



ES601 Plus

Universal Automated Electrical Safety & Performance Analyzer



Look for the ES601 Plus System Connectivity icon to the left on other Datrend Systems product data sheets. This icon signifies that the product has automated testing connectivity to the ES601 Plus.

A New Generation of Biomedical Test & Measurement Automation is here!

Step up to the many benefits of biomedical test & measurement automation that the Datrend Systems ES601 Plus offers. Automate your electrical safety testing, defibrillator and transcutaneous pacemaker testing, infusion device testing, physiological monitor testing, etc. Say goodbye to data transposition errors, over-looked out of tolerance test readings, skipped procedural steps, incorrect procedural implementation, lost hand-written test data sheets, forgotten entries into hand-written test forms, and so much more. Imagine being able to just walk up to your medical device, scan the bar-coded control number, and effortlessly implement a set of pre-selected standardized tests for it! Save time and effort in the process of standardizing your medical device testing and increasing your efficiency and throughput. Step up to the **ES601 Plus Automated Electrical Safety & Performance Analyzer.**

Automate & Integrate: The ES601 Plus provides automated test & measurement integration with Datrend's Phase 3 Defibrillator Analyzer, Infutest 2000 and Infutest Solo Infusion Device Analyzers, AMPS-1 Multiparameter & AccuSim NIBP Simulators, Oxitest Pulse Oximetry Simulator, etc. Certain devices from other manufacturers can also be integrated with the ES601 Plus. There's also a built-in ECG & Arrhythmia simulator in the ES601 Plus that provides standard ECG, Arrhythmias, Defibrillator & AED Performance Test waveforms, sine, square, triangular etc.

Standardize Your Testing: The ES601 Plus provides test standardization and automatic validation of measured test results for compliance within pre-specified accuracy limits. Standardized test procedures ensure that all of your technicians are performing the exact same level of testing on all of your medical devices. This puts you in 100% control of your medical device testing program and provides additional quality.

Data Input: It's easy to get data into your ES601 Plus. The 1/4-VGA touchscreen display has a built-in QWERTY keyboard. Or you can use an optional barcode scanner (keyboard wedge or RS232 type) or an external PS2 style keyboard.

Get Started Fast or Fully Customize: The ES601 Plus comes with a "starter set" of automated test procedures (we call them "autosequences") for your defibrillators, infusion devices, patient monitors, etc. There's also a library of preventive maintenance (PM) "checklists" for a variety of medical devices. You can customize any of these "autosequences" and "checklists" to meet your specific needs. Assign specific autosequences or checklists to each of your medical devices for truly streamlined and 100% standardized testing.

Print Labels & Reports: If your PM program calls for you to place "Inspected/Next Inspection Due" stickers on medical devices following a routine inspection, the ES601 Plus can actually print these stickers for you through a Dymo LabelWriter printer right on the spot. You can also print actual test records directly from the ES601 Plus through a variety of Centronics compatible parallel or RS232 printers attached to the ES601 Plus.

Test Record Storage: The ES601 Plus can store your test results to its internal memory and then print them on-demand to an attached external printer, or transfer them to your PC for medical device historical test data & record archiving. Capture and save as much test data as you like. Autosequence measurements are compared against acceptable limits for that test, and failures are flagged in the reports.

Electrical Safety Testing Standards: The ES601 Plus comes pre-programmed with automated electrical safety testing "autosequences" that meet AAMI/ANSI ES-1, various IEC standards, and VDE standards for universal application. There's even a version of the ES601 Plus that can meet the IEC test requirements for 25-amp ground continuity tests. Electrical safety testing autosequences are also editable by the user through the ES601 PC Utility Software.

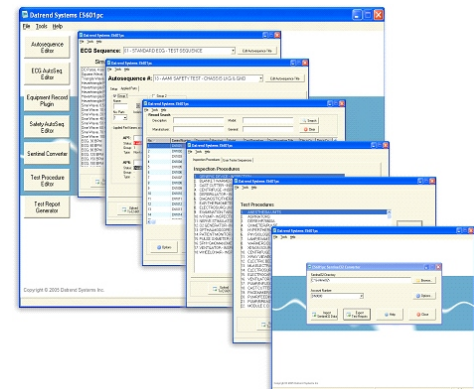
Peripheral Device Connectivity: The ES601 Plus has six special integrated peripheral test device RS232 data exchange ports (no need to purchase a "wedge" device at additional cost), USB, RS232, a Centronics compatible parallel printer port, Ethernet, a dedicated RS232 barcode scanner port, and a PS2 external keyboard port for the ultimate flexibility in connectivity with peripheral devices.

