

# CAR - TEST - SYSTEM 14

EMC-Test Equipment for electrical installation of vehicles

## Highlights:

- Rise time variable 1- 5 $\mu$ s
- Vehicle voltages :  
12V / 24V / 42V / 48V / 70V
- Battery current:  
50A / 100A / 200A



### According to

ISO 7637: 2011

ISO 16750 : 2012

ISO 21848

Pulse	Waveforms	Ri
#1	1-5/2000 $\mu$ s, 600 V, ISO 1-5/1000 $\mu$ s, 600V, ISO / SAE	
#2a	1 / 50 $\mu$ s, 600 V, ISO	2/4/10/20/30/50/90/150 $\Omega$
#3	5/100 ns, 800 V, ISO	50 $\Omega$

The EMC test system is designed for testing electromagnetic immunity of the electrical installation of vehicles and components against supply line transients.

The CAR-TESTER allows generation of transient immunity test pulses, pulse #1, #2 and #3.

Optionally it can be expanded with the electronic power supply PS xx-xx, which serves as an adjustable voltage source to the electrical system simulation for 12V, 24V, 42V, 48V and 70V and slow switching pulses 2b, 4 sine between, and pulse test A and B (Pulse 5) that can simulate up to a battery current until 200A.

The device contains in its basic configuration, the above pulses, a triggerable load switch and an Ethernet interface board. A fast pulse voltage divider to measure the impulse in the electrical system is also integrated in the device.

The modular system concept allows realisation of different test requirements:

- Different power supply voltages of 12V, 24V, 42V, 48V and 70V (or specific)
- Different power supply currents, nominal power supply current of 50 A, 100 A and 200A
- Option test Superimposed Alternating Voltage 25KHz
- Option test Pulse A and Pulse B ( #5)

A microprocessor-controlled 7" touch screen display unit is integrated and permits an easy operation of the generator.

The software program CAR-remote permits the PC control of the generator via Ethernet and also allows the standardized documentation according to IEC 17025 and the evaluation of test results.

The user can use the standard test routines (ISO, VG, Car manufacturer specific) or define his own test sequences.

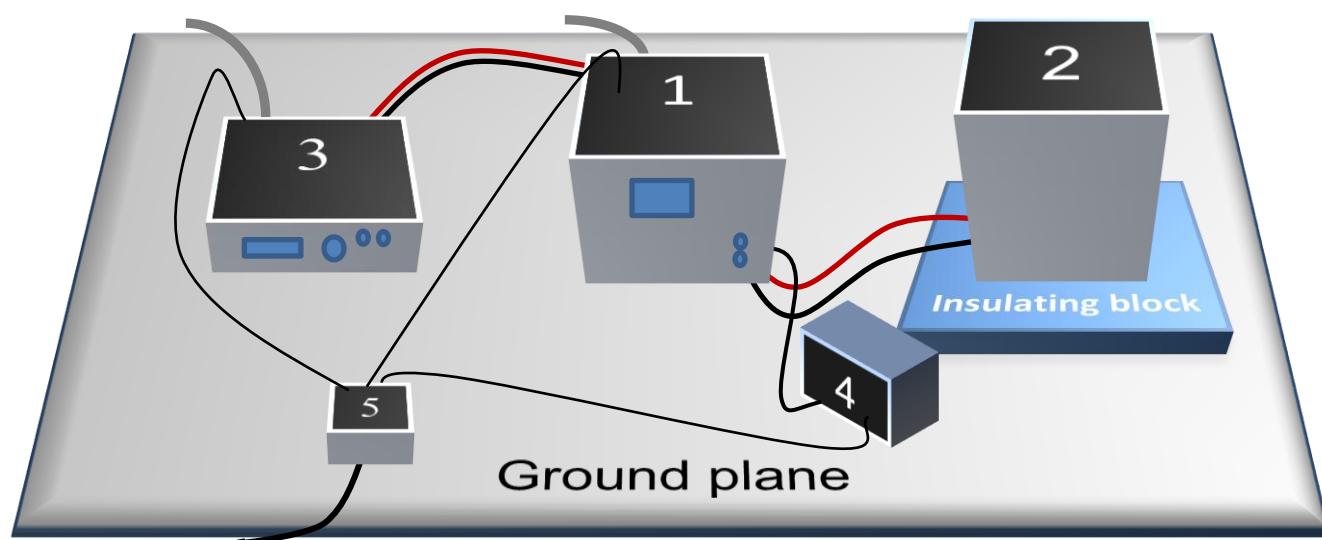
It is equipped with an Impulse Recording Function (IRF) to record definite impulses (with oscilloscope).

