routine preventive-maintenance inspection.

Clinical studies have already documented that by using the DALE301 on incoming inspections of new rigid endoscopes, it will often pay for itself within the first year.

With the DALE301, you can identify the following:

- Broken lenses
- Crooked rod shaft
- Normal wear and tear
- Internal moisture
- Presence of contamination
- Lens debris

Features

- Incoming acceptance inspections performed
- Simple to use
- Lightweight and compact
- No light source or other accessories required
- Pre-repair inspections to prevent unneeded repairs and save money
- Post-repair inspections to verify a performed service or indicate if a repair was simply a "dusting off"
- Compatible with most rigid endoscopes
- Compatible with common cameras for hard copy documentation to trend test or to compare and document after service

Specifications

Outer Diameter of Eyepiece
31.75 mm +0 –0.1 per DIN 58105

End-Cap Inner Diameter
No less than 120 mm

Optical Design
Focal length: 40 mm ± 3%
Refraction: 25 dpt
Material: PMMA (Plexiglass)
Diameter: 19 mm

Focal Point Adjustment Scale
16 cm

Maximum Diameter of Rigid Endoscope
<10 mm

Environmental
Operating temperature: 15 to 40 °C
Storage temperature: -20 to +65 °C
Relative humidity: 95% max

Dimensions
8.75" L x 1.75" W x 1.75" H
(22 cm L x 4 cm W x 4 cm H)

Weight
13.1 oz (370 g)

DALE14

DALE14 CE

Multiparameter Simulator

More comprehensive simulation capability.

The DALE14 is powerful enough to test full-function monitors with its onboard ECG, arrhythmia, respiration, blood-pressure and temperature simulations. The DALE14's pullout card is convenient for looking up all simulations for manual use. Or use its RS232 port for direct connection to a PC.

Features

- Compact
- 12-lead ECG simulation
- Wide range of arrhythmias
- Auto/manual modes
- RS232 port
- 2 IBP channels
- Respiration
- Temperature

Standard Accessories

Operating manual
Battery eliminator
Lead-test adapter
Carrying case

Optional Accessories

BP cable
Temperature cables
RS232 cable
Service manual

Specifications

ECG Waveforms
Normal sinus rhythm: 30 to 350 BPM
Auto mode

Performance Waveforms
Square: 2 Hz
Sine: 10, 40, 50, 100 Hz
Triangle: 2 Hz
Pulse: 30, 60 BPM
Auto mode: 0.5 to 2.0 mV

Amplitudes
± 2% lead II or ± 5%

Arrhythmias
Atrial fibrillation
Second-degree heart block type II
Right-bundle-branch block
Premature atrial contraction
Premature ventricular contraction
Premature ventricular contraction, early
Multifocal PVCs
Run of 5 PVCs
Bigeminy
PVC R-on-T wave
Ventricular tachycardia
Ventricular fibrillation
Pacer
Fetal/maternal

Autosequence
Pulse wave: 4 s/l mV
Sine-wave bursts: 10, 40, 50, 60, 100 Hz
Triangle wave: 2 Hz

High-Level Output
0.5 V/mV, lead I

Respiration
Output configuration: Lead I, II or RL to LL
Baseline impedance: 500 Ω or 1000 Ω
Delta impedance: 0.1, 0.2, 0.5, 1.0, 3.0 Ω
Normal physiological rates: 0, 15, 20, 30, 40, 60, 80, 100, 120 BPM
Apnea: 12 and 32 s

Blood Pressure
Input/output impedance: 300 Ω
Output sensitivity: 5 or 40 µV/V/mmHg
Output range: 0 to 300 mmHg

Channel-I Manually Selectable Waveforms (mmHg)
Arterial: 120/80
Left ventricle: 120/0
Central venous pressure: 15/10
Right ventricle: 25/0
Pulmonary artery: 25/10
Pulmonary artery wedge: 10/2
Atmosphere (0)
Static: 20, 40, 80, 100, 200, 250, 300 BPM
Artifact BP1/ BP2

Automated Channel-1 Blood-Pressure Waveform
Sequence: Atmosphere (0)
Static: 20, 40, 80, 100, 200, 250, 300 BPM

Channel-2 Manually Selectable Waveforms (mmHg)
Atmosphere (0)
Track BPI: duplicates channel 1 select
Central venous pressure: 15/10
Swan-Ganz: insert, inflate, deflate, remove

Automated Channel-2 Blood-Pressure Waveform
Sequence: Atmosphere (0)
Static: 20, 40, 80, 100, 200, 250, 300 BPM

Temperature
30 °C, 37 °C, 40 °C

Power
9 V alkaline battery

Dimensions
6.3" L × 4" W × 1.5" H
(16 cm L × 10 cm W × 4 cm H)

Weight
13.4 oz (380 kg)

DALE14 ECG adapter leads

DALE13

DALE13 CE

ECG/Arrhythmia Simulator

Fast, complete ECG testing.
The DALE13 is a small ECG simulator packed with waveforms designed to verify accuracy of ECG machines, monitors and telemetry units.

Features

- Simple to-use rotary knob
- Handheld
- 12-lead ECG simulation
- 12 arrhythmias
- Universal ECG jacks
- Autosequencing of performance waveforms

Standard Accessories

Operating manual
Battery eliminator
Carrying case

Optional Accessories

Service manual

Specifications

ECG Waveforms
Normal sinus rhythm: 30 to 240 BPM

Performance Waveforms
Square: 2 Hz
Sine: 10, 40, 50, 60, 100 Hz
Triangle: 2 Hz

Amplitudes
0.5 to 2.0 mV

Arrhythmias
Atrial fibrillation
Second-degree heart block type I
Right-bundle-branch block
Premature atrial contraction
Premature ventricular contraction
Run of 5 PVCs
Bigeminy
PVC R-on-T wave
Ventricular tachycardia
Ventricular fibrillation
Pacer

Autosequence
Pulse wave: 4.0 s/l mV
Sine wave bursts: 10, 40, 50, 60, 100 Hz
Triangle wave: 2 Hz

High-Level Output
0.5 V/mV, lead I

Power
9 V alkaline battery

Dimensions
5.2" L × 3.9" W × 1.4" H
(13 cm L × 10 cm W × 4 cm H)

Weight
14.2 oz (400 g)

EHS10

EHS12

EHS10 & EHS12

ECG Simulators

Performance testing of critical ECG equipment.

