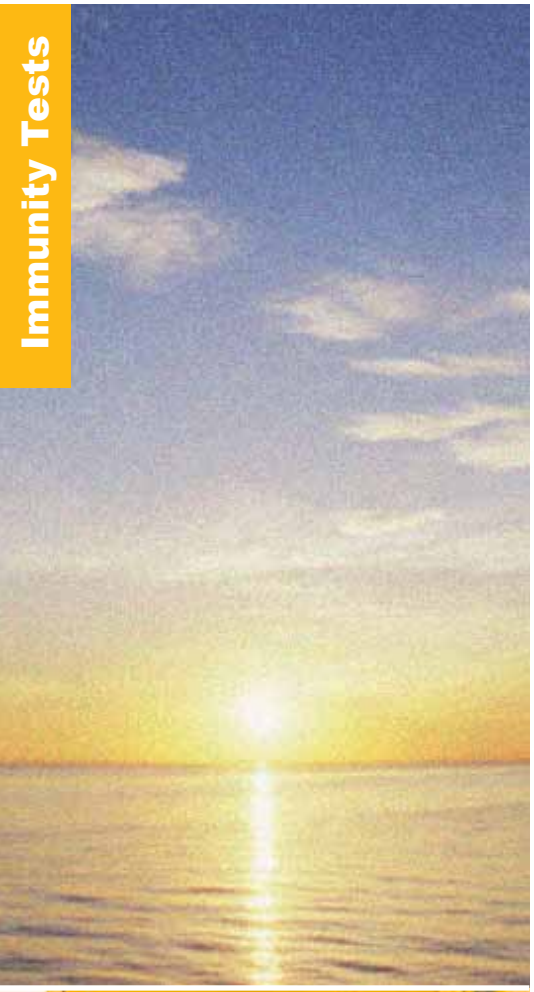
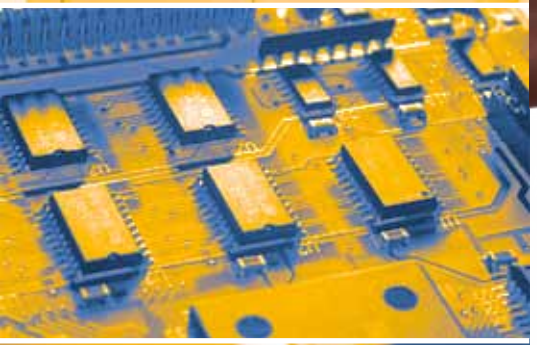
Immunity Tests





EMC - PARTNER

ESD Test System

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ESD3000 - Modular Hand-Held Tester

Modular System easily expandable

The easily interchangeable discharge modules (DM) quickly adapt ESD3000 to the specified circuits of a new application. Each new module fitted to the ESD3000 is automatically identified and the corresponding program displayed. Modules can be configured to meet requirements for special component values but also so that the waveshape is correct using the defined calibration method.

ESD3000DM1 PN: 103606

IEC 61000-4-2 / ITU K.20
150pF, 330 Ohm. AD up to 16kV, CD up to 10kV.
Repetition 0.05s up to 30s or single discharge manually.

ESD3000DM2 PN: 103607

ISO TR10605 / PSA B21 7110
330pF / 2000 Ohm. AD up to 16kV. CD up to 10kV (inside vehicle).
Repetition 0.05s up to 30s or single discharge manually.

ESD3000DM4 PN: 103608

MIL-STD-883 / GR78-CORE
100pF / 1500 Ohm. AD up to 16kV. CD up to 10kV.

ESD3000DM6 PN: 103610

IEC 61340-3-1 / JEDEC 22-A114 / MIL-STD-750D
100pF / 1500 Ohm. No AD. CD up to 8kV.

ESD3000DM7 PN: 103611

IEC 61340-3-2 / JEDEC 22-A115
200pF / 0 Ohm. No AD. CD up to 2kV.

ESD3000DN1 PN: 103615

IEC61000-4-2 / RTCA/DO-160 / PSA B21 7110 / GMW 3097
150pF / 330 Ohm. CD and AD up to 30kV
Repetition of Discharges depeding on charging voltage. Min. 1Hz at max. charging voltage or single discharge manually.

