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Edition	4	Ch.	--	Code	PEL

PURPOSE

Definition of the equipment required and the procedure to follow to bench-test immunity to voltage variation on the power leads of electric and electronic systems.

Change	Date		
-	June 95	Edition 1 –	New; edited in accordance with the Technical Memory Procedure; this standard cancels and replace point 5 of standard 7.Z0890.
-	13/08/97	Edition 2 –	Updated. (SS)
-	20/05/99	Edition 3 –	Added measure cycles key on/off and updated helps in accordance with procurement specification 9.90110. (SS)
-	04/27/04	4th Edition –	Supervisor (was Durando) changed. Deleted paragraph "Test time requirements". (SS)

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Standard Utilization Criteria

This Standard has the purpose to check the correct operation of the electric and electronic system when subjected to the power voltage variations generated during the engine start-up and by the key switch bounces.

Referenced Standards

9.90110 Specifications for electric and electronic devices for motor vehicles.

95/54/CE Directive

7-G0030 Significance calculation for tested objects.

Required Test Equipment

1 - TEST ENVIRONMENT

The room dimensions must allow to contain instruments and the test bench; the room must be free from noise which can affect the test results.
The environmental requirements are as follows:

Temperature:	23 ± 5 °C
Relative humidity	45 ÷ 70 %
Atmospheric pressure:	860 ÷ 1060 mbar

2 - SIGNAL GENERATOR

Arbitrary wave forms must be generated, having frequency band in 0.001 Hz ÷ 20 kHz with horizontal resolution exceeding 4000 points and vertical resolution higher than or equal to 10 bits.

3 - PROGRAMMABLE POWER SUPPLY

It must be voltage driveable through a signal generator, providing a minimum pass band of 10 kHz (DC÷10 kHz) and an internal resistance (Ri) lower than or equal to 0.01Ω.
Moreover, it must be capable to supply and deliver the maximum current required for proper operation of the tested device.
Therefore, it is recommended to use a programmable power supply or a DC amplifier with output voltage between 0 and 24 V, delivered current higher than 40 A and minimum pass band equal to 10 kHz.

4 - DIGITAL OSCILLOSCOPE

It must have a pass band higher than 200 MHz, with single-pulse sampling at 400 Msample/s minimum per channel.
Moreover, it must be equipped with voltage probes having the following characteristics:

attenuation 10 x:	R >= 10 MΩ, C <= 12 pF, max voltage 500 V, pass band >= 200 MHz
attenuation 100 x:	R >= 10 MΩ, C <= 2.5 pF, max voltage 1500 V, pass band >= 120 MHz

5 - POWER SUPPLY (NON PROGRAMMABLE)

It must supply the required voltage and delivery the maximum current for the proper operation of the tested device.
It is recommended to use an adjustable voltage power supply within 0 and 24 V, 40 A, with 45 Ah floating battery, 225 A.

6 - GROUND PLATE

It must consist of high electric conductivity sheet (copper, aluminum, brass, galvanized steel), with minimum thickness 1.5 mm and minimum dimensions 2 x 1 m.
The ground plate must be connected to the building ground line via a proper copper plait welded to the plate itself.

7 - TEST BENCH

It must consist of insulating material (e.g. wood), with dimensions suitable for housing the ground plate.

NOTE: The above listed equipment can be replaced with other ones provided that they are equivalent or better in characteristics, accuracy and repeatability.

Date:	.....	VIOLATION:	NO [ ] YES [ ]
Technician's Name:	.....	Signature:	.....

Description of the Device to be Tested

Description of the Device to be Tested	
Requested Data	***Read Data***
SYSTEM :	
DRAWING No. :	
NAME :	
ECU IDENTIFICATION No.:	
SUPPLIER :	
DESTINATION :	

Date: .....

Technician's Name: ..... Signature: .....

Significance of the Test Components

SIGNIFICANCE OF THE TEST COMPONENTS

Component Type	*Significance % value A*	*% Weight B*	*Component affecting the test significance*	*Meaningful Characteristics*	*Minimum Technological Level*
Active		50	ECU	printed circuit board box if metallic software release	B
Active		20	Harness	cables length and section	C
Active		30	Sensors and actuators	impedance	C

For the calculation of the significance of the components under test refer to the standard 7-G0030

= Tested System Significance: SUM (A x B) / 100 = %

Date: ..... VIOLATION: NO [ ] YES [ ]

Technician's Name: ..... Signature: .....

Test Preparation

1 - TEST EQUIPMENT SETUP

1.1 Retrieve the necessary technical documentation to perform the test, there including: **Technician [ ]**
- operating conditions of the tested system.
- stimulation system (if necessary).
- monitored parameters and their tolerance (listed in the schematic of **Help 8.1** through **Help 8.28**).
- malfunctioning definition (listed in the schematic of **Help 8.1** through **Help 8.28**).
- system connection lay-out during the tests.