Furthermore, nearly all customer-specific impulse adjustments are possible by the flexible software control.

The CAR-TESTER excels by its compact design, simple handling and precise reproducibility of test impulses. High-voltage switching is accomplished by means of a maintenance-free semiconductor switches.

Options	Description
PC Software CAR-Remote (power supplies required)	control of CAR - Tester 14 control of PS xx-xx control of PG2804 control of CAR-Transient Emission 14
CAR-Transient Emission 14	slow and fast pulse
Load Dump PG 2804 acc. to ISO 16750	Test A, (Puls #5) 800J
Load Dump PS 3x66-55 acc. to ISO 16750	With Power Supply PS 330-11, Test A + Test B
Build in 19" Rack 9HE, 600 deep	
CDN 2012 acc. to ISO 7637-3	Capacitive Coupling clamp
ICC-F140 acc. to ISO 7637-3	Inductive coupling clamp

## Basic circuit vehicle CAR-TEST-SYSTEM 14



- 1 CAR-SYS Generator  
with internal power supply resistance  $R_i$   
ground connection; maximum length for test pulse 3: 100 mm
- 2 device under test disconnected / connected
- 3 Power supply 70V/ 200A
- 4 Oscilloscope, at monitor output, built in 1:100
- 5 Ethernet switch including LWL converter  
Connected with PC control (CAR-Remote Software)

### Options :

- CAR-Transient Emission
- CAR-SS-A1250-16E
- Load Dump 2804
- Load Dump 3xPS 66-55

Technical specifications:		CAR-TEST-SYSTEM 14
<b>Mainframe</b>		
Microprocessor controlled touch panel		7", capacitive
Ethernet Interface for remote control of the generator		built-in
Interface for saving reports		USB
External trigger input /output		Switch/ 10 V
Connector for external safety interlock loop		24 V=
External red and green warning lamps acc. to VDE 0104		230V / 60 W
Mains power		90V - 264V, 50/60 Hz
Dimensions desk top case, W * H * D		450*310*500 mm <sup>3</sup>
Weight		35kg
Measurement Equipment		100:1, 1 kV-peak
Impulse voltage divider, 4.95 kΩ / 50 Ω		
<b>Surge Puls 1, 2a acc. to ISO 7637-2, 2011</b>		
Charging voltage, adjustable		± (0 - 600) V ± 10%
Max. stored energy		18 J
Max. charging time Pulse #1		0.5 sec – 5 sec.
Max. charging time Pulse #2a		0.2 sec
Polarity, switch able		positive, negative
Source resistance; switch able		150/90/50/30/20/10/4/2Ω
Only with negative pulse polarity		
Power supply disconnection time, t2		(0.2-200) ms ± 20%
Trigger delay, t3		< 100 μs
Risetime, variable		1μs bis 5μs, 1μs steps
<b>Puls 1 (Puls # 1 ISO, 1b SAE)</b>		
		(see Standard 5.6.1)
Waveform		1-5/2000μs oder 1-5/1000μs
Impulse voltage Us		0 - -600V +/-10%
Rise time, tr		1.0μs + 0/-0.5μs; 3.0μs +0/-1.5μs
Pulse duration, td		2000 μs / 1000 μs ± 20%
<b>Puls 2a</b>		
		(see Standard 5.6.2)
Waveform 1/50μs		1/50μs
Impuls voltage Us		±0 - 600V
Rise time, tr		1.0 μs +0μs/-0.5μs
Pulse duration, td		50 μs ± 20%
<b>Pulse 2b, with Power Supply PS 66-55 (transients after ignition is switched)</b>		
		<b>12V / 24V System</b> (see Standard 5.6.2)
Us		0-66V
td		0.02 - 2s
t12, tr, t6		1 ms +/-0.5ms
<b>BURST Puls 3a/3b ISO 7637-2, 2011</b>		
		(see Standard 5.6.3)
Amplitude of burst output voltage, adjustable		± (25-800) V ± 10%
Waveform		
Rise time, tr		5.0 ns ± 30 %
Pulse duration, td		150 ns ± 30 %
Source resistance, Rs		50 Ω
Polarity, switch able		pos / neg
Pulse period t1, adjustable		0,01 ms - 1.0 ms
Burst duration t4, adjustable		0,01 ms - 25 ms
Burst period t5, adjustable		10 ms - 1000 ms
Max. continuous burst frequency		20 kHz