ESD3000DN2 PN: 103616

ISO TR10605 / SAEJSSI-IS/FORD AB/AC /GMW 3097
330 pF, 2000 Ohm. CD and AD up to 30kV.
Repetition of Discharges depeding on charging voltage. Min. 1Hz at max. charging voltage or single discharge manually

ESD3000DN3 PN: 103617

ISO TR10605 / SAEJSSI-IS/FORD AB/AC /GMW 3097
150 pF, 2000 Ohm. CD and AD up to 30kV.
Repetition of Discharges depeding on charging voltage. Min. 1Hz at max. charging voltage or single discharge manually.

ESD3000DN4 PN: 103618

STANAG 4239 / ISO 14304 / MIL-STD-1512
500 pF, 5000 Ohm. CD and AD up to 30kV.

ESD3000DN5 PN: 103619

MIL-STD-331C / MIL-DTL-23659D / STANAG 4239
500 pF, 5000 Ohm. CD and AD up to 30kV.

ESD3000DN6 PN: 104126

ISO TR10605
330 pF, 330 Ohm. CD and AD up to 30kV.

Features

Simple Operation

Backlit LCD Display
Change parameters during test procedures using „+“ and „-“ keys
Internal program memory
Compact and light design

Modular System

Wide range of discharge modules (DM) / discharge networks (DN)
Individually calibrated discharge modules and networks
Easy expansion to meet new requirements
Automatic module recognition and configuration.

User Configurable

Quick test program with standard default values
Electronic polarity change
Predefined software for different test standards
Remote control and software upgrade through standard interface

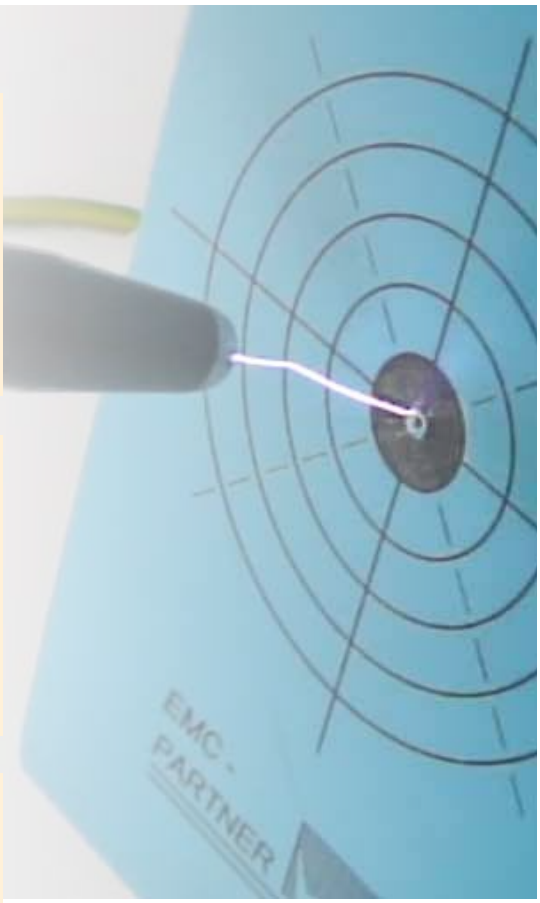
Service Friendly

High voltage circuit in module simplifies calibration
Standard rechargeable AA Batteries
Easy firmware update from EMC PARTNER.com
Calibration data for each module

Highest Test Levels

Up to 30kV Air Discharge
Up to 30kV Contact Discharge
Standard (0.7nS - 1nS) or Fast ESD (ca. 300pS) events
Lasts up to 8 hours with fully charged batteries
.