CMMS Connectivity: The ES601 Plus can be interfaced to popular CMMS software platforms in today's market in a number of ways. We have interface development projects active all the time with CMMS vendors. Contact us for a current listing of developed interfaces for the ES601 Plus. The ES601 Plus PC Utility Software also provides tools for connectivity.

Sentinel CMMS Connectivity: Still running Sentinel CMMS software? The ES601 Plus PC Utility Software will allow you to convert your Sentinel equipment database files, as well as your checkitems, and checklists, and transfer them into the ES601 Plus. You can even transfer your test results from the ES601 Plus into Sentinel through this utility software.

No CMMS Program?: You're not running one of the CMMS software programs that the ES601 Plus has an established data exchange interface with? No problem. The ES601 Plus PC Utility Software, standard with the ES601 Plus, can fulfill your needs for building customized autosequences and checklists, customizing the ES601 Plus setup, building and maintaining a medical device database by control number, and storing test data from the work that you do with your ES601 Plus.

Are you a medTester User?: Users of the medTester platform will find the ES601 Plus a refreshing enhancement of the automated testing to which they have grown accustomed to. The ES601 Plus is the next logical evolutionary step in biomedical test & measurement automation.



The ES601 Plus is backed by the Datrend Systems 5-Year Warranty!

ES601 Plus

Electrical Safety Testing Standards

AAMI-ES1
IEC60601
VDE-0751
TR62353 (IEC62353)
EC601-BAT (IEC60601 for battery-powered medical device)
AAMI-BAT (AAMI-ES1 for battery-powered medical device)
VDE-BAT (VDE-0751 for battery-powered medical device)
TR353-BAT (IEC62353 for battery-powered medical device)
IEC61010

Automated Testing

By Safety AutoSequence
By ECG AutoSequence
By General Inspection
By Tester AutoSequences
By Test Procedure
By Device ID (Control Number) Search

Manual Mode Safety Tests

Line Voltage
Load Current
Insulation Resistance
Protective Earth
Leakage Current

Voltage Measurement

Range: 0.0 to 300.0 VAC
Accuracy: DC to 100Hz $\pm 1\%$ of reading ± 1 LSD

Load Current

Range: 0 - 20.00 amps AC
Accuracy: $\pm 2\%$ of reading ± 1 LSD

Insulation Resistance

Range: 0.5 to 999.9 megohms
Accuracy: $\pm 2\%$ of reading ± 1 LSD

Protective Earth Resistance

Range: 0.001 to 0.200 ohms at 25A AC $\pm 10\%$
0.001 to 3.000 ohms at ± 1 A bipolar DC
Accuracy: $\pm 1\%$ of reading ± 1 LSD

Leakage Current

Standards: IEC60601-1, AAMI-ES1:1996, VDE-0751, IEC62353, IEC61010
Range: 0 to 14,000 μ A RMS / 0 to 25,000 μ A DC
Method: True RMS reading
Accuracy: DC & 25Hz-200kHz - $\pm 1\%$ of reading ± 2 LSD
200kHz-1MHz - $\pm 4\%$ of reading ± 3 LSD
Mains on Applied Parts voltage is 110% of AC supply for IEC60601 tests,
or 100% of AC supply for other safety standards.

