

CAR - TEST - SYSTEM 14

**EMC-Test Equipment for
electrical installation of vehicles
Acc. to ISO 7637-2, ISO 16750-2
ISO 21848**

Rise time variable 1- 5 μ s

Pulse Waveforms :

**#1 1-5/2000 μ s, 600 V, ISO
1-5/1000 μ s, 600V, ISO/ SAE**

#2a 1 / 50 μ s, 600 V, ISO

Rs = 2/4/10/20/30/50/90 Ω

#3 5/100 ns, 800 V

Rs = 50 Ω

Vehicle voltages :

12V / 24V / 42V / 48V / 70V

Battery current:

50A / 100A / 200A



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 5" 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 fiber optic and also allows the standardized documentation according to IEC 17025 and the evaluation of test results.

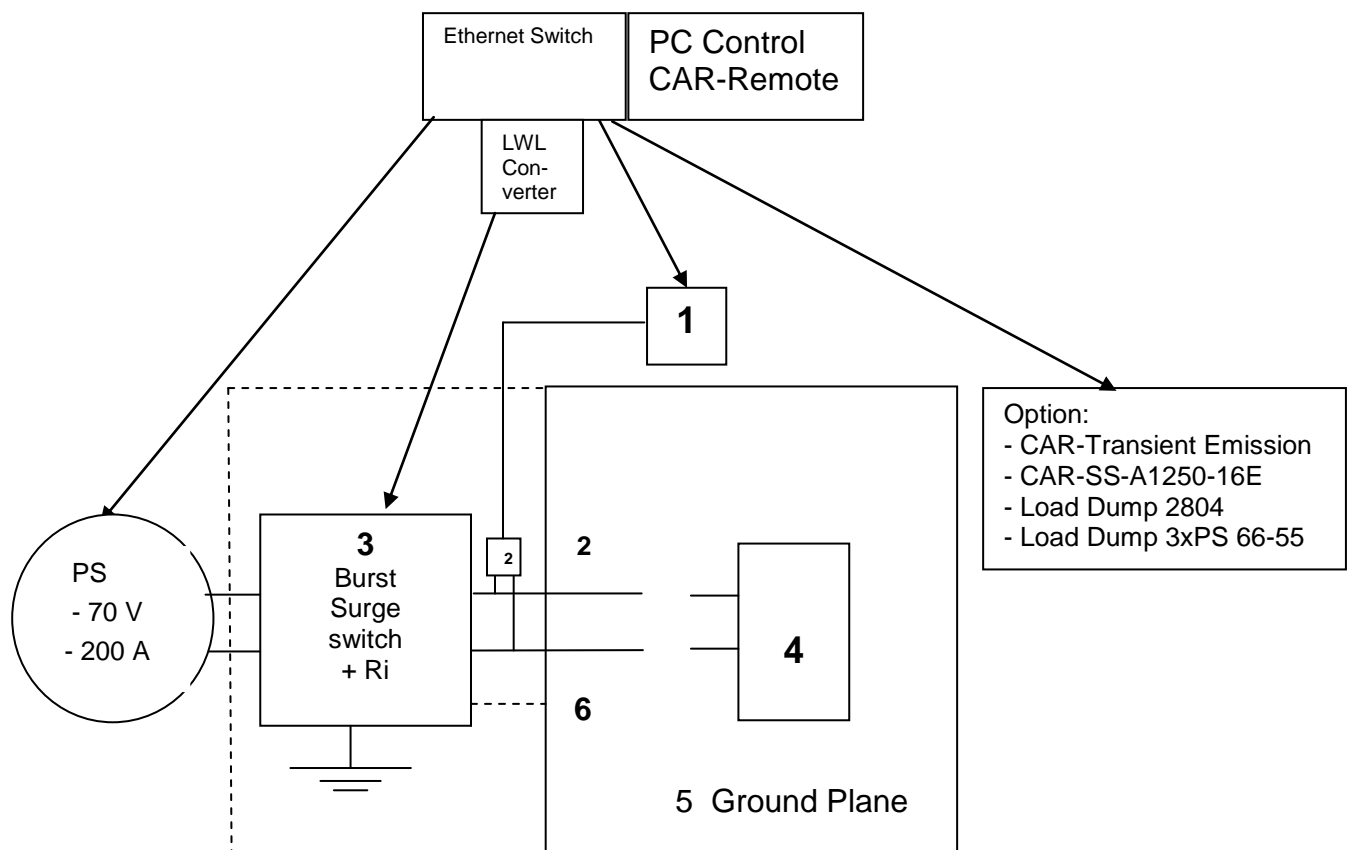
The user can use the standard test routines (ISO, VG, Car manufacturer specific) or define his own test sequences.

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.