The EHS10 and EHS12 are compact, battery-operated ECG simulators that are designed to test the operating performance of ECG equipment, including electrocardiographs, patient monitors, and telemetry systems. The EHS10 performs 5-lead ECG simulation, while the EHS12 is capable of full 12-lead ECG simulation. Because they are small and cost-effective, the EHS10 and EHS12 can be included in every technician's tool kit.

Features

- 10 ECG-performance-testing waveforms
- Small, portable, easy to use
- Continuity test of lead wires
- Start-up test to indicate proper operation
- Low-battery indicator, flashing LED
- Fixed-width QRS complex
- Crystal frequency source and reference voltage
- 9 V alkaline battery, 200 hours of operation
- Microcomputer-controlled digital information
- Universal connectors for lead attachment

Specifications

Accuracy
Amplitude: ± 2% of reading
Frequency: ± 0.5% of setting

Controls
Power switch (2-position toggle)
Function switch (10-position rotary)

Waveforms
Heart rate: 30, 60, 120, 240 BPM
Sine: 10, 60, 100 Hz
Square: 0.125, 2.0 Hz
Triangle: 2.0 Hz

Output Impedance
Leads 5 KΩ

Amplitude (peak-to-peak)
Lead I (LA-RA): 1.75 mV
Lead II (LL-RA): 2.75 mV
Lead III (LL-LA): 1.0 mV
Lead C-RL: 5/0 mV

Power
9 V alkaline battery
(200 hours of operation)

Dimensions
EHS10: 4" L x 2.5" W x 1" H
(10 cm L x 6 cm W x 3 cm H)
EHS12: 6" L x 4" W x 1.5" H
(15 cm L x 10 cm W x 4 cm H)

Weight
EHS10: 4.9 oz (140 g)
EHS12: 11.7 oz (330 g)

Patient Simulator Comparison

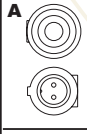
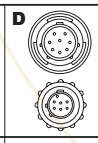
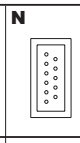
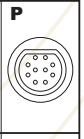
	DALE14	DALE13	EHS12	EHS10
Display	2-digit LCD	NO	NO	NO
12-lead ECG simulation	YES	YES	YES	NO (5-lead)
ECG arrhythmias	YES (13)	YES (11)	NO	NO
Pacer simulations	YES (1)	YES (1)	NO	NO
ECG performance waves	YES (9) (50 & 60 Hz)	YES (7) (50 & 60 Hz)	YES (6) (60 Hz only)	YES (6) (60 Hz only)
ECG high-level output	YES	YES	YES	YES
Lead test	YES	NO	YES	YES
Blood pressure w/ autosequence & Swan-Ganz	YES (2-ch)	NO	NO	NO
Respiration	YES	NO	NO	NO
Temperature	YES (YSI 700 & 400)	NO	NO	NO
Pullout card	YES	NO	NO	NO
ECG performance autosequence	YES	YES	NO	NO
Serial port (RS232)	YES	NO	NO	NO
Power	9 VDC alkaline battery or eliminator	9 VDC alkaline battery or eliminator	9 VDC alkaline battery	9 VDC alkaline battery

Blood-pressure and temerature cables

Manufacturer	Description	Cable Key
Burdick	10-pin Female	B
Care	5-pin Male	C
Corometrics	3-pin Male / 3-pin Female	E
Corometrics	12-pin Male	M
Criticare	6-pin Male	G
Critikon	6-pin Male	G
Datascope	6-pin Female	F
Datex	10-pin Female	B
Gould/Statham	5-pin Male	C
Hewlett Packard	5-pin Female	J
Hewlett Packard	12-pin Male	I
Invivo	6-pin Male	G
Ivy Biomedical	6-pin Male	G
Kontron/Roche	6-pin Female	F
GE Marquette 7000	8-pin Male	P
GE Marquette Eagle	11-pin Male	N
GE Marquette Twin	7-pin Male, 8-pin Male	D
Medical Data Electronics	6-pin Male	G
Mennen Medical	6-pin Male	H
Nihon Khoden	5-pin Male	O
North American Drager	6-pin Male	G
Novametrix	3-pin Male / 3-pin Female	E
Ohmeda	6-pin Male	G
Physio-Control	6-pin Male	G
Protocol	6-pin Male	G
Puritan Bennett	10-pin Female	B
Siemens	10-pin Male	K
SMEC	6-pin Female	F
Spacelabs	6-pin Male	G
Spacelabs/Squib	5-pin Male	L
Tektronix/Squib	6-pin Male	G
Vitastat	5-pin Male	L
Vitatek/Squib	6-pin Male	G
Universal BP Adapter	Unterminated Pigtail	5183006 (*not shown below*)

Temperature cables

HP Temperature Cable Adapter	1/4" Phone plug to 2-pin	A
Temperature Cable YSI 400 Series	1/4" Phone Plug	5183001 (*not shown below*)
Temperature Cable YSI 700 Series	1/4" Phone Plug	5183002 (*not shown below*)

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
															
48083	5183032	5183023	5183007	5183024	5183008	5183010	5183011	5183012	5183013	5183016	5183020	5183030	5183031	5183014	5183027

DALE900

DALE900 CE

Defibrillator Analyzer

Output-energy and cardioversion measurement in a compact, battery-operated package.

The DALE900 has the flexibility to test semi- and fully automated defibrillators and is compatible with the wide range of defibrillator technologies utilized in today's devices equipped with Edmark, Lown, trapezoid, and biphasic-energy-output waveforms. These waveforms are provided through the paddles in a 5-lead configuration. To determine the proper synchronization of your defibrillator, the DALE900 measures actual delay time from the peak of the generated R-Wave to the leading edge of the defibrillator-discharge waveform.

Features

- Energy and cardioversion testing
- ECG signal through defibrillator paddles
- Slow-motion playback of digitized defibrillator discharge
- Preset sequences and ECG simulation with Option 1

Optional Features

Option 1: Add Option 1 for even-more-comprehensive defibrillator analysis that eliminates errors and cumbersome paperwork. This package offers the following:

• *User-Programmable Test Sequences:* Customize 20 test sequences with programmable protocols and test limits when you add Option 1 to the DALE900. Available tests include cardioversion-maximum-energy verification, and up to 20 energy tests. Sequences for 18 defibrillators are factory preset.

• *Automated ECG-Performance Testing:* Give your DALE900 the ability to output ECG waveforms in a 5-lead configuration. By adding Option 1, you can inspect gain, linearity, and frequency response at the required AHA (American Heart Association) points. A normal-sinus-ECG is sequenced automatically through a series of heart rates to test rate-meter calibration and alarm operation. The output is calibrated at 1.0 mV in Lead 1.