1.2 Set the necessary instrumentation for the test execution (listed in the proper module "REQUIRED TEST EQUIPMENT"), according to the set-up shown in the schematic of **Help 1**. **Technician [ ]**

1.3 Lay down the system to be tested with its harness and the auxiliary instrumentation necessary to its correct operation (sensors and actuators) at the distance of 50±5 mm on the ground plate keeping them insulated as shown in **Help 1**.
If it is explicitly provided for a ground connection on the system frame or on one of the sensors/actuators, the connection shall be the shortest possible. **Technician [ ]**

1.4 Connect the power lines (positive and negative) from the tested device to the output of the programmable power supply by using two copper wires (Cu) of 2.5 mm^2 section, length 500±50 mm, parallel and spaced by 20±2 m and away from the ground plate by 50±5 mm. **Technician [ ]**

1.5 Connect the required sensors and actuators for the tested device, which shall possibly be the same specified in the drawing for the installation on vehicle; they shall be properly stimulated and monitored, by laying down the proper signal and control cables at an angle of 90º±15º with respect to those ones of the power supply in the case that a common connector is present (common connector for power and signal/control lines). **Technician [ ]**

1.6 Connect the battery and power supply negatives to the ground plate, and connect the tested system power lines to the output of the programmable power supply.
NOTE: For injecting the noise signals required only for the key-on condition (+15), only the power supply lines of the tested device in the key-on test are to be connected to the programmable power supply output, while the unswitched power lines (+30), if present, shall be connected to the non-programmable power supply positive and/or to the battery. **Technician [ ]**

2 - TESTED DEVICE ACTIVATION

2.1 Connect the tested device and power it as requested by the drawing or by the relevant specifications. **Technician [ ]**

2.2 Apply the necessary signals to operate the system to all the electric inputs or physical sensors. **Technician [ ]**

2.3 Set the system in the specific static (no stimulation signal variations) or dynamic (sequence of particular stimulation signals variations such as to voluntarily modify the system's status or behavior) operating conditions, according to the drawing's or related specification's requirements in order to test its correct operation. **Technician [ ]**

2.4 Achieve the characteristic parameters of the signals provided by the actuators to be used as a reference during the test. **Technician [ ]**

Date: ..... VIOLATION: NO [ ] YES [ ]

Technician's Name: ..... Signature: .....

Test Execution

1 - NOISE INJECTION

Repeat the following procedure for each defined noise type.

1.1 Set the signal generator to obtain the electrical voltage characteristics and timing at the output of the programmable power supply as described in **Help 2**, **Help 3**, **Help 4**, **Help 5**, **Help 6** and **Help 7** for the selected noise. **Technician [ ]**

1.2 Check the correct operation of the tested device, under the particular tested operating conditions, by comparing the signals characteristic parameters provided by sensors with the reference ones. **Technician [ ]**

1.3 At the end of the noise injection, when reached or passed the test duration time or the number of pulses requested by the specification 9.90110, record the test result, the actual test duration and the possibly occurred malfunctioning type into the **Table 1** ('Test Results'). **Technician [ ]**

Table 1:

Test Results

PULSE	TEST COND'N	RESULT	Number of Pulses (test duration)	Malfunctioning Type	NOTES
Fiat 4					
Sinusoidal Variations 1-5Hz					
Micro-interruptions 1ms/10ms (+15)					
Micro-interruptions 1ms/10ms (+15 & +30)					
Micro-interruptions >1ms (+15)					
Micro-interruptions >1ms (+15 & +30)					
Key off/on misuse Cycle 1					
Key off/on misuse Cycle 2					

Date: ..... VIOLATION: NO [ ] YES [ ]

Technician's Name: ..... Signature: .....

2- ACCEPTABILITY LIMITS

For each test condition and for each applied noise type the tested device shall result immune to the voltage levels defined in the specification 9.90110.

3- SECTION FOR OPTIONAL CHARTS, TABLES, DIAGRAMS, ETC.

Attach the chart and/or tables related to the performed tests, including available circuit connection schematics, pin-out, etc...