Benefits



Get Testing Faster

Minimum learning time
Easy to follow user interface
Air and Contact tips easy to exchange
No big base unit, full mobility

Save Time

Reduce setup time with automated test routines.
Less operator fatigue, keep testing
Real time parameter change, Ideal development tool
No overtest, save unnecessary development time

Upgrade on Site

Start with a 16kV tester
Low cost and rapid extension to 30kV AD /CD
New modules can be added at any time.
Always calibrated, ALL high voltage elements in the module

Keep Testing

Highly reliable, maximize system up time
Optimize usage, calibrated extensions exchanged on site
8 hours test time between battery charges
2 year warranty

Only Need One Tester

Expandable to include many applications
Covers all ESD testing needs for HBM and MM
Cost effective solution
Wide range of application accessories

Application Options

Automobile ESD Tests

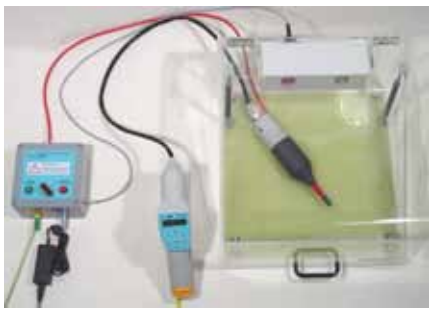
ISO 10605 specifies ESD tests only for motor vehicles and automobile electronics. Vehicle test are split into locations that can be touched only from inside a vehicle and those that can be touched from outside. Different energy levels are used for these tests. A third test is for automotive electronic components. A special Field Coupling Strip is used to inject the disturbance source into a component.

ESD3000 + ESD3000DM2 together with ESD3000 DN2 and ESD3000DN3 cover all test requirements up to 25kV. The 2000ohm discharge resistor simulates direct human contact with a vehicle. The 330ohm resistor discharge through a key or metallic object.

Component ESD Tests

Handling of sensitive components during production or storage can lead to damage that may not be immedately detected. Designing components with built in ESD protection is a major advantage to increasing reliability. A typical test standard is IEC61340 this requires special low level impulses.

ESD3000 + ESD3000DM4 or ESD3000DM6 Module are suitable for this application..



Fuse and Electro Explosive Device Tests

Electro Explosive Devices (EEDs) are increasingly used not only in the military but also in the automotive industry for airbag activation. Military applications include fuses for munitions as well as escape pods and canopy jettison. The small explosive charge is electronically activated. Ensuring the reliability of these devices requires ESD testing. ESD3000 & Relay Module (RM32) with Discharge Network DN4 and/or DN5 plus Safety switch and Explosive Device test cabinet are a complete and safe solution.

Railway Impulse Tests

IEC 60571 and EN50121 specify impulse tests for Electronic equipment used on rail vehicles Two pulses are defined

Waveform	Voltage Level	Risetime	Duration
A	1,800V	5µs	50µs
B	8,400V	0.05µs	0.1µs

Waveform B surges up to 8.4kV are a special application.

This is not strictly an ESD test but a low energy impulse that can be generated with ESD3000 & ESD3000DM8.

Immunity ESD Tests

The most common test procedure applied to any electronic or electrical equipment that can be touched by humans. For example, computer keyboards, household and industrial products. Also within this category are potential hazards due to servicing personnel. There are many standards that cover such applications. The test range extends from a few kilo volts up to 25kV for personnel ESD. The ESD discharge with fast risetime is a wideband interference source that can disrupt correct operation of a product. The ESD is most commonly inject Directly into an EUT case or by using Vertical and Horizontal Coupling planes as antennas

.

Applicable Standards

International Electrotechnical Committee (IEC)

IEC 61000-4-2 (Ed2:2008): Testing and measurement techniques - Electrostatic discharge immunity test.

IEC 61340-3-1: Electrostatics - Electrostatic discharge simulation - Human body model (HBM) - Component testing.

IEC 61340-3-2: Electrostatics - Electrostatic discharge simulation - Machine model (MM) - Component testing.

International Standards Organisation (ISO)

ISO10605: Road vehicle - Test methods for electrical disturbance from electrostatic discharges.

Japanese Automobile Standards Organisation (JASO)

D001-94 (31 March 1994): General Rules of Environmental Testing Methods for Automotive Eelctronic Equipment.

Military Procurement Standards (MIL)

MIL-STD-883 (18 June 2004): ESD classification testing of devices.

MIL-STD-331 (5 January 2005): Fuse and Fuse components.