• *Defibrillator Training:* With Option 1, the DALE900 meets the needs of first-responder training programs that use the latest automatic or semiautomatic defibrillation equipment. One cardioversion and 7 emergency scenarios are programmed for EMT-D student training or certification. Attach a serial printer and the DALE900 documents student-response times, actual energy discharge levels, cardiac-event listings, and instructor comments.

Standard Accessories

Internal paddle contact adapters
115 V or 230 V battery eliminator
Carrying case
Operating manual

Optional Accessories

Option 1
Disposable electrode adapters
Service manual

Specifications

Defib Energy Measurement
Load Resistance
50 Ω ± 1% noninductive (< 1 mH)
High Range
Maximum energy: 700 J
Accuracy specifications are for energy levels ≤ 360 K
Accuracy: ± 2% of reading for 100-360 J; ± 2 J for < 100 J
Real-time oscilloscope output: 1 V/1000 V (applied)
Low Range
Maximum energy: 50 J
Accuracy: ± 2% of reading for 20 to 50 J: ± 0.4 J for < 20 J
Real-time oscilloscope output: 1 V/200 V (applied)

Display Resolution
0.1 J

Measurement Time Window
64 ms

Real-Time Oscilloscope Output
1000:1 BNC jack

Expanded-Time Playback
Expansion of 200 to 1

Cardioversion
Timing window: -120 to +880 ms at R-wave peak.
Waveform: Normal sinus at 60 BPM 1 mV/Lead 1

Normal-Sinus ECG
Base Model Selections
Cardioversion: 60 BPM
V-Fib: Automated defibrillator testing
Option-1 Selections
Rate accuracy: ± 1% of selection

Amplitude: 1.0 mV/Lead 1, ± 5.0%
Lead Format
AHA (American Heart Association) or
European color-coding available

ECG-Performance Testing (with Option 1 only)
(Output at 1.0 mV/Lead 1)
Square wave: 2 Hz
DC pulse waveform: 4.0 s
Sine waves: 0.05 to 1000 Hz
Triangle wave: 2 Hz
Lead-short test: zero output

Arrhythmias
Atrial fibrillation (fine and coarse)
Atrial flutter
Sinus arrhythmia
First-degree AV Block
Second-degree AV Block 1 & 2
Third-degree AV Block
Premature ventricular contraction
Multifocal PVCs
Couplet
Bigeminy
Trigeminy
Run of 5 PVCs
Run of 11 PVCs
Ventricular rhythm
Ventricular tachycardia
Ventricular fibrillation 1 & 2
Electro-Mechanical Dissociation (EMD)
Asystole

Power
9 V alkaline battery or battery
eliminator (115 V or 230 V available.
Please specify.)

Case
ABS plastic

Dimensions
9" L x 8.25" W x 4" H
(23 cm L x 21 cm W x 10 cm H)

Weight
5 lbs (2.3 kg)

DALE900 electrode adapters

DALE400 CE

External Pacemaker Analyzer

Testing for an entire range of external pacemakers.

The DALE400 has been specifically designed for use with all external cardiac pacemakers including invasive (transvenous) and noninvasive (transcutaneous) types. Its impressive range of tests and simulations will meet the needs of all cardiac units.

Features

- Handheld portability
- All necessary test leads
- Large, 2-line LCD display
- Comprehensive test ranges
- Replaces 5 separate test devices

Standard Accessories

Test leads
Operating manual
Pacer Load Adapter (PLA)

Optional Accessories

Carrying case
RS232 cable
Printer cable
Parallel printer
AC power supply
Service manual

Specifications

Display
2-line × 16-character LCD

Inputs
Ventricle pacing signal:
(0-12 V, 25 mA), (500 Ω load)
Atrial pacing signal:
(0-12 V, 25 mA), (500 Ω load)
Transthoracic pacing signal:
(0-40 V, 250 mA), (50 Ω load)

Outputs
Parallel printer port
Serial computer port

Measurement of Pacing Pulse
Amplitude: 0 to12 V invasive,
0 to 40 V noninvasive
Rate: 30 to 300 BPM
Pulse length: (< 1 to 50 ms)

AV Time Interval
0 to 1000 ms

50/60 Hz Interference Signal
0 to 25 mV in 1 mV steps

Refractory Period Measurement
20 to 500 ms

Simulated R-, S- & T-Waves
Width 5, 10…, 100, 200 ms

Waveforms
Square, triangle, haversine, ISO Rate
(30 to 120 BPM)

Amplitude
0 to 25 mV, in 0.5 mV steps

Long-Term Tests
Reference value for pulse rate,
amplitude and length established
from first 10 pulses. Thereafter,
any deviation over 10% (adjustable)
is flagged.

Power
Four AA cells
Current drawn 20 mA approx.
or connect to 9 VDC supply

Dimensions
7.5" L × 5.5" W × 1.5" H
(18 cm L × 13 cm W × 4 cm H)

Weight
1.54 lbs (700 g)

DALE400

DALE3000 CE

Electrosurgical Analyzer

Simple, portable, and digital to satisfy your electrosurgical-unit (ESU) testing needs.

The DALE3000 makes it easy to conduct generator-output, HF-leakage, and CQM tests, allowing you to read the results on a bright LED display. Compatible with both isolated and earth-referenced ESUs, the DALE3000 has fifteen standard test loads to match the requirements of most ESUs. All of the high-frequency (HF) leakage tests, as specified in the current IEC and ANSI/AAMI standards, are easily conducted. The DALE3000 will also verify the basic operation of the dispersive electrode's Contact Quality Monitor (CQM).

Features

- Easy-to-use test instrument
- Performs output, HF-leakage, & CQM tests
- Select watts, current, and test load with a touch of a button
- Main test loads from 50 Ω to 750 Ω (in 50 Ω steps)
- Performs all IEC & ANSI/AAMI HF-leakage tests
- Auxiliary HF-leakage test load
- Large LED, 4-digit numeric display
- Oscilloscope output
- RS232 serial-port interface for test automation

Since the instrument's enclosure is constructed of high-grade plastic, the DALE3000 is lighter than other models. Also, you are protected from potentially dangerous electrical shock while testing the high-voltage, high-frequency ESU-generator output.