Activities to Restore the Tested Device/Bench/Vehicle

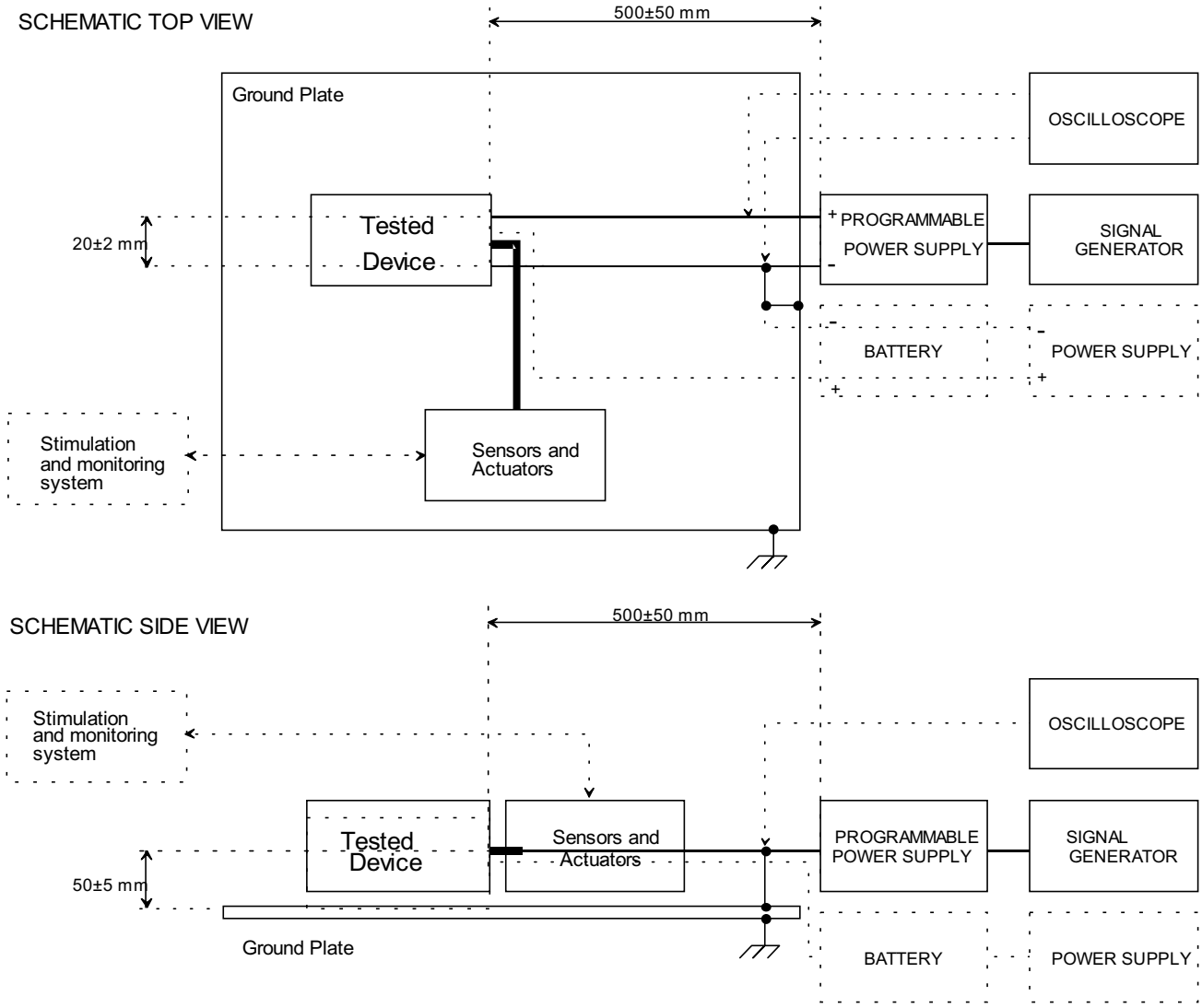
1	Disconnect from the tested system all the sensors, actuators, probes and whatever is not an integral part of the system.	**Technician [ ]**
2	Restore connections eventually modified to allow the tests.	**Technician [ ]**
3	Reset the test bench to be ready for running other tests.	**Technician [ ]**

Date: ..... VIOLATION: NO [ ] YES [ ]

Technician's Name: ..... Signature: .....