<b>Technical specifications:</b>		<b>CAR-TEST-SYSTEM 14</b>
<b>Power supply switch:</b>		
Output current, depending on system type		50 A, 100 A, 200 A
Max. reverse voltage		800 V
Transient over voltage protection		>1000V
High short circuit current capability		900A
Protection with automatic circuit breaker		50 A, 100 A, 200 A
Amplifier sense line decoupled form output		built-in
Trigger input, connectable to external modules		built-in
<b>Direct current supply voltage</b> (see Standard 4.2.2)		
Test method, Code A-H		for $U_N$ 12V / 24V
Usmin		0-66V; 0-72V
Usmax		0-66V; 0-72V
<b>Overvoltage</b> (see Standard 4.3.x.x)		
Test method (see Standard 4.3.1.1.2)		for $U_N$ 12V
Test method (see Standard 4.3.1.2.2)		for $U_N$ 12V
Test at a temperature of Tmax=20°C (see Standard 4.3.2.2)		for $U_N$ 24V
Us		0-66V
<b>Superimposed alternating voltage</b> (see Standard 4.4.2)		
Test method		Severity level 1-4
Internal resistance of the power supply		50 mΩ to 100 mΩ
Frequency range		50 Hz to 25 kHz
Type of frequency sweep		triangular, logarithmic
Sweep duration		120s
Number of sweeps:(continuously)		5
Power Supply current		30A
<b>Slow decrease and increase of supply voltage</b> (see Standard 4.5.2)		
Test method, Code A-H		for $U_N$ 12V / 24V
Us		0-66V
Rate		0,1-10V/min
<b>Discontinuities in supply voltage</b> (see Standard 4.6.1.2)		
Test method Momentary drop Code A-H		for $U_N$ 12V/24V
Us		0-66V
Drop Voltage		0-66V
Variable waittime		
<b>Test Reset Behavior at voltage drop Code A-H</b> for $U_N$ 12V / 24V (see Standard 4.6.2.2)		
Us		0-66V
Drop step		1-100%
Drop width		1-100s
Drop period		2-101s

Technical specifications:		CAR-TEST-SYSTEM 14
<b>Test method Starting profile Level 1-4 (sine between)</b>		for $U_N$ 12V / 24V (see Standard 4.6.3.2)
Us6		0-66V
Us		0-66V
tf		1-10ms
t6		1-100ms
t7		1-100ms
t8		500-10000ms
tr		1-100ms
<b>Load Dump:</b>		
- With PG 2804 or		
- In conjunction with 3xPS 66-50 (option), part of the CAR SYS		
Test method Test A (see Standard 4.6.4.2.2)		for $U_N$ 12V / 24V
Test method Test B suppression (see Standard 4.6.4.2.3)		for $U_N$ 12V / 24V
Us		0-200V
Imax		till 50A
Ri		0,5 - 8 $\Omega$ , steps 0.5 $\Omega$ ( 0,5 – 8 $\Omega$ in steps 0,5 $\Omega$ )
td		40 - 1000ms
tr		2 - 20 ms +0/-5ms      steps 1ms
Repetition		20s

### Example configuration of HILO-TEST system

#### CAR-TEST-SYSTEM 14 I

Puls #1, #2 und #3, Built in 19" Rack

+ Option Power Supply PS 66-55 ( 66V, 55A, 3300W)

Puls #2b, #4, and more, 50A continuous current (battery load), see technical specification

+ Option 19" rack

9HE, 600 mm deep



#### CAR-TEST-SYSTEM 14 II

Puls #1, #2 und #3, built-in 19" rack

+ power supply amplifier PS 66-110, (66V, 110A, 6600W)

Pulse #2b, #4, 100 A= cont. current, and other tests, see tech. specifications

#### CAR-TEST-SYSTEM 14 III

+ power supply amplifier PS 54-220, (54V, 220A, 9900W)

Pulse #2b, #4, 200 A= cont. current, and other test, see tech. specifications