DALE3000

Standard Accessories

Test leads (4): Active, dispersive, earth reference, CQM
Two insulated jumpers
Fuses: Two 3.15 A
Detachable power-cord set
Operating manual

Optional Accessories

Serial cables
Hard-sided carrying case
Service Manual

Specifications

Modes of Operation
Manual
Remote
Simplex: Transmits data only
Duplex: Transmits data and receives control commands

Displayed Parameters
Power (W)
RF current (mA)
Test load (Ω)

Tests Performed

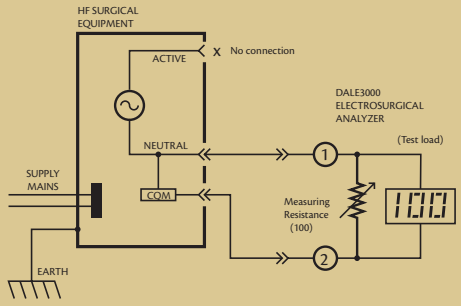
Generator Output
HF/RF Leakage: Performs tests in accordance with IEC 601- 2-2, 1289-2, ANSI/AAMI HF-18.

Earth Referenced Leakage (IEC)
Type BF Test 1
Type BF Test 2

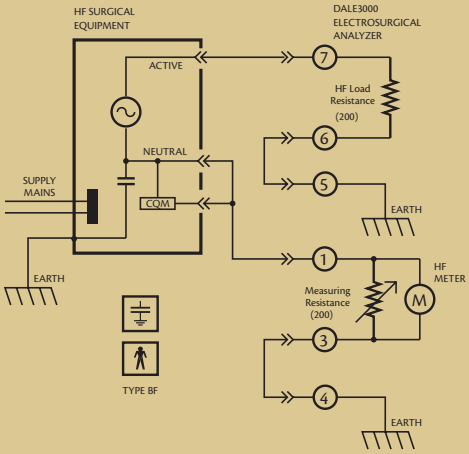
Isolated Output Leakage (IEC & ANSI/AAMI)
Type CF/Bipolar Test 3

Contact Quality Monitor (CQM)

Measurement Technique
A precision, high-voltage/high-frequency capacitive divider samples the applied ESU signal. This voltage and the selected test-load-resistance value are utilized to derive the True RMS current and power values of the applied electrosurgical signal.



Contact Quality Monitor



Load from active electrode to earth

RF Measurements
Watts (Resolution)
Range: 0.1 to 400 (± 0.1 W)
Maximum power input: 400 W
Accuracy: ± 5% of reading or ± 3 W (whichever is greater)
RF Current (Resolution)
Range: 30 to 2500 mA (± 1 mA)
Accuracy: ± 2.5% of reading or ± 15 mA (whichever is greater)

Bandwidth (Measurement Circuitry Only)
Flat response: 10 kHz to 10 MHz
-3dB points: 1 kHz to 20 MHz

System Response (Measurement Circuitry and Test Load Sections)
-3dB points: 1 kHz to 10 MHz @ 300 Ω

Test-Load Section
Selections: 15
Range: 50 Ω to 750 Ω
Step size: 50 Ω
Accuracy: ± 4% of selected value
Maximum duty cycle @ 400 W: 50% (period = one minute)

Auxiliary-Leakage Test Load
Fixed: 200 Ω
Accuracy: ± 4% rated @ 225 W
Input capacitance at 300 Ω
Active to neutral: 30 pF
Active or neutral to earth ground: 40 pF

Auxiliary Contact-Quality-Monitor (CQM) Test
The main test loads are used to perform a simple operational check of the ESU's CQM feature.

Signal Averaging Mode (SAM)
2 rolling average algorithms to smooth ESU output

Display
4-digit red LED, seven segments

Front-Panel Controls
Measurement select (1): Watts or current
Load select (2): Increment or decrement

Top-Panel Input Connections (7)
Designations:
Generator output-active (1)
generator output dispersive (2)
earth/ground reference (2)
auxiliary HF-leakage load (2)
Connector type: 4 mm (.160") diameter safety sockets (IEC-1010 approved)

Serial Port
Baud rate: 2400 Fixed
Connector type: Male DB9
Modes: Simplex and duplex

Oscilloscope Output (Uncalibrated)
Transformer coupled-output connector type: BNC

Ventilation (Variable Speed Fan)
Over-temperature protection
Blocked-rotor optical sensor/detector

Power Requirements
Operating voltage (frequency): 115/230 VAC (50 Hz/60 Hz)
Maximum input: 60 W
Fuses: 3.15 A (2) user replaceable (external)

Safety Requirements
U.S.A.: UL3101-1
Canada: CAN/CSA C22.2 No. 1010-1 1992
International: EN 61010-1 (1990) (73/23 EEC low-voltage directive)

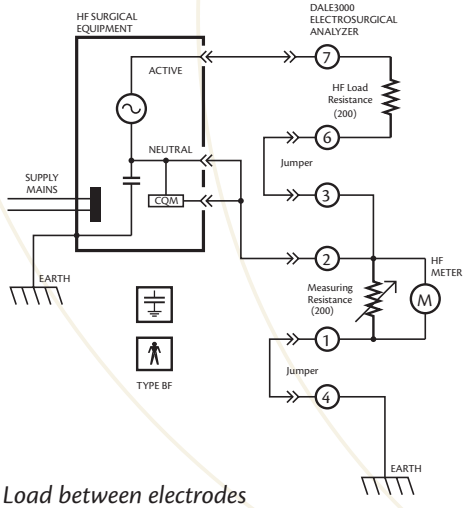
Electromagnetic Interference and Susceptibility
89/336/EEC Electromagnetic (Amendment 93/68/EEC)
EN 50082-1 Group I
EN 550221 Class A

Environment
Operating temperature: 15 °C to 35 °C
Storage temperature: 0 °C to 50 °C
Humidity: <90% non-condensing

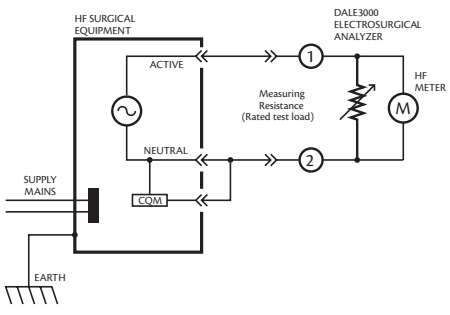
Case
High-impact plastic

Dimensions
12" L x 13.5" W x 6" H
(30 cm L x 34 cm W x 15 cm H)