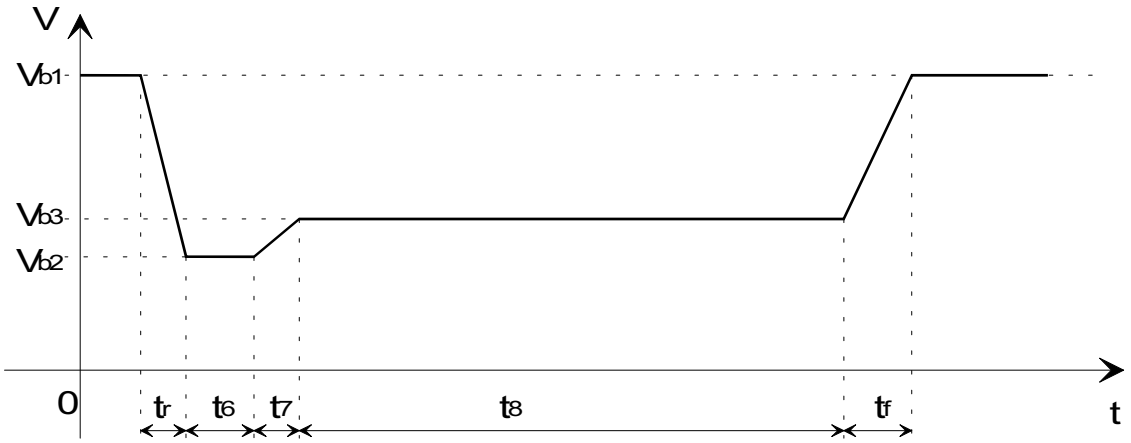
HELP 1

EQUIPMENT LAY-OUT SET-UP



HELP 2

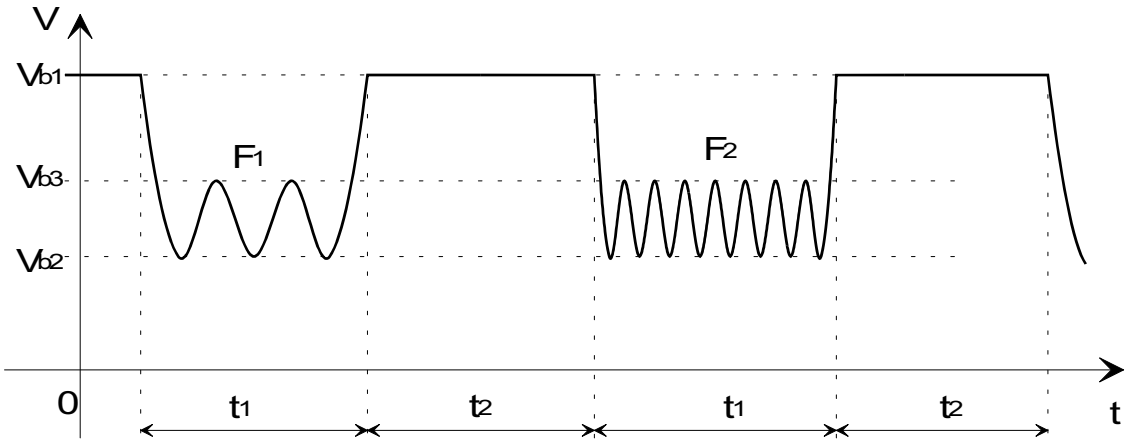
"FIAT 4" PULSE
Power supply voltage drop during the engine starting up.



Vb1 = 12 V
Vb2 = 4.5 V (Amplitude)
Vb3 = 6 V
Ri <= 0.01 Ω (power supply's internal resistance)
t6 = 10 ms
t7 = 5 ms
t8 = 2 s
tr = 5 ms
tf = 10 ms

HELP 3

POWER SUPPLY VOLTAGE SINUSOIDAL VARIATIONS
Power supply voltage drop during the engine starting up.