MIL-STD-750 (28 February 1995): Test method standard semiconductor devices.

MIL-STD-464 (18 March 1997): Electromagnetic Environmental Effects.

MIL-STD-1541 (30 December 1987): Electromagnetic Compatibility Requirements for space systems.

European Standard (EN)

EN 61000-4-2 (A2:2009 Ed.2): Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.

American National Standards Institute (ANSI)

C63.16 : American National Standard for Electrostatic Discharge Test Methodologies

Telcordia

Bellcore GR-78-CORE (September 1997): Generic Requirements for the Physical Design and Manufacture of Telecommunications products and Equipment.

Bellcore-GR-1089-CORE (4 June 2006): Electromagnetic Compatibility and Electrical Safety-Generic Criteria for Network Telecommunications Equipment.

Electronic Industry Association / JEDEC

EIA/JESD22-A114-B (June 2000): ESD Sensitivity Testing Human Body Model

EIA/JESD22-A115-A (October 1997): ESD Sensitivity Testing Machine Model

Society of Automotive Engineers (SAE)

SAE J551-15 (July 2002): Vehicle Electromagnetic Immunity - Electrostatic Discharge (ESD).

Technical Specifications

Electro Static Discharge up to 16kV

ESD3000DM1

Energy storage capacitance	150pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Current rise time , 2 Ohm load	0,7 to 1ns
First current amplitude into 2 Ohm “contact discharge”	7,5 to 30 A
Current amplitude at 30ns	4 to 16 A
Current amplitude at 60ns	2 to 8A
Voltage range “air discharge”	0.2 to 16kV
Voltage range “contact discharge”	0.2 to 10kV
Repetition of the discharges	0.05 up to 30s or single discharge

ESD3000DM2

Energy storage capacitance	330pF (± 10%)
Discharge resistance	2000 Ohm (± 10%)
Current rise time , 2 Ohm load	0,7 to 1ns
First current amplitude into 2 Ohm “contact discharge”	7,5 to 30 A (± 10%)
RC time constant	600 ±130ns
Voltage range “air discharge”	0.2 to 16kV (± 10%)
Voltage range “contact discharge”	0.2 to 10kV (± 10%)
Repetition of the discharges	0.05 up to 30s or single discharge

ESD3000DM4

Energy storage capacitance	100pF (± 10%)
Discharge resistance	1500 Ohm (± 10%)
Current rise time , 2 Ohm load	<10ns at 0.2 up to 8kV
Peak current	2.66 A at 4kV
Voltage range “air discharge”	0.2 to 16kV (± 10%)
Voltage range “contact discharge”	0.2 to 10kV (± 10%)

ESD3000DM6

Energy storage capacitance	100pF (± 10%)
Discharge resistance	1500 Ohm (± 10%)
Current rise time , 50 Ohm load	2 to 10ns (250V up to 8kV)
RC time constant	150ns
Polarity	positive and negative
Voltage range “contact discharge”	250V up to 8kV

ESD3000DM7

Energy storage capacitance	200pF (± 10%)
Discharge resistance	0 Ohm (± 10%)
Current ringing frequency, into 0 Ohm load	11 to 16 MHz (100V up to 2 kV)
Polarity	positive and negative
Repetition of the discharges	100V up to 2kV (± 10%)

Technical Specifications

Electro Static Discharges up to 30kV

ESD3000DN1

Energy storage capacitance	150pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Charging resistance	54 M Ohm
Current rise time, 2 Ohm Load	0,7 tp 1ns
First current aplitude into 2 Ohm “CD”	7,5 to 30A (± 10%)
Current amplitude at 30ns	4 to 16A
Current amplitude at 60ns	2 to 8A
Voltage range “air discharge”	1 to 30kV
Voltage range “contact discharge”	1 to 30kV

ESD3000DN2

Energy storage capacitance	330pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Current rise time, 2 Ohm Load	0,7 tp 1ns
First current aplitude into 2 Ohm “CD”	7,5 to 30A (± 10%)
RC time constant	600ns (±130ns)
Voltage range “air discharge”	2 to 30kV
Voltage range “contact discharge”	2 to 30kV