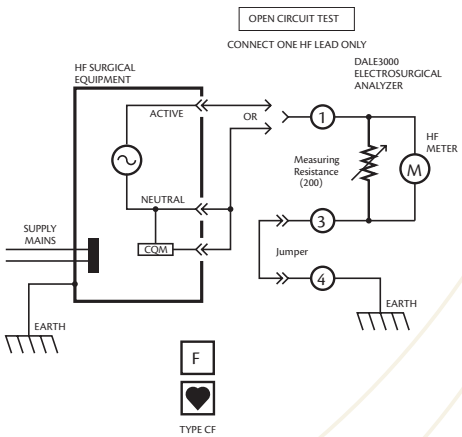
Weight
12 lbs (5.5 kg)



Load between electrodes



Generator output



Isolated bipolar output

DALE4100 CE

Infusion Device Analyzer

Rapid check for infusion pumps.
This portable device quickly evaluates the operation of infusion devices with both steady and nonsteady flow patterns. A simple user interface removes the clutter from infusion-pump testing. Use the instrument in manual- or computer-control modes.

Modes of Operation

Flow (Steady Flow)
This mode performs direct-flow measurement by timing the displacement of fluid within a known volume. Use this mode for testing devices that have steady flow patterns, such as a syringe driver. The sample size varies with the flow rate, to minimize the time to first reading.

Volume (Nonsteady Flow)
This mode performs a volume measurement and derives the flow. This sample size is set at 1 ml regardless of the flow rate. Use this mode to test infusion pumps with nonsteady flows and PCAs.

Occlusion Pressure
Set the infusion pump to the manufacturer's recommended flow rate, and select occlusion on the DALE4100. Measurements will be displayed in mmHg or psi. This measures the downstream occlusion on the infusion pump.

Priming
Priming the DALE4100 is a simple technique using an enclosed syringe. Generally this task can be done with less than 5 ml of fluid, depending on the priming solution.

Features

- Quick, accurate measurements of steady and nonsteady flow devices
- Flow-rate, delivered-volume, and occlusion-pressure testing
- Portable: attaches on the IV pole
- Simple setup and operation
- RS232/printer ports

DALE4100

Standard Accessories

Operating manual
Drain tubes
Stopcocks
Priming syringe

Optional Accessories

Parallel printer
Printer cable
RS232 cable
Service manual

Specifications

Flow Rate
1 to 100 ml/hr: ± 4% (normal),
± 2% (high accuracy)
100 to 1000 ml/hr: ± 2% (normal),
± 2% (high accuracy)
1000+ ml/hr: ± 4% (normal),
± 2% (high accuracy)

Volume
1 to 100 ml/hr: ± 4% (normal),
± 2% (high accuracy)
100 to 1000 ml/hr: ± 2% (normal),
± 2% (high accuracy)
1000+ ml/hr: ± 4% (normal),
± 2% (high accuracy)

Occlusion
0 to 35 psi ± 5% of reading

Time to Perform Flow-Rate Measurement
1 ml/hr: 5 min (normal),
60 min (high accuracy)
100 ml/hr: 25 sec (normal),
60 sec (high accuracy)
1000 ml/hr: 5 sec (normal),
5 sec (high accuracy)

Power
Operating voltage (frequency):
115/230 VAC, switchable (50/60 Hz)

Dimensions
6.25" L × 9.75" W × 5.25" H
(16 cm L × 25 cm W × 13 cm H)

Weight
5 lbs (2.3 kg)

DALE7000 CE

Intelligent Radiology MAS Meter

A truly unique radiology instrument in a class of its own.

The DALE7000 is a unique product for the radiological service technician and engineer. The DALE7000 simultaneously measures MAS, exposure time, and mA while providing mA-waveform information. The DALE7000 displays three 50 ms mA waveform samples so that radiographic and mammographic preheat circuits can be analyzed and adjusted without using an oscilloscope. Based on requests from service engineers, the DALE7000 can be set to include/exclude the first 10 ms of the mA waveform.

The DALE7000 intelligent meter uses a microprocessor to analyze the digital mA waveform and to display accurate values essential for analyzing and calibrating radiographic and mammographic equipment. The meter is designed to analyze any waveform signal, from single-phase (self-half-wave-rectified) waveforms up to and including any of the high-frequency (constant-potential) waveforms.

The DALE7000 meter has two sets of mA input jacks for testing both alternating-current (AC) mA signals and direct current (DC) mA signals.

The four-line display of the DALE7000 shows the following:

- Line 1: MAS (average tube current [mA] times mA-waveform exposure time)
- Line 2: Exposure time (mA waveform exposure time in seconds)
- Line 3: mA (average tube current [mA] over the entire mA-waveform)
- Line 4: Three sample mA-waveform values (with no delay)

The first waveform value represents the average mA for the first 50 ms of exposure. The second waveform value represents the average mA for the second 50 ms of exposure. The third waveform value represents the average mA for the third 50 ms of exposure.

DALE7000

Features

- Diagnostic power-up sequence to indicate operational status
- Automatic reset
- Pushbutton control that causes the meter to include/exclude the first 10 ms of exposure
- Automatic LCD update
- Automatic power-down when meter is not used for more than five minutes
- Display blanks when an exposure is being made
- Low-battery indication

Specifications

Dynamic Range
10 to 2,000 mA to 999.9 MAS
1 ms to 6.535 s

Accuracy
MAS: ± 0.1 MAS or 1%
(whichever is greater)
mA: ± 1 mA or 0.5%
(whichever is greater)
Time: ±1 ms or 1%
(whichever is greater)

Reset
Automatic reset and LCD update

Environmental
Operating temperature: 15 to 35 °C

Power
One 9 V battery (40-hour life)

Dimensions
4" L x 6.5" W x 1.3" H
(10 cm L x 17 cm W x 3 cm H)

Weight
10 oz (280 g)

DALE20

DALE21

DALE20 CE

Pneumatic Transducer Tester

Troubleshooting with 1% accuracy for your pneumatic transducers.
The DALE20 is a handheld pressure-generating device, designed for calibration and for troubleshooting pneumatic or hydraulic systems. An LCD indicates pressure received externally or pressures manually generated from the internal chamber.

To test blood-pressure transducers or monitors, simply connect a blood-pressure transducer to the luer lock fitting and create any series of pressures from –300 to +300 mmHg.