ECG Simulator

Performance Waveforms

DC Pulse: 4 seconds
Square Wave: 2 Hz
Triangle Wave: 2 Hz
Havertriangle Pulse: 10, 25, 40, 100 and 200 msec, @ 60 BPM
Sine Wave: 0.5, 10, 20, 40, 50, 60, 70 and 100 Hz
Normal Sinus Rhythm: 30, 60, 90, 120, 150, 180, 240 and 300 BPM

Arrhythmia Waveforms

Second Degree A-V Block (BLK II)
Premature Atrial Contraction (PAC)
Right Bundle Branch Block (RBBB)
Premature Ventricular Contraction (PVC)
R-on-T PVC
Run of 5 PVC
Multifocal PVC
Bigeminy

Defibrillator/AED Test Waveforms

Atrial Fibrillation (AFIB)
Asystole
Supraventricular Tachycardia (SVT)
Polymorphic VTach @ 140 BPM (PVT140)
Monomorphic VTach @ 160 BPM (PVT160)
Ventricular Fibrillation (VFIB)
Missed beat @ 80, 120 BPM

Output Amplitude

Selectable: 1 mV, 2mV, or 0.5 mV on Lead II
Accuracy: - Rate: $\pm 0.2\%$
- Amplitude: $\pm 2\%$

8001-120 120V, N. America
8001-121 120V, N. America w/ PETM
8001-220 230V, Europe
8001-221 230V, Europe w/ PETM
8001-240 230V, UK
8001-241 230V, UK w/ PETM
8001-222 230V, Australia
8001-223 230V, Australia w/ PETM

User Interface

Display

Graphic LCD 4.53" x 3.40" (11.5 cm x 86 cm)

Monochrome backlight
320 x 240 pixel graphics
53 character x 30 lines text

Keypad - Touch screen

Audio Indicator - Single-frequency piezoelectric

Non-Volatile Memory - 1 Megabyte flash memory

Data Capacity

341 Test Records (test data)
6142 PM Test Data Items
2976 Equipment Records
500 PM Test Procedures
24 Safety Test AutoSequences
6 ECG Test AutoSequences
18 General Inspections
12 Pulse Oximeter Tester AutoSequences
12 IV Pump Tester AutoSequences
12 Defibrillator Tester AutoSequences
12 NIBP Tester AutoSequences
12 ESU Tester AutoSequences
12 Pacemaker Tester AutoSequences
60 AutoSequences for user-defined Testers

Printer Port Data Output - DB25F, Centronix standard

RS-232 Port Data Output - DB9F, 9600 baud, N, 8, 1

USB Data Transfer/Capture

Hardware Interface - USB Device
Protocol - USB 2.0 compliant, 1 Mbit/sec

Ethernet Data Transfer/Capture

Hardware Interface - RJ-45
Protocol - 10baseT, 10 Mbits/sec, maximum

Keyboard and Barcode Scanner Ports

RS-232 barcode scanner
PS/2 keyboard or PS/2 barcode scanner

Equipment Technical Specifications

Electrical-Region Specific: 115VAC ($\pm 10\%$), 60 Hz, 16A
230VAC ($\pm 10\%$), 50 Hz, 13A

Environment for Use

15 to 40 °C, 10% to 90% RH, Altitude: 2000m max., Indoor use only, Category II

Dimensions

9" (23 cm) W x 9" (23 cm) D x 10" (25 cm) H

Weight

12 lbs (5.4 kg) Standard / 17 lbs (7.7 kg) with PETM option

Standard Accessories

Kelvin Cable (P/N 3140-425)
USB Cable (P/N 3140-403)
ES601PC Software on CDROM (P/N 6950-003)
Operator's Manual on CDROM
Power Cord (region specific)
North America 15A (P/N 3000-009)
Continental Europe (P/N 3000-011)
United Kingdom (P/N 3000-012)
Australia (P/N 3000-018)
Accessory Bag 7006-052

Optional Accessories

Barcode CCD Scanner, RS-232 (P/N 7600-051)
Barcode CCD Scanner, PS/2 (P/N 7600-052)
PC Interface Cable: DB9F-DB9M (P/N 3140-010)
RJ-12M to RJ-12M Tester Port Cable (P/N 3140-429) used with:
- RJ-12F to DB9F Adapter (P/N 3140-426)
- RJ-12F to DB9M Adapter (P/N 3140-427)
- RJ-12F to DB25M Adapter (P/N 3140-428)
ECG/Banana Adapter (set of 10) (P/N 7500-425)
Power Cord: North America 20A (P/N 3000-010)



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