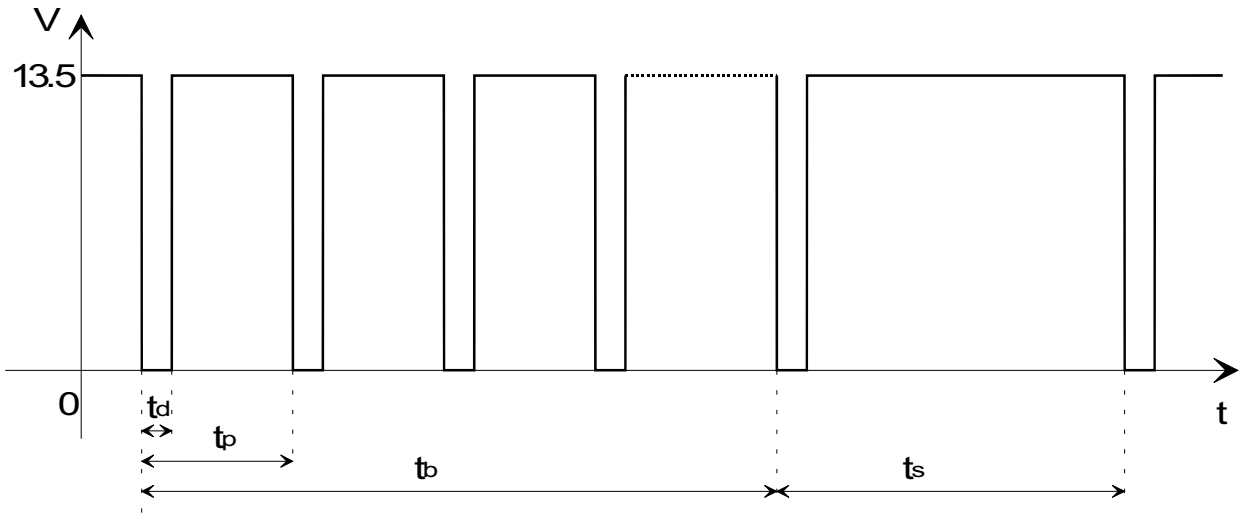


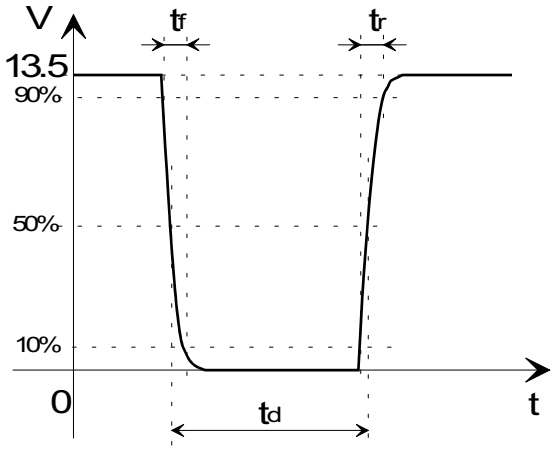
Vb1 = 12 V
Vb2 = 6 V
Vb3 = 8 V
Ri <= 0.01 Ω (power supply's internal resistance)
t1 = 2 s
t2 = 2 s
F1 = 1 Hz
F2 = 5 Hz

HELP 4

1ms/10ms MICRO-INTERRUPTIONS ON POWER LINES

Voltage transients on power lines due to bounces in the key switch and/or by bad contacts on connectors.

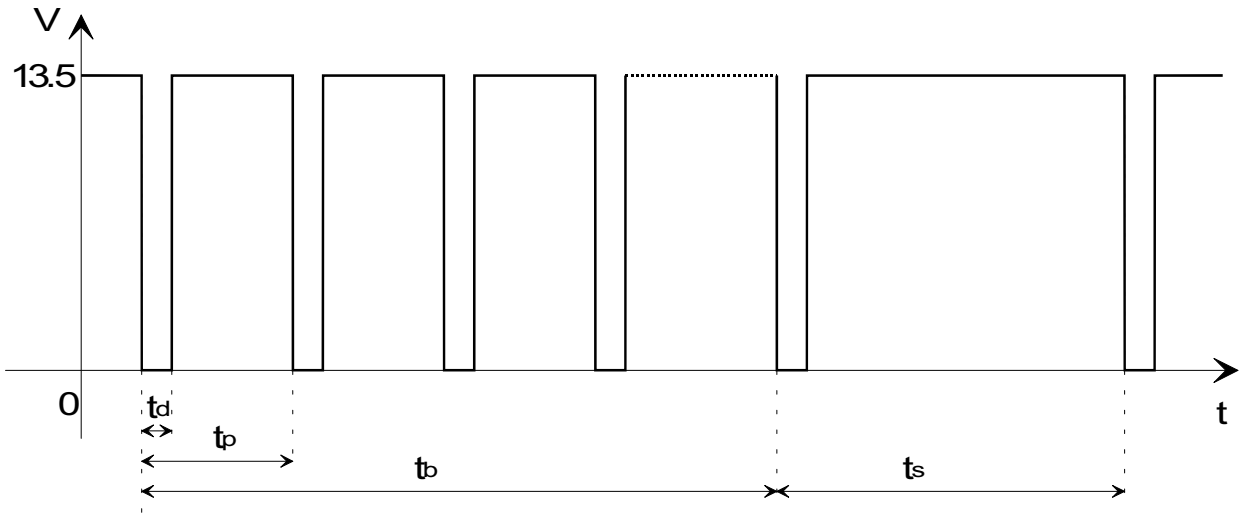


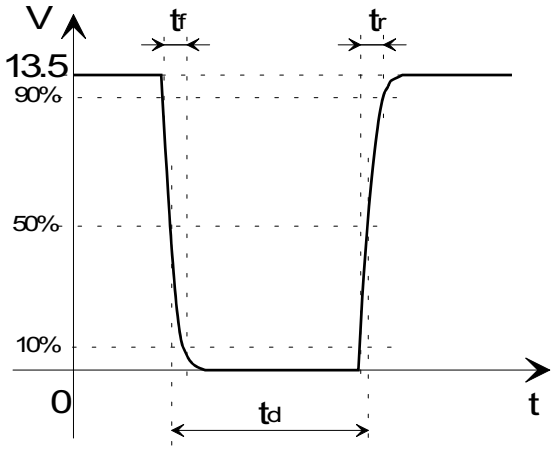


Ri <= 0.01 Ω (power supply's internal resistance)
td = 1 ms (duration)
tp = 10 ms (cycle)
tb = 4 s (burst duration)
ts = 10 s (burst interval time)
tr <= 100 µs
tf <= 100 µs

HELP 5

MICRO-INTERRUPTIONS >1 ms ON POWER LINES
Voltage transients on power lines due to bad contacts on connectors.