ESD3000DN3

Energy storage capacitance	150pF (± 10%)
Discharge resistance	2000 Ohm (± 10%)
First current aplitude into 2 Ohm “AD”	< 5ns
RC time constant	300ns (±60ns)
Voltage range “air discharge”	2 to 30kV

ESD3000DN4

Energy storage capacitance	500pF
Discharge resistance	5000 Ohm
Voltage range “contact discharge”	± 2kV up to 30kV
Current rise time, 1 Ohm Load	<15ns

ESD3000DN5

Energy storage capacitance	500pF
Discharge resistance	500 Ohm
Voltage range “contact discharge”	± 2kV up to 30kV
Current rise time, 1 Ohm Load	<15ns

ESD3000DN6

Energy storage capacitance	330pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Current rise time, 2 Ohm Load	0,7 to 1ns
Voltage range “contact discharge”	2 to 30kV (± 10%)
First current amplitude into 2 Ohm “AD”	< 5ns
RC time constant	300ns (± 60ns)
Voltage range “air discharge”	2 to 30kV (± 10%)

*(All Discharge Network) Repetition of discharges	Depending on charging voltage. min. 1Hz at max. charging voltage or single discharge.

Technical Specifications

Modules for Special Applications

ESD3000DN32-CAR1

Energy storage capacitance	150pF (± 10%)
Discharge resistance	500 Ohm (± 10%)
Current rise time, 2 Ohm Load	0,7 to 1ns
Voltage range “contact discharge”	2 to 30kV (± 10%)
First current amplitude into 2 Ohm “AD”	< 5ns
RC time constant	300ns (± 60ns)
Voltage range “air discharge”	2 to 30kV (± 10%)

ESD3000DN32-CAR5

module integrated into ESD3000RM32 module

Energy storage capacitance	330pF (± 10%)
Discharge resistance	0 Ohm
Source impedance Rt	<30 Ohm
Discharge mode	AD and CD
Voltage range	2 up to 30kV (± 10%)
Voltage setting accuracy	± 10% for voltages >5kV and ± 500V for voltages < than 5kV
Application	Testing of airbag initiators

ESD3000DN32-IND1

Energy storage capacitance	150pF (± 10%)
Discharge resistance	150 Ohm (± 10%)
Current rise time, 2 Ohm Load	0,7 to 1ns
Voltage range “contact discharge”	2 to 30kV (± 10%)
First current amplitude into 2 Ohm “AD”	< 5ns
RC time constant	30ns (± 30%)
Voltage range “air discharge”	2 to 30kV (± 10%)

ESD3000DN32-MIL2

Energy storage capacitance	400pF (± 10%)
Discharge resistance	150 Ohm (± 10%)
Current rise time, 2 Ohm Load	0,7 to 1ns
Voltage range “contact discharge”	2 to 30kV (± 10%)
Voltage range “air discharge”	2 to 30kV (± 10%)

ESD3000DN32-MIL3

Energy storage capacitance	500pF (± 10%)
Discharge resistance	0 Ohm (± 10%)
Voltage range “contact discharge”	2 to 30kV (± 10%)
Voltage range “air discharge”	2 to 30kV (± 10%)

ESD3000DM16A-C63H

Energy storage capacitance	150pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Polarity	positive and negative
Voltage range “air discharge”	2 to 16kV (± 10%)

Technical Specifications

ESD3000DM16C-C63H

Energy storage capacitance	150pF (± 10%)
Discharge resistance	330 Ohm (± 10%)
Polarity	positive and negative
Voltage range “contact discharge”	2 to 16kV (± 10%)

ESD3000 Mainframe Specifications

Voltage increment resolution	100 volt steps
Discharge detection	every pulse or real discharges only
Discharge counter	1 to 29999
Discharge polarity	positive, negative and alternating
Holding time	5s
Programmable parameter ramps	voltage, polarity
Discharge trigger	manual, automatic or remote
Power supply	10 x UM-3 / AA batteries
Weight including batteries	870g

