

Lightning Tests



# MIL3000 Test System

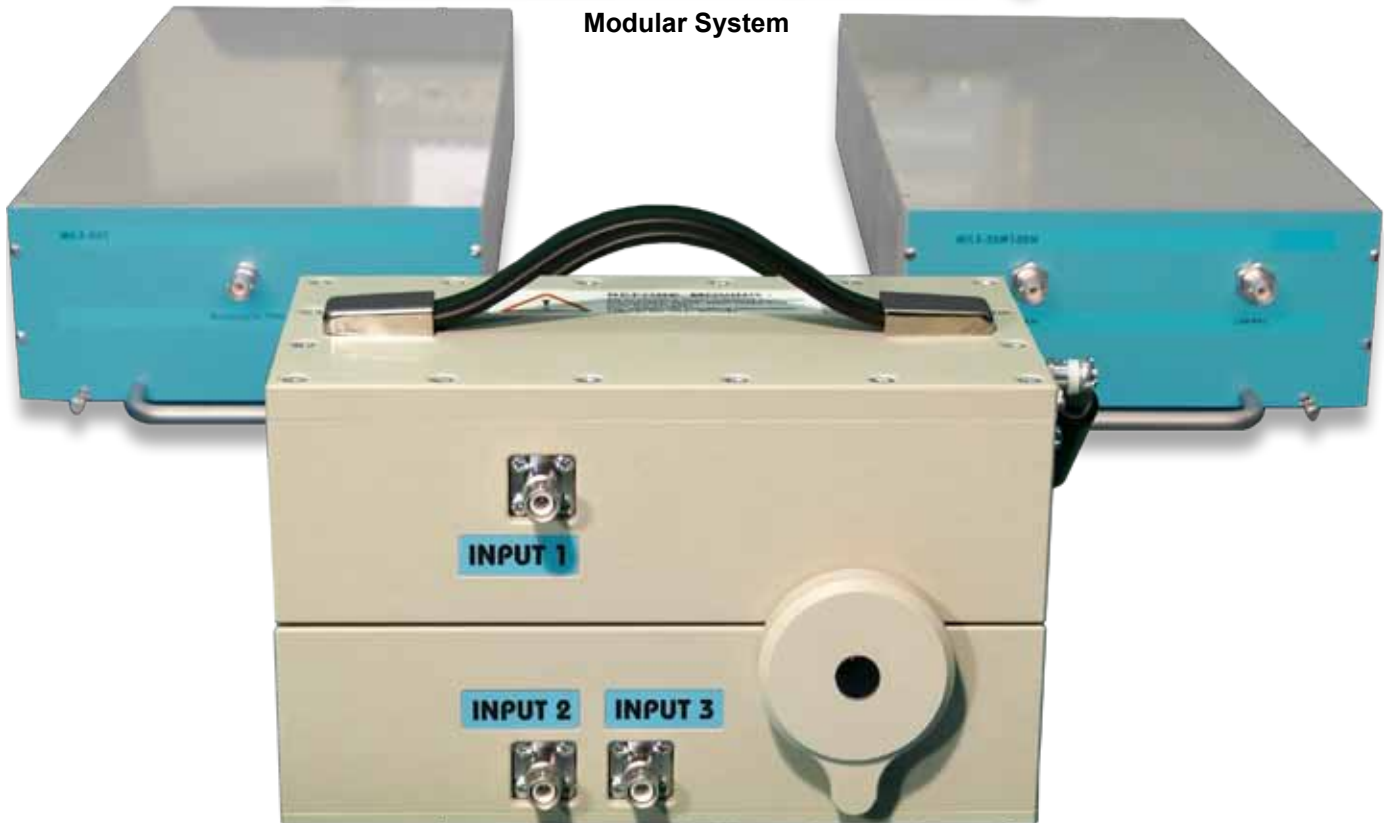


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# MIL3000 - Modular Impulse Tester



Modular System



**One Coupler for all**

## System Optimized for MIL-STD Testing

MIL3000 system is the first of its kind using touch screen technology. An enhanced user interface and the single coupler CN-BT6 used for BOTH CS115 and ALL CS116 frequencies greatly reduces the system complexity and is an aid to increase productivity.