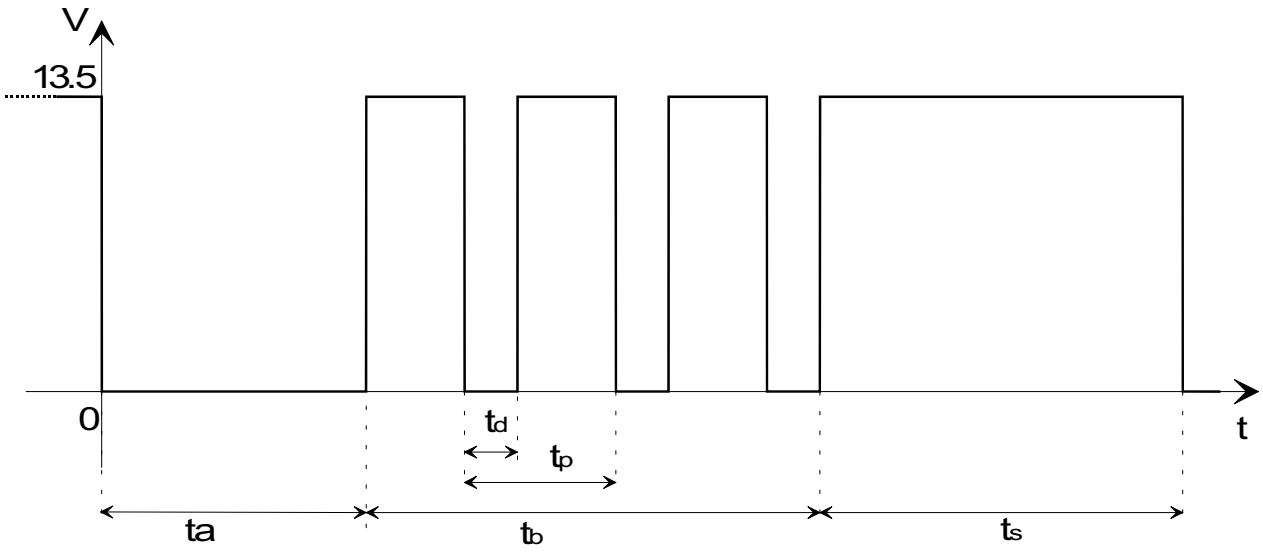


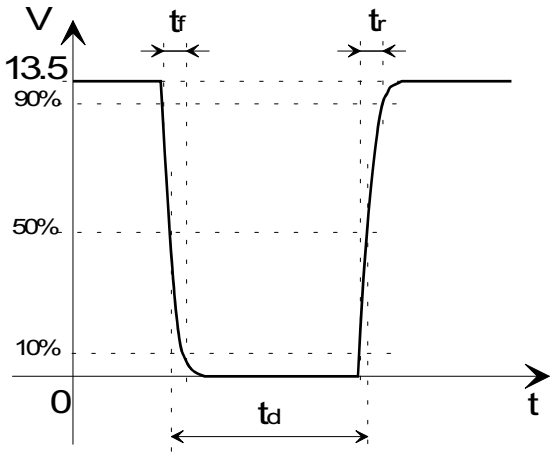
Ri <= 0.01Ω (power supply's internal resistance)
td = 3, 10, 30, 100, 300, 1000, 3000 ms (duration)
tp = 10*td (cycle time)
tb = 10 s (burst duration)
ts = 10 s (burst interval time)
tr <= 100 µs
tf <= 100 µs

HELP 6

KEY OFF/ON MISUSE CYCLE 1

Voltage transients on power lines due to improper use of the key switch.