Features

- Handheld
- Generates and measures positive or negative pressures
- Operates with gas or liquid

Standard Accessories

3-way stopcock adapter
Operating manual

Specifications

Range
–300 to +300 mmHg

Accuracy
± 1% of full scale

Power
One 9 V alkaline battery (60-hour continuous use)

Dimensions
5.68" L × 3.5" W × 1.125" H
(14 cm L × 9 cm W × 3 cm H)

Weight
11 oz (312 g)

DALE21 CE

Universal Pressure Meter

Reliable and accurate measurement of gas or liquid pressures.
The DALE21 Universal Pressure Meter measures positive or negative pressures. Use a single mode switch to select one of five ranges. An LCD readout displays pressures received externally from the following sources: ophthalmologic lasers, dialysis machines, automatic tourniquets, drainage devices, IV pumps, diagnostic and surgical suction devices, ventilators, and pressure gauges.

Features

- Handheld use
- Air or liquid measurements
- External output
- Multiple ranges

Standard Accessories

Operating manual

Specifications

Range
–700 to +800 mmHg
–952 to +1088 cm H_2O
–374 to +428 in of H_2O
–13.50 to +15.50 psi
–13.5 to +100.0 psi

Accuracy
± 1% of full scale

Pressure Connector
Male luer lock

Overpressure Protection
110 psi

Voltage Output
1.1 V/psi on all ranges except 100 psi, which is 0.01 V/psi

Power
9 V alkaline battery

Dimensions
5.75" L × 3.125" W × 2.5" H
(15 cm L × 8 cm W × 6 cm H)

Weight
0.4 oz (295 g)

DALE22

Parabolic Flow Adapter

Low-cost gas-flow measurement.
The DALE22 is a unique, handheld, easy-to-use device enabling users of the DALE21 Universal Pressure Meter to make critical gas-flow measurements in hospitals, factories or service centers. Typical applications include calibrating flows of various gases from wall outlets, breathing machines, ventilators, anesthesia machines, compressors and regulators.

Operation of the DALE22 is based on the principle that the differential pressure measured across a known restrictor is proportional to the flow of gas through the restrictor.

Features

- Handheld
- Extremely simple and easy to use
- Designed to ANSI, ISO, and ASTM standards
- Measures any gas flow
- Includes NBS-traceable calibrated flow readings

Specifications

Flow Range
10 to 250 lpm (2 restrictors: 10 to 75 lpm and 60 to 250 lpm)

Flow Accuracy
± 5% of reading

Gases Measured
Air, O_2, N_2O, CO_2, CO

Requires
DALE21 Universal Pressure Meter


DALE22

DALE30

DALE30 CE /DALE31

Digital Tachometers

Flexible, dual-function RPM calculations.
The DALE30/31 Handheld Digital Tachometers are dual-function instruments providing contact and noncontact measurement of rotational and linear motions.

The DALE30 is CE-marked and comes with a calibration certificate with instrument calibration traceable to NIST.*

Features

- Contact or noncontact measurement
- 8-character, constant unit-of-measure display
- Four memories (last, minimum, maximum, and average readings)
- Sixteen units of measure

Standard Accessories

Convex tip
10 cm, linear measuring wheel
Operating manual

Specifications

Measurement Range
Rotational speed 6 to 99,999 rpm in noncontact mode, 6 to 25,000 rpm in contact mode, or equivalent expressed in alternate units

Display
8-character dot matrix LCD

Contact Adapter
Interchangeable tip

Battery
9 V transistor battery

Dimensions
Unit: 7.5" L × 3.75" W × 1.75" H
(19 cm L × 6 cm W × 4 cm H)

Weight
7.6 oz (220 g)

* The DALE31 is not CE-marked and does not come with a calibration certificate.

DALE40 CE

Phototherapy Radiometer

Instant measurement of light output.
The DALE40 is designed to measure light radiation accurately in the blue part of the spectrum from 429 to 473 nm to treat hyperbilirubinemia in newborn children.

Features

- Large LCD
- Accuracy to ± 5% of full scale
- Spectral range of 429 to 473 nm
- Complete portability

Standard Accessories

Storage case
Operating manual

Specifications

Spectral Range
429 to 473 nm
(max. 97% response at 453 nm)

Measurement Range
0 to 1999 µW/cm2

Resolution
1 µW/cm^2

Probe
Lens matches the cosine-receiving function of human skin

Power
9 V battery (150 continuous hours)

Dimensions
3.1" L × 1.5" W × 5.7" H
(8 cm L × 4 cm W × 15 cm H)

Weight
8.8 oz (250 g)

DALE50 CE

Oxygen Monitor

Watchful monitoring of oxygen levels.

The DALE50 Oxygen Monitor offers unmatched performance reliability for respiratory, anesthesiology, neonatal, and home-care applications.

Features

- Large, easy-to-read, custom 3½ digit display
- Extra-long sensor life
- Quick, in-air calibration setup
- Low-power consumption
- Self-diagnostic check of analog and microprocessor circuitry

Standard Accessories

Operating manual

Optional Accessories

Replacement fuel cell
Carrying case
Mount (pole or wall)

Specifications

Display
Large LCD

Range
0 to 100%

Resolution
0.1%

Response Time
90% in 12 seconds

Warm-up Time
None

Fuel Cell
Ceramatec CAG-25E galvanic disposable fuel cell

Cell Life
3 years in most applications, warranted for 2 years

Humidity
0 to 95% non-condensing

O2 Alarm
Flashing red LEDs, 2300 Hz audible alarm beeper
Low alarm: 18 to 99%
High alarm: 19 to 99%

Power
Two AA alkaline batteries (3200 hours of continuous operation); low-battery indicator

Cable Length
10 ft (3m) when fully extended

Dimensions
3.5" L × 5.5" W × 1.5" H
(9 cm L × 14 cm W × 4 cm H)

Weight
11.2 oz (318 g)

DALE50

DALE40

DALE100

DALE100 & DALE100E

Power Line Monitors

The DALE100 and 100E Power Line Monitors give you a convenient way to analyze the quality of the power in your facility's power distribution system. Simply plug the unit into a power outlet and let it monitor what goes on with your AC power. The instrument constantly monitors power-line conditions and events such as:

- Hot-line impulses of 20, 50, 100 and 500 V
- Neutral line impulses of 1, 5, 10 and 50 V
- Surge
- High-line voltage
- Normal-line voltage
- Low-line voltage
- Voltage sag
- Voltage dropout
- Power failure
- High-frequency, normal-mode noise
- Hot and neutral lines reversed
- Open ground

Flashing LEDs alert you to abnormal conditions and events. The DALE100 is for 115 VAC power systems, while the DALE100E is for 230 VAC power systems. Both units come with USA power connectors.