ESD3000 Selection Guide

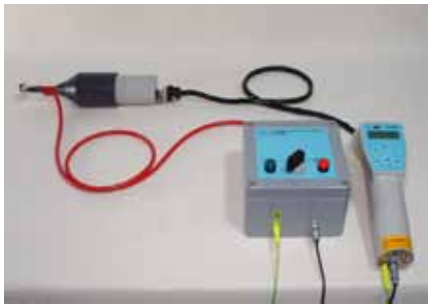
STANDARDS	ESD3000 Mainframe	ESD3000DM1 (150pF/330Ω)	ESD3000DM2 (330pF/2000Ω)	ESD3000DM4 (100pF/1500Ω)	ESD3000DM6 (100pF/1500Ω)	ESD3000DM7 (200pF/0Ω)	ESD3000RM32	ESD3000DN1 (150pF/330Ω)	ESD3000DN2 (330pF/2000Ω)	ESD3000DN3 (150pF/2000Ω)	ESD3000DN4 (500pF/5000Ω)	ESD3000DN5 (500pF/500Ω)	ESD3000DN6 (330pF/330Ω)	Special Applications	ESD3000DN32-CAR1	ESD3000DN32-CAR5	ESD3000DN32-IND1	ESD3000DN32-MIL2	ESD3000DN32-MIL3	ESD3000DM16A-C63H	ESD3000DM16C-C63H
IEC61000-4-2	●	●					●	●													
ITU-T K.20	●	●																			
ISO TR10605	●		●				●		●	●			●								
PSA B32 7110	●		●				●	●													
MIL-STD-883	●			●																	
GR78-CORE	●			●																	
IEC 61340-3-1	●				●																
JEDEC 22-A114	●				●																
MIL-STD-750D	●				●																
IEC-61340-3-2	●					●															
JEDEC 22-A115	●					●															
RTCA/DO-160	●						●	●													
GMW 3100	●						●	●													
SAEJSSI-IS	●						●		●	●											
FORD AB/AC	●						●		●	●											
GMW 3097	●						●		●	●											
STANAG 4239	●						●				●										
ISO 14304	●						●				●										
MIL-STD-1512	●						●				●										
MIL-STD-331C	●						●					●									
MIL-DTL-23659D	●						●					●									
JASO D 001-94	●						●								●						
Renault 32-10-001/D	●						●									●					
ABD0100.1.2	●						●										●				
Special Military	●						●											●			
MIL-STD-1576	●						●												●		
ANSI C63.16	●																			●	●

Accessories and Options

ESD-TARGET2

ESD-VCP50 – Vertical Coupling Plate

ESD.-TARGET2-50



ESD3000 SAFETY-S

ESD-TARGET2

2ohm target with SMA connector, upper limit > 4GHz, 20dB attenuator and 1m coaxial cable. Calibration: target-attenuator-cable chain..

Application: ESD calibration and comparison

ESD-VERI-V

20GOhm divider for high voltage measurement on the ESD3000 up to 25kV.

Ratio is determined by the 1MOhm input of the oscilloscope. Ratio approx. 20'000.

Application: ESD voltage verification.

ESD-VCP50 – Vertical Coupling Plate

- Mechanical dimension: 0.5m x 0.5m
- Application: indirect ESD discharge with contact tip
- Includes: 2m cable with 2 x 470kOhm resistors

ESD-TARGET2-DN

2ohm target with SMA connector, upper limit > 4GHz. Calibrated target attenuator cable chain for up to 30kV.

Application: ESD calibration and comparison

ESD-TARGET2-50

50 Ohm target with SMA connector. Calibrated target attenuator cable chain according to IEC61340-3-1 and -2.

ESD-TARGET2-500

500 Ohm target with SMA connector. Calibrated target attenuator cable chain according to IEC61340-3-1 and -2.

ESD3000 only

ESD3000 SAFETY-S

Under certain circumstances it is desirable to remove all charge from the ESD generator discharge tip before connecting a test object. Particularly in applications involving explosive devices (airbags, foil initiators, etc.) where unexpected activation may endanger operating personnel. In addition, semiconductor devices can be damaged by a test finger holding residual charge.