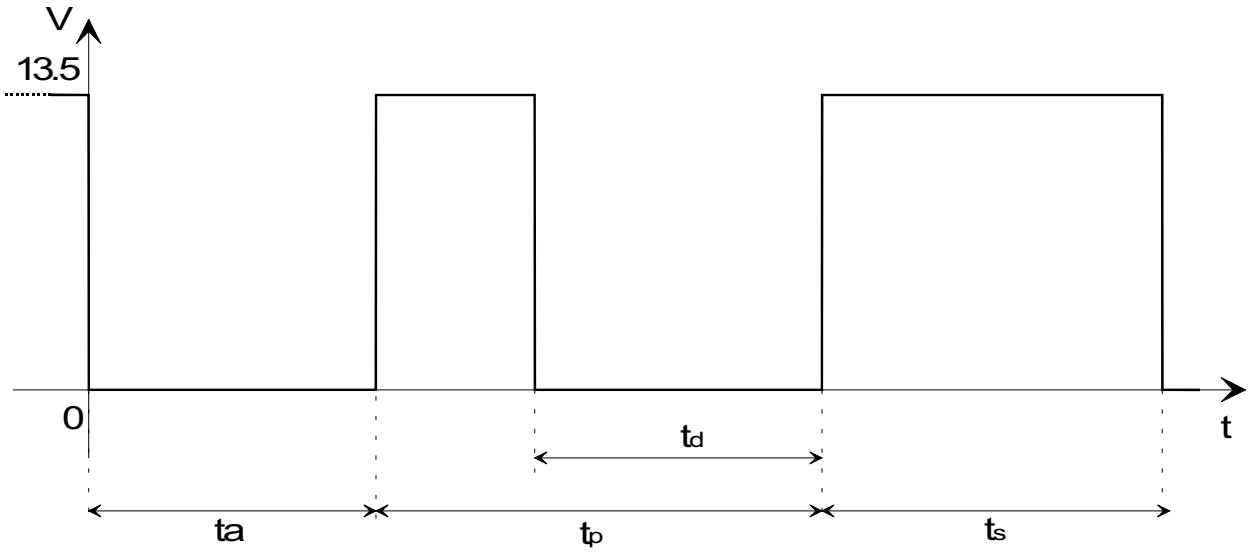


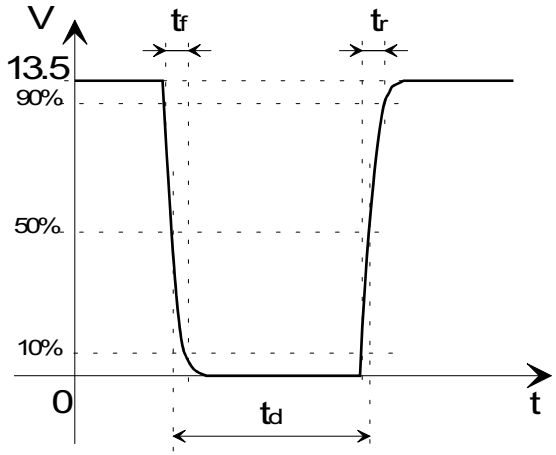
Ri <= 0.01Ω (power supply's internal resistance)
ta = 10 s (power OFF time)
td = 200 ÷ 800 ms (duration) step increments of 10 ms
tp = 3*td (cycle)
tb = 10 s (burst duration)
ts = 12 s (power ON time)
tr <= 100 µs
tf <= 100 µs

HELP 7

KEY OFF/ON MISUSE CYCLE 2

Voltage transients on power lines due to improper use of the key switch.





Ri <= 0.01 Ω (power supply's internal resistance)
ta = 10 s (power OFF time)
td = 1.7 ÷ 4.9 s (duration) step increments of 50 ms
tp = 5.7 s (cycle)
ts = 12 s (power ON time)
tr <= 100 µs
tf <= 100 µs

HELP 8.1

MULTIPLE INSTRUMENT

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Odometer and Speedometer	All other instruments and check lights
Operation Class:	CF1	CF2
Operating conditions:	Simulated input signals to obtain all indicators at mid-scale and all check lights off.	Simulated input signals to obtain all indicators at mid-scale and all check lights off.
Monitored Parameters:	-Indicators positions and check lights status -Any other parameter, identified as useful for the tested device correct diagnosis	-Indicators positions and check lights status -Any other parameter, identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-The odometer's indication shall not become zero and it shall be correctly incremented -The speedometer's value variation shall be less than ± 10%	-The instruments value variation shall be less than ± 10% -No spurious check lights on
	M2	- The odometer's indication shall not become zero	-Temporary indications variations and/or check lights on are allowed

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.2

BODY COMPUTER (CAN NETWORK)

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1* **(1)**
Function:	Speed signal
Operating Class:	CF1
Operating conditions:	simulate a vehicle speed of 40km/h
Monitored Parameters:	-Messages on CAN network -Any other parameter, identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	- Vehicle speed signal correct repetition (on CAN network)
	M2	- Vehicle speed signal missed repetition allowed (on CAN network)

NOTES:
(1): Since the body computer includes functions different from those currently implemented, such as the IMMOBILIZER, the ELECTRONIC ANTI-THEFT or the DOOR LOCK RECEIVER/TRANSMITTER, the WINDOW REGULATOR ECU and LIGHTS SWITCH/CHECK ECU, the test conditions related to those systems which are to be replace by it shall be considered.