Specifications

Voltage Impulses
Hot line: 20 V to 500 V
Neutral line: 1 V to 50 V

Surge
135 V and above RMS line voltage
High-line: >125 V
Normal-line: 105 V to 125 V
Low-line: <105 V
Sag: <95 V
Dropout: Below 80 V RS for 8 ms
Power failure: Below 80 V RMS for 500 ms

High Frequency Noise
Noise on AC line of 2 V p-p

Frequency
20 kHz to 10 mHz

Hot/Neutral Reverses
Outlet is not properly grounded

Power
6 ft power cord

Dimensions
4" L x 6" W x 1" H
(10 cm L x 15 cm W x 3 cm H)

Weight
8 oz (230 g)

DALE2000

LIM/GFCI Tester

Accuracy and ease.
The DALE2000 is a battery-operated instrument that checks the safety of isolated power systems and ground-fault circuit interrupters. This unique device holds the trip reading on its digital display for 10 seconds. Simply plug the DALE2000 into a typical outlet of the system being tested, select the desired test via the pushbuttons, rotate the trip-point selector, and read the test results on the large digital display.

Specifications

Accuracy
Line voltage: ± 2% R, ± 1 LSD
Isolation current: ± 1% R, ± 1 LSD
LIM trip current: ± 2% R, ± 1 LSD
GFI trip current: ± 2% R, ± 1 LSD

Resolution
Line voltage: 1 V
Isolation current: 1 µA
LIM trip current: .01 mA
GFI trip current: .01 mA

Range
Line voltage: 85 V to 245 V
Isolation current: 0 to 1.999 mA
LIM trip current: 1.0 to 7. 5 mA or 2.0 to 14 mA
GFI trip current: 1.0 to 11.0 mA or 2.0 to 20 mA

Power
9 V alkaline battery (4000 measurements)

Dimensions
3.5" L x 6.2" W x 1.75" H
(9 cm L x 16 cm W x 4 cm H)

Weight
1.4 lbs (640 g)

DALE2000

UIT630

IT400

IT800

Medical-Grade Isolation Transformers

Twelve models to match your power requirements.

Dale Technology Medical-Grade Isolation Transformers can help turn any electrical equipment that does not comply with electrical-leakage-current standards into a device that is safe for use in the patient-care vicinity. Items such as computers, computer peripherals, CRT monitors, printers, televisions, VCRs and video cameras often have electrical-leakage currents that are beyond acceptable standards for use in the patient vicinity. A Dale Technology Medical-Grade Isolation Transformer can make these products safer to use in patient-care areas.

When combining one or more medical devices onto a cart or rack-mounted system, in most cases, the cumulative electrical-leakage current of the "system" no longer meets electrical-leakage-current standards. Again, the use of a Dale Technology Medical-Grade Isolation Transformer can help reduce the danger of micro- or macro-shock, as well as bring system electrical-leakage current within acceptable limits.

The Dale UIT630 Universal Isolation Transformer is customer configurable for either 120/240 VAC input and output to accomodate the growing European market that requires CE marking. Access the voltage selector without opening the unit. The UIT630 comes complete with a removable AC power cord and four IEC-type output receptacles.

All of Dale Technology's Medical-Grade Isolation Transformers utilize a toroidal-transformer design, which is vastly superior to the conventional E-I-transformer designs that some other manufacturers use.

E-I Transformer
(found in some other manufacturers' transformers)

Toroidal Transformer (found in all Dale Technology transformers)

Toroidal Transformers Advantages

Small Size: Most toroids are smaller than their E-I transformer counterparts.

Low Weight: Because they are smaller and more efficient than their E-I laminated-steel counterparts, toroid transformers can be up to 50% lighter, depending on power rating. Low weight simplifies mounting and transport considerations.

Low-Stray Magnetic Field: Since a toroid's primary and secondary windings are uniformly distributed over the entire surface area of the core, undesired electrical noises are suppressed within the toroid. As a result, toroids emit very low radiated magnetic fields. This makes the toroidal transformer ideal for use in areas where highly sensitive electronic devices or circuitry may be in use.

Low Mechanical Hum: There are no laminations or bolts that can loosen over time and generate the audible buzzing noises associated with the common E-I-type of transformers.

Low No-Load Losses: Compared to conventional E-I transformers, toroids exhibit extremely low no-load losses. In applications where a circuit is in a "stand-by" mode for a long period of time, the potential cost reduction for power can be as high as 80-90%.

High Efficiency: Due to its unique construction, a toroidal transformer is typically between 15 and 30% more efficient than a conventional E-I transformer.

Low Operating Temperature: Since the toroid core is so efficient, most of the losses in a toroid are in the copper wire. The toroid dissipates heat much quicker than the conventional E-I type, which uses more iron. At half load, a toroid's temperature rise is only about 30% of what it is at full load.

Dale Technology Medical-Grade Isolation Transformers provide years of trouble-free service while enhancing the electrical safety of your facility's patient-care areas.

Features

- Toroidal transformers for improved efficiency, reduced size and low weight
- Lifetime warranty on toroidal transformer coil
- Circuit breakers on IT-series models, fuse on UIT630
- Agency approved (details available on table)
- Hospital-grade plugs and receptacles
- Low-leakage power cable
- OEM-type custom configurations available on large-quantity orders