ESD3000 Safety switch used in conjunction with ESD3000DM and ESD3000DN enables testing in a controlled environment that provides maximum safety for operating personnel and minimum risk of damage to Semiconductors.

ESD3000DM-EXT

This extension allows the separation of control and discharge module. It can be used for DM and RM+DN.

CNH12

The CNH12 can be used for proximity magnetic field susceptibility tests.

CNH12

ESD-STAND Ed2

- Non metallic stand for ESD2000 / 3000 in accordance with IEC 61000-4-2 Ed.2.
- Height adjustable from 0.4m up to 1.75m.
- Application: long term tests in contact and air discharge mode

TC-MIG24 ED (for explosive devices)

Testing of EUTs that could spontaneously explode or rapidly change state, such as airbags or munition fuses, can be accomplished with minimum risk to testing personnel by separating the ESD3000 control unit and the discharge module. ESD3000DM-EXT enables a separation of up to 1m.

Use of a test cabinet from EMC PARTNER further increases safety by containing flying debris.

ESD3000 with remote DM for testing explosive devices

ESD Solution for TRA2006

ESD2000

ESD2000 is a lightweight design with fixed discharge network to meet the IEC/EN 61000-4-2 requirement (150pF/330ohm).

ESD2000

ESD Solution for TRA3000 & IMU3000

EXT-TRA3000-E

EXT-TRA3000-E is a lightweight design with fixed discharge network to meet the IEC/EN 61000-4-2 requirement (150pF/330ohm). The EXT-TRA3000 E produces contact discharges up to 10kV and air discharges up to 16kV.

EXT-TRA3000-E

Software

ESD3000-OPTOLINK

TEMA Software

ESD3000-OTPOLINK

For remote control of ESD3000, the ESD3000-OPTOLINK and one of the following software packages is needed:

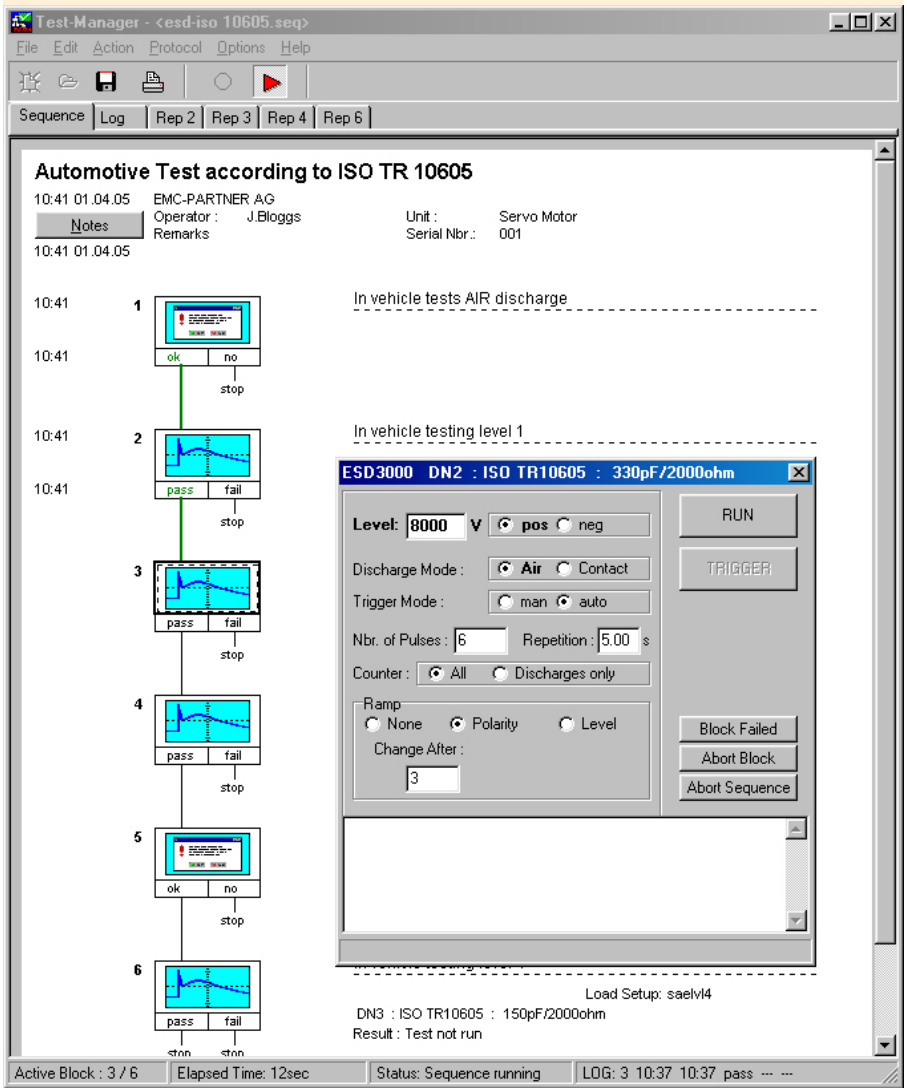
- E3LOADER: downloaded free of charge from the EMC PARTNER Website. Using the serial interface, firmware can be updated.
- TEMA Software: Comfortable control of ESD3000 from a PC. Includes also control for EMC PARTNER Transient Test System and MIG2000 generators.