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.3

I.D.I.S. SYSTEM

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*	*condition 3*	*condition 4*	*condition 5*
Function:	MAIN	AUDIO	NAV	TEL	BOARD COMPUTER
Operating Class:	CF2	CF2	CF2	CF2	CF2
Operating conditions:	record the stored setting contained in the MAIN section and in the sub-sections; radio, navigator (menu and map), telephone and board computer (trip).	record the stored setting contained in the AUDIO section	record the stored setting contained in the NAV section	record the stored setting contained in the TEL section	record the stored setting contained in the B.C. section
Monitored Parameters:	-I.D.I.S. display -Any other parameter identified as useful for the tested device correct diagnosis.	-I.D.I.S. display -Any other parameter identified as useful for the tested device correct diagnosis.	-I.D.I.S. display -Any other parameter identified as useful for the tested device correct diagnosis.	-I.D.I.S. display -Any other parameter identified as useful for the tested device correct diagnosis.	-I.D.I.S. display -Any other parameter identified as useful for the tested device correct diagnosis.

Acceptance Criteria For the behavior mode:	**M1**	The stored setting shall be kept	the displayed information shall not be corrupted	the navigator's map shall not be modified	the displayed information shall not be corrupted	the displayed information shall not be corrupted
	M2	The stored setting shall be kept	The stored setting shall be kept	The stored setting shall be kept	The stored setting shall be kept	The stored setting shall be kept

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.4

LIGHTS SWITCH/CHECK ECU

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Lights switch control	Lights check
Operation Class:	CF1	CF2
Operating conditions:	-Parking lights, low beam headlights and tail fog light switched on; -stop lights switch activated; -right/left turn lights on	-Parking lights, low beam headlights and tail fog light switched on; -stop lights fault simulation
Monitored Parameters:	-Stop and turn lights. -Any other parameter identified as useful for the tested device correct diagnosis	-Lights and check lights in the instrument panel. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No variation under the set operating condition (lights switching off or on, variation of the flashing frequency, etc.).	- No variation under the set operating condition (lights switching off or on). -Stop lights fault correct signaling
	M2	-Switching on of non operated lights is not allowed.	-Switching on of non operated lights is not allowed.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.5

WINDOWS REGULATOR ECU

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Holding windows in a fixed position	Controlled windows operation
Operation Class:	CF1	CF2
Operating conditions:	Windows positioned at mid-run	Remote activation of the window up/down command
Monitored Parameters:	-Windows movement -Any other parameter identified as useful for the tested device correct diagnosis	-Windows movement -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No unwanted displacement from the selected position	-Correct actuation of the up/down command
	M2	-No unwanted displacement from the selected position	-Missed actuation of the up/down command is allowed

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.6

DOORS LOCK ECU
TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1* **(1)**	*condition 2* **(1)**
Function:	Keeping position on opening	Keeping position on closing
Operation Class:	CF2	CF2
Operating conditions:	Door lock set to allow for doors opening	Door lock set to hold doors closed
Monitored Parameters:	-Door lock movement -Any other parameter identified as useful for the tested device correct diagnosis	-Door lock movement -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No unwanted displacement from the selected position	-No unwanted displacement from the selected position
	M2	-Door lock movement allowed	-Door lock movement allowed

NOTES:
(1): If the door lock system is operated through a remote control the test shall be performed according to the procedure defined for the DOOR LOCK RECEIVER/TRANSMITTER.

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.7

DOOR LOCK RECEIVER/TRANSMITTER

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Remote controlled door lock operation
Operation Class:	CF2
Operating conditions:	Remote activation of the door lock open/close command **(1)**
Monitored Parameters:	-Door lock movement -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Correct actuation of the open/close command
	M2	- Missed actuation of the open/close command is allowed

NOTES:
(1): The transmitter shall be positioned symmetrically to the receiver with reference to the maximum antenna radiation, 2 m away from the receiver and about 10 cm away from the ground plate.
For the radio frequency transmitters (433.92MHz central frequency) it is acceptable a malfunction detection at the transmission fundamental frequency within a ± 10MHz range.

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.8

ELECTRONIC ANTI-THEFT SYSTEM

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Anti-theft activation/deactivation cycle with alarm signal
Operation Class:	CF2
Operating conditions:	Engine off simulation with repetition of the following alarm cycle **(1)**: -burglary through volumetric devices (door or bonnet contacts, if no volumetric device used) -anti-theft device deactivation -anti-theft device activation Note: each 3 frequency increment steps the burglary shall be activated through a door or bonnet contact.
Monitored Parameters:	-Turn lights (Blinker) -Anti-theft acoustic signal -Anti-theft