IT1500-4

IT1100

IT200

Medical-Grade Isolation Transformers Comparison

Specifications	IT200	IT400/IT400-4/ IT400-6	IT800/IT800-4/IT800-6	IT1100	IT1500-4/IT1500-6/IT1500-8	UIT630
AC input (VAC)	120	110	110	110	110/240	115/230
Max input current (A)	1.5 @ 120 VAC	3.5 @ 110 VAC	6 @ 110 VAC	8 @ 110 VAC	12 @ 110 VAC 6 @ 240 VAC	6.3 @ 115 VAC 3.15 @ 230 VAC
AC output (VAC)	120	120	120	110	120/240	115/230
Max output current (A) (rated)	1.5 @ 120 VAC	3.5 @ 120 VAC	5.7 @ 120 VAC (UL) 6.5 @ 120 VAC (CSA)	7.6 @ 110 VAC (UL) 7 @ 120 VAC (CSA)	11.5 @ 120 VAC (UL) 12 @ 120 VAC (CSA) 6 @ 240 VAC (UL)	6.25 @ 120 VAC 3.12 @ 240 VAC
Max output power (VA) (rated)	180	420	684 (UL) 780 (CSA)	836 (UL) 840 (CSA)	1380 @ 120 VAC UL) 1440 @ 120 VAC (CSA) 1440 @ 240 VAC (CSA)	750 @ 120 VAC 749 @ 240 VAC
Leakage current (µA)	<50	<50	<50	<50	<50	<50
Frequency (Hz)	50/60	50/60	50/60	50/60	50/60	50/60
Load regulation (%)	5	5	5	5	5	5
Voltage isolation KV (toroid primary to secondary)	4	4	4	4	4	4
Weight (lbs)	10	12	18	22	30	18
Transformer type	Toroidal	Toroidal	Toroidal	Toroidal	Toroidal	Toroidal
Power-cord length/gauge	8 ft / 18 AWG	8 ft / 18 AWG	8 ft / 18 AWG	8 ft / 18 AWG	12 ft / 14 AWG	10 ft detachable 18 AWG (#181000 cord set)
Surge suppression & EMI/RFI filtering	Optional	Optional	Optional	Optional	Optional	Optional
Medical-grade receptacle(s)	1 duplex	IT400 ± 1 duplex IT400-4 ± 2 duplex IT400-6 ± 3 duplex	IT800 ± 1 duplex IT800-4 ± 2 duplex IT800-6 ± 3 duplex	1 duplex	IT1500-4 - 2 duplex IT1500-6 ± 3 duplex IT1500-8 ± 4 duplex	4 IEC-type
Size (in) L x W x H	5.4 x 4.3 x 4.3	IT400 ± 8 x 5.5 x 3.6 IT400-4 - 9.5 x 5.5 x 3.6 IT400-6 - 9.5 x 5.5 x 3.6	IT800 - 9.5 x 6.9 x 3.6 IT800-4 - 11.3 x 6.9 x 3.8 IT800-6 - 11.3 x 6.9 x 3.8	10.0 x 7.0 x 5.0	All - 12.5 x 8.6 x 5.3	10.7 x 8 x 5.3
Agency certifications	CSA	UL 2601.1 / CSA	UL 2601.1 / CSA	UL 2601.1 / CSA	UL 2601.1 / CSA CE (EN 60601-1)	CE (EN 60601-1)
Chassis material/ finish	Aluminum / Clear Iridite					

** Specifications subject to change without notice.*

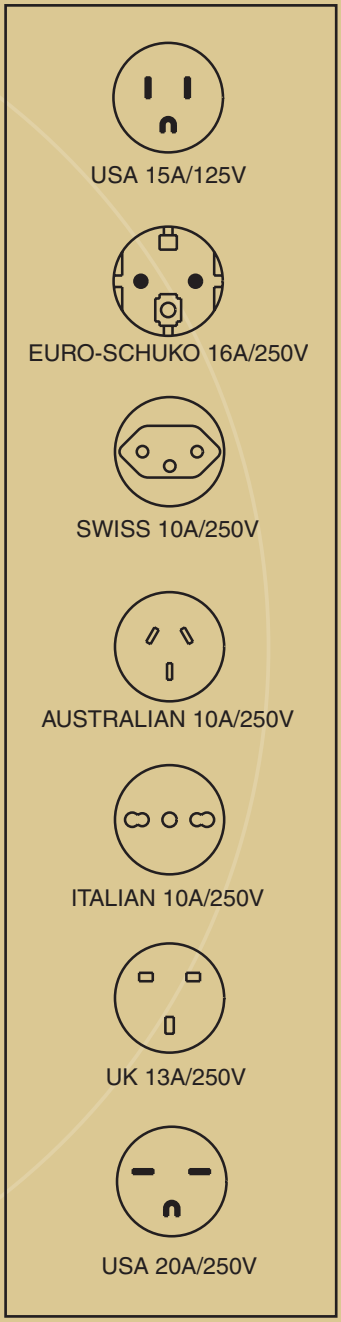
DALE Cable & Cord Sets

Replacement power cords and components.

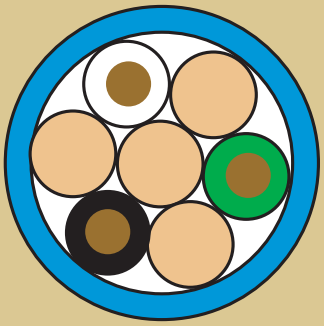
A wide variety of hospital-grade rewireable and molded power-cord sets, hospital-grade plugs, and power connectors are available for all medical and dental equipment applications. These cords and connectors meet all applicable UL standards. Power cords are available with either standard power cable or Dale Technology's exclusive Low-Leakage Power Cable. See the current Dale Technology price list for a full listing of these cord sets and connectors.

Low-Leakage Power Cable.

Dale Technology's Low-Leakage Power Cable is the safest means of supplying electrical power to medical equipment. The unique construction properties allow for less than 1 µA per foot of electrical-leakage current. The outer jacket material is rugged PVC. These special features combine to make Dale Technology's Low-Leakage Power Cable the best choice for all power and extension cords used in medical applications. Available in 18/3 SJT, 16/3 SJT, 16/3 ST and 14/3 SJT sizes. USA and international wiring color-coded cable is available. See the current Dale Technology price list for a full listing of Low-Leakage Power Cords. Available for purchase by the foot.



Cord end connectors



Cross-sectional view of Low-Leakage Power Cable

Dale Technology Service

Technical Service Center

When you require assistance with our products, call our Technical Assistance Center. Your call will be handled by a factory-trained Customer Service Engineer. You can also contact us for assistance by fax, e-mail, or letter.

Calibration and repair are provided by our factory-operated Service Center in the U.S. or factory-authorized service centers around the world.

New Service Policies

Instrument Evaluation Charge
- $75 to evaluate a unit, which is applied to the repair cost if repair is approved by customer

Expedited Service
- 50% premium charged for one-day calibration turnaround when approved by Service Coordinator

Labor Rate
- $115/hr for time-and-materials work

Service Pricing
- Flat rate for calibration and very minor repair
- Time and material for all repairs

Return Shipping
- Actual return-shipping pricing for service units, plus a handling fee for packaging and handling costs

Repair Warranty
- Ninety days on parts and labor for work performed on units serviced
- One year material and workmanship on new units

Data Fees
- Calibration certificate included in calibration fee
- Pricing for calibration and pre-calibration data available from factory.

RMA Requirement
- RMAs (Return Material Authorizations) not required to send units to Dale Technology

DALE TECHNOLOGY

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