USB-RS232 Adapter

ESD3000 can be controlled from TEMA software using computers with USB interfaces and the USB-RS232 adapter.

TEMA Software

Start testing faster with pre-loaded standard routines. Supervise the test process using, Loop continue or stop functions linked into EUT responses. Customise the test report format and content automatically generating a document for export to Word© or Excel©.



Example of sequence for automotive tests

EMC PARTNER's Product Range

The Largest Range of Impulse Test Equipment up to 100kA and 100kV.

Immunity Tests

Transient Test Systems for all EMC tests on electronic equipment. ESD, EFT, surge, AC dips, AC magnetic field, surge magnetic field, common mode, damped oscillatory and DC dips. According to IEC and EN 61000-4-2, -4, -5, -8, -9, -10, -11, -12, -16, -18, -19, -29.

Lightning Tests

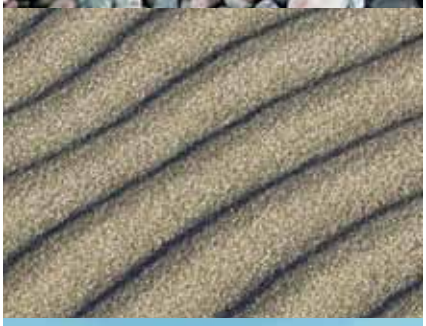
Impulse test equipment and accessories for aircraft, military and telecom applications. Complete solutions for RTCA / DO-160 and EUROCAE / ED-14 for indirect lighting on aircraft systems, MIL-STD-461 tests CS106, CS115, CS116 and Telecom, ITU-T .K44 basic and enhanced tests for impulse, power contact and power induction.

Component Tests

Impulse generators for testing; varistors, gas discharge tubes (GDT), surge protective devices (SPDs), X / Y capacitors, circuit breakers, watt-hour meters, protection relays, insulation material, suppressor diodes, connectors, chokes, fuses, resistors, emc-gaskets, cables, etc.

Emission Measurements

Measurement of Harmonics and Flicker in 1-phase and 3-phase electrical and electronic products according to IEC /EN 61000-3-2 and 61000-3-3 . HARCS Immunity software adds interharmonic tests, voltage variation and ripple on DC tests according to IEC/ EN 61000-4-13, -4-14, -4-17.



System Automation

A full range of accessories enhance the test systems. Test cabinets, test pistols, adapters and remote control software, simplify interfacing with the EUT.

Programmable PSU, EMC hardened for frequencies form 16.7Hz to 400Hz. Frequency PS3-SOFT-EXT complies with IEC / EN 61000-4-14 and -4-28.

Service

Our committment starts with a quality management system backing up our ISO 17025 accreditation. With the SCS number 129, EMC PARTNER provide accredited calibration and repairs. Our customer support team are at your service!

For further information please do not hesitate to contact EMC PARTNER's representative in your region. You will find a complete list of our representatives and a lot of other useful information on our website:

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Your local representative

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