## MIL3-REC PN: 107241

### MIL-STD-461 CS115

Plug-in module fits into MIL3000 to generate:  
Bulk current injection impulse up to 5A.  
Rise & fall time < 2ns pulse duration 30ns



## MIL3-10K10M PN: 107239

### MIL-STD-461 CS116

Plug-in module fits into MIL3000 to generate:  
Damped sinusoidal transient up to 10A.  
Oscillation frequencies 10kHz, 100kHz, 1MHz, 10MHz.



## MIL3-30M100M PN: 107240

### MIL-STD-461 CS116

Plug-in module fits into MIL3000 to generate:  
Damped sinusoidal transient up to 10A.  
Oscillation frequencies 30MHz, 100MHz.



## MIL3-SPIKE PN: 107483

### MIL-STD-461 CS106

Plug-in module fits into MIL3000 to generate:  
Voltage spike impulse up to 500V.  
Rise time 1.5us and pulse duration 5us



## MIL3-DO-160-S17 PN: 107484

### DO-160 Section 17

Plug-in module fits into MIL3000 to generate:  
Voltage spike impulse up to 1200V.  
Rise time 2us and pulse duration 10us

## MIL3-DO-160-S19 PN: 107485

### DO-160 Section 19

Plug-in module fits into MIL3000 to generate:  
Induced spike test level 600V.  
Burst duration 150us and spike frequency 250kHz



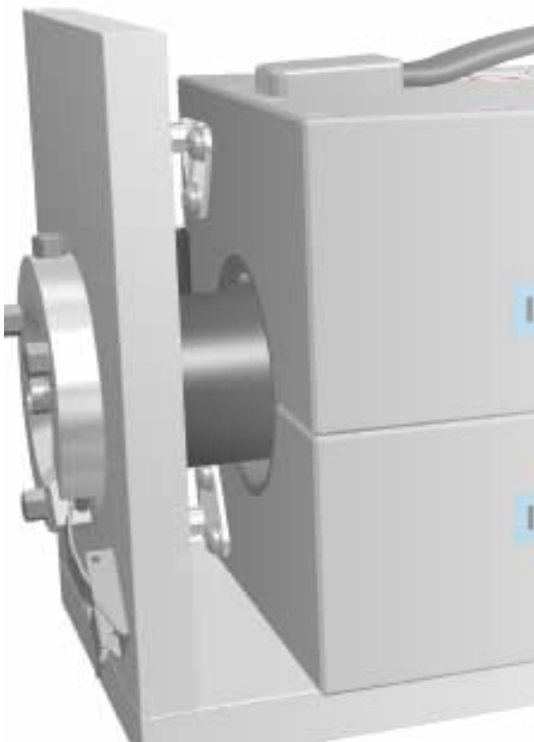
## Applicable Standards

### Military Procurement Standards (MIL)

MIL-STD-461: Requirements for the control of Electromagnetic Interference characteristics of subsystems and equipment.



# Features



## Easy Operation

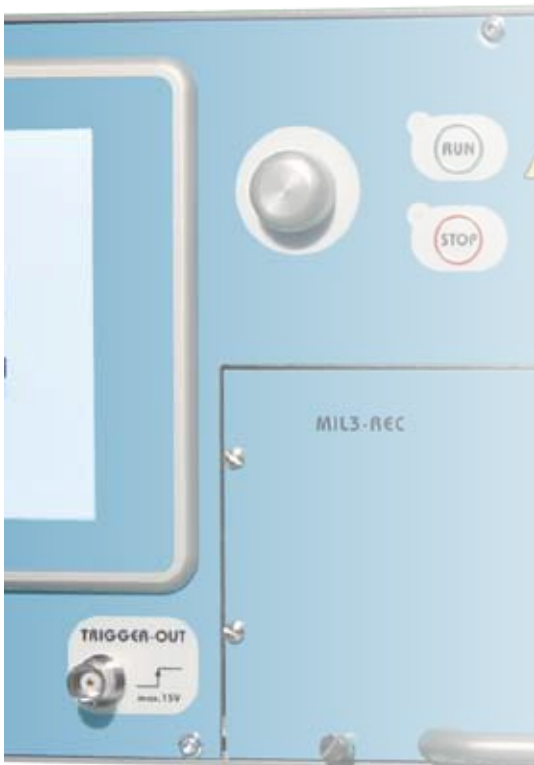
- Graphical user interface on instrument front panel
- Software control from a computer
- Automatic switching between frequencies
- Electronic Polarity change automation

## Modular System

- Test pulses in discrete Modules
- Easy expansion to meet new requirements
- Automatic module recognition and configuration
- Single coupler for CS115 & CS116

## User Comfort

- Standard DEFAULT values
- QUICK test program with standard default values
- Predefined SOFTWARE for different test standards
- REMOTE control and software upgrade



## Full Feature System

- Amplitude RAMP function
- Electronic POLARITY change
- SYNCHRONISATION to AC power
- Integrated SAFETY CIRCUIT with EMERGENCY STOP

## Data Protection

- Internal memory to save test files
- Software to backup test files on a computer
- Software to store Test Report data
- Calibration data for all waveforms

# Benefits

## The Tester You Need

Lowest operator learning curve  
REAL TIME parameter change,  
EXPANDABLE to include additional applications  
LINK multiple tests to run AUTOMATICALLY

## Upgrade on Site

Upgrade applications as needed  
Low cost and rapid system extension  
New modules can be added at any time.  
No hardware down time

## Best Performance

EXCEEDS standard test levels  
Integrated operator instructions with TEMA3000  
Automation of test process  
Reduce operator error

## Turn-Key Solution

Wide range of APPLICATIONS  
Test place AUTOMATION  
Ideal for TEST LABS  
2 years warranty

## Software is Key

Graphic User Interface for FASTER programing  
SAVE TIME create tests once only  
Save FAVOURITE tests  
RECALL and Run favourite tests



# Application Options



## Single Port for CS115 & CS116 Tests

MIL-STD-461 CS115 and CS116 tests are both performed on cable bundles. This means the test cable must be fed through a coupler which is driven by the MIL3000 test generator. One coupler that can be calibrated for all waveforms and then left in place on the EUT test cable, reduces test time and the possibility for operator error considerably.

CN-BT6 gives users this increased security together with a larger cable aperture of 6cm diameter.

The system can be calibrated for all waveforms, setup data is stored in MIL3000 memory for easy recall. Once the system is calibrated, the coupler CN-BT6 can be left in place on the test bench and tests performed without having to breakdown and reset the equipment under test. This represents a great saving in time and reduces the possibility of an operator error.

## System for MIL-STD-461 and DO-160

The flexibility of a modular system enables the basic MIL-STD-461 system to be extended to include also voltage spike test CS106 and tests from DO-160 sections 17 and 19. A separate coupler with 6cm x 6cm aperture enables voltage spike testing of large diameter cables.

Simply insert a new application module and it is automatically recognised by the MIL3000 mainframe. All user programmable parameters are made available through the colour touch panel.

The system flexibility protects your investment, providing test capability for an ever increasing range of applications.

### CS115 Test

#### CS115 Test Routine

1. Fit MIL3-REC module into MIL3000 mainframe
2. Connect HV output to CN-BT6 Input 1
3. Power on MIL3000 generator
4. select CS115 Test
5. Set generator output to minimum
6. Program RAMP function
7. Press START on Generator.



## Automated Testing

Complete test routines including CS115 and all CS116 frequencies can be programmed in the MIL3000 generator, then linked together to form a continuous test process. MIL3000 includes a „Linker“ function to enable multiple tests to be linked together and run sequentially. A basic test report is saved in the MIL3000 and can be extracted either using the web server (connect to a PC through the Ethernet port) or from the USB port on the front panel.

TEMA3000 is a powerful software suite to control MIL3000 generator. The software can also control an oscilloscope to capture waveforms during the calibration or test process. This information can be included automatically into the test report. Operator instructions and test setup pictures can be included in the TEMA3000 routines. This eliminates the need for separate written procedures and reduces the possibility of operator error.

# Accessories and Options

## Plug-in Modules

Modules are available for MIL3000 system to cover the CS115, CS116, CS106, DO-160 section 17 and 17 test requirements. Users can select module for an individual test and later add new modules to enhance the system capability. New modules are automatically recognised and controlled by the MIL3000 firmware.

All modules are independent and can be ordered at any time. Detailed technical specifications for each module indicate the matching accessories.

## Couplers

### CN-BT6

Injection probe for CS115 and also CS116. A single coupler that covers the complete frequency range 10kHz up to 100MHz. Aperture 6cm for large cable bundles.

Supplied with:

- 1 x 50 ohm termination
- 1 x cable 1m SHV-BNC
- 1 x cable 2m SHV-BNC

### CN-MIG-BT5

Injection probe for CS106 and DO-160-S17. A single coupler for all voltage spike tests with MIL3000. Aperture 6cm for large cable bundles.

## Test Accessories

### 20dB Attenuator

Used with MIL3-10K10M module to reduce generator output. Only needed for tests where the EUT is very sensitive. NOT required for calibration.

### I-PROBE-CS-P8585C

Current monitor probe used during CS115 and CS116 testing to ensure the anticipated test level is not exceeded. Measurement bandwidth up to 200MHz.

## Verification Accessories

### VERI-MIL3

Coaxial calibration fixture for use with CS115 and CS116 waveforms. Supplied with following:

- 2 x 20dB N-type attenuators
- 2 x 20dB BNC-type attenuators
- 1 x cable 1m N to BNC



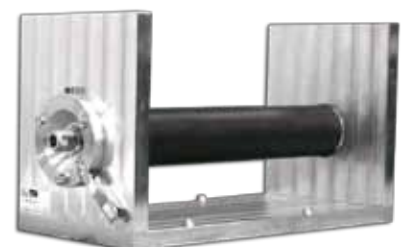
CN-BT6



CN-MIG-BT5



I-PROBE-CS-P8585C



VERI-MIL3

# Technical Specifications



## MIL3000 Modules

### MIL3000 Control Features

User Interface	7" colour touch panel
Operating System	EMC PARTNER (EPOS)
Polarity change	Positive & Negative
Trigger Mode	Manual & Automatic
Power Synchronisation	50Hz to 400Hz
Syncro angle	0° to 360° in 1° steps
Syncro Source	External up to 240V
Communication Interface	Ethernet
Update	via USB
Automatic Ramp	Amplitude

## CS115 Module

### MIL3-REC

Current range into 100ohm	1A up to 10A
Rise time	< 2ns
Fall time	< 2ns
Duration	30ns
Repetition rate	30Hz (Max)
Coupling	CN-BT6

## CS116 Module 10kHz to 10MHz

### MIL3-10K10M - 10kHz

Current range into 100ohm	0.02A up to 0.22A
Frequency	10kHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6

### MIL3-10K10M - 100kHz

Current range into 100ohm	0.2A up to 2.2A
Frequency	100kHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6

### MIL3-10K10M - 1MHz

Current range into 100ohm	1A up to 12A
Frequency	1MHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6



# Technical Specifications

## MIL3-10K10M - 10MHz

Current range into 100ohm	2A up to 12A
Frequency	10MHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6

## CS116 Module 30MHz to 100MHz

### MIL3-30M100M - 30MHz

Current range into 100ohm	2A up to 12A
Frequency	30MHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6

### MIL3-30M100M - 100MHz

Current range into 100ohm	1A up to 6A
Frequency	100MHz
Damping (Q)	15 ± 5
Repetition rate	2Hz (max)
Coupling	CN-BT6

## CS106 Module

Rise time	1.5us
Duration	5us
Voltage sag (undershoot)	<120V peak
Voltage Range	100 up to 500V
Polarity	Positive / Negative
EUT power supply	115V/400Hz or 230V/50 & 60Hz

## DO-160 Section 17 Module

Rise time	2us
Duration	10us
Repetition	2Hz maximum
Voltage Range	100 up to 1200V
Polarity	Positive / Negative
Source Impedance	50Ω

## DO-160 Section 19 Module

Voltage	600V
Burst Duration	150us
Spike Frequency	250kHz
Test Time	1 up to 29999s
Polarity	Positive / Negative



# Software



Remote control from a PC requires TEMA3000 software and an OPTICAL LINK to galvanically separate the PC from MIL3000.

TEMA3000 is a modern software running under Windows 7 & 8 operating systems.

The heart of a complex test system, TEMA3000 includes the functions:

- Generator control from a PC
- Linking of test to form a complex sequence
- Library of predefined tests for IEC basic and product standards
- Integration of DSOs
- Test report generation



## Generator control from a PC

Connected using the Ethernet cable to MIL3000, TEMA3000 opens a window which emulates the EPOS in MIL3000. All parameters are input exactly as on the MIL3000 front panel. Any generator connected to TEMA3000 will be simultaneously programmed over the Ethernet cable. Conversely, parameters entered on MIL3000 are changed in TEMA3000.



## Linking tests to form a sequence

Individual tests stored on the PC or in MIL3000 can be combined to form a complex test sequence. This feature enables CS115 and CS116 tests to be linked and run in a continuous sequence. Apart from tests, other applications can be started, an oscilloscope can be integrated or a message box opened. As a LIBRARY module, pre-defined test routines are available from EMC PARTNER. These cover all IEC basic and generic standards.



## Control of a DSO

A DSO module is available to extend the basic TEMA3000 software package. DSOs with Ethernet and USB interfaces can be controlled from TEMA3000 software. Apart from setting timebase and amplitude, measurement features in the DSO can also be accessed and measurement results added to the test report. Tektronix, Agilent, Lecroy and Rohde & Schwarz models are supported as standard.

## Test Report Generation

TEMA3000 basic module generates a HTML format test report. The basic software can be extended with the PROTOCOL module which enables transfer of report data as .csv files for import into EXCEL®, custom report formatting and final reports generated as Adobe® .pdf files.



## Web Server

Use any PC with any operating system and internet browser to connect to the internal web server. This enables access to test report and service data either directly on a PC internet browser or using the USB memory stick. Customize the test report by uploading company logo and test information from the USB memory stick. Conversely, by simply selecting the GOTO USB button, test report and service information can be saved directly to the USB memory stick. Communication with a PC is by Ethernet, which again reduces dependency on obsolete or expensive interfaces.

Remote control from a PC is best achieved with the OPTICAL LINK and the TEMA3000 software package.

# 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, -13, -14, -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 lightning 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.

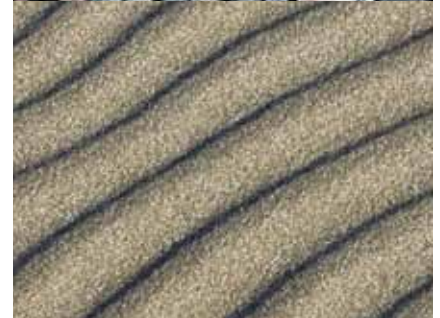
## System Automation

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 from 16.7Hz to 400Hz. Frequency PS3-SOFT-EXT complies with IEC / EN 61000-4-14 and -4-28.

## Service

Our commitment 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:

**[www.emc-partner.com](http://www.emc-partner.com)**

### **The Headquarters in Switzerland**

EMC PARTNER AG  
Baselstrasse 160  
CH - 4242 Laufen  
Switzerland

Phone: +41 61 775 20 30  
Fax: +41 61 775 20 59  
Email: [sales@emc-partner.ch](mailto:sales@emc-partner.ch)  
Web-Site: [www.emc-partner.com](http://www.emc-partner.com)

### **Your local representative**