Basic circuit vehicle CAR-TEST-SYSTEM 14



Key

- 1 oscilloscope
- 2 voltage probe, build in 1:100
- 3 test pulse generators with internal power supply resistance R_i
- 4 device under test disconnected / connected
- 5 ground plane
- 6 ground connection; maximum length for test pulse 3 is 100 mm

Technical specifications	CAR-TEST-SYSTEM 14
Mainframe	
Microprocessor controlled touch panel	5", 800X480, 24 bit
Optical Ethernet Interface for remote control of the generator	optional
Interface for saving reports	USB
External trigger input /output	10 V at 1 k Ω
Connector for external safety interlock loop	24 V =
External red and green warning lamps acc. to VDE 0104	230 V, 60W
Mains power	230 V, 50/60 Hz
Dimensions desk top case, W * H * D	450*310*520 mm ³
Weight	35 kg
Surge Pulse 1, 2 acc. to ISO 7637-2: 2011	
Charging voltage, adjustable	$\pm (0 - 600) V \pm 10\%$
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	150/90/50/30/20/10/4/2 Ω
Only with negative pulse polarity	
Power supply disconnection time, t2	(0.2-200) ms $\pm 20\%$
Trigger delay, t3	< 100 μ s
5.6.1 Test Puls 1 (Puls # 1a ISO, 1b SAE)	
Waveform 1-5/2000 μ s or 1-5/1000 μ s	
Impulse voltage Us	0 - -600V +/-10%
Rise time, tr	1.0 μ s + 0/-0.5 μ s; 3.0 μ s +0/-1.5 μ s
Pulse duration, td	2000 μ s / 1000 μ s $\pm 20\%$
5.6.2 Puls 2a	
Waveform 1/50 μ s	
Impuls voltage Us	0 - 600V +/-10%
Rise time, tr	1.0 μ s +0 μ s/-0.5 μ s
Pulse duration, td	50 μ s $\pm 20\%$
5.6.2 Pulse 2b with Power Supply PS 66-55 (transients after ignition is switched)	
Us	0-66V
td	0,02 - 2s
t12, tr, t6	1 ms +/-0.5ms
5.6.3 BURST Puls 3a/3b acc. to ISO 7637-2: 2011	
Amplitude of burst output voltage, adjustable	$\pm (25-800) V \pm 10\%$
Waveform	
Rise time, tr	5.0 ns $\pm 30\%$
Pulse duration, td	100 ns $\pm 30\%$
Source resistance, Rs	50 Ω
Polarity, switch able	pos./neg.
Pulse period t1, adjustable	1.0 μ s - 1 ms
Burst duration t4, adjustable	0.1 ms - 25 ms
Burst period t5, adjustable	10 ms - 1000 ms
Max. continuous burst frequency	20 kHz

Power supply switch	
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
Tests acc. to ISO16750, 2012 with Power Supply PS xx-xx 50A, 100A, 200A	
Direct current supply voltage	
4.2.2 Test method, Code A-H	for U_N 12V / 24V
Usmin	0-66V; 0-72V
Usmax	0-66V; 0-72V
Overvoltage	
4.3.1.1.2 Test method	for U_N 12V
4.3.1.2.2 Test method	for U_N 12V
4.3.2.2 Test at a temperature of $T_{max}=20^{\circ}C$	for U_N 24V
Us	0-66V; 0-72V
Superimposed alternating voltage	
4.4.2 Test method	Severity level 1-4
Internal resistance of the power supply	50 m Ω to 100 m Ω
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
Slow decrease and increase of supply voltage	
4.5.2 Test method, Code A-H	for U_N 12V / 24V
Us	0-66V
Rate	0,1-10V/min
Discontinuities in supply voltage	
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	
4.6.2.2 Test Reset Behavior at voltage drop Code A-H	
Us	0-66V
Drop step	1-100%
Drop width	1-100s
Drop period	2-101s

4.6.3.2 Test method Starting profile Level 1-4	for U_N 12V / 24V
Us6	0-66V
Us	0-66V
tf	1-10ms
t6	1-100ms
t7	1-100ms
t8	500-10000ms
tr	1-100ms
Load Dump	
With PG 2804 or in conjunction 3xPS 66-55 (option), part of the CAR SYS	
4.6.4.2.2 Test method Test A	for U_N 12V / 24V
4.6.4.2.3 Test method Test B suppression	for U_N 12V / 24V
Us	0-200V
I _{max}	till 50A
R _i	0,5, 1, 2, 4, 8Ω (0,5 – 8 Ω in steps 0,5 Ω)
t _d	40 - 1000ms
t _r	2 - 20 ms +0/-5ms steps 1ms
Repetition	20s
Measurement Equipment	
Impulse voltage divider, 4.95 kΩ / 50 Ω	100:1, 1 kV-peak
Option 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	
Option CAR-Transient Emission 14, slow and fast pulse	
Option Load Dump PG 2804 nach ISO 16750 Test A, Test B (Puls #5) 800J	
Option Load Dump 3xPS 66-55 nach ISO 16750 with Power Supply, Test A + Test B	
Option Eingebaut in 19" Rack 9HE, 600 deep	
Option CDN 2012 acc. ISO 7637-3 Capacitive Coupling clamp	
Option ICC-F140 nach ISO 7637-3 Inductive coupling clamp	

EXAMPLE CONFIGURATION OF HILO-TEST SYSTEM

CAR-TEST-SYSTEM 14 I

Puls #1, #2 and #3

+ 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, 600mm deep



CAR-TEST-SYSTEM 14 II

Puls #1, #2 and #3

+ 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

Puls #1, #2 and #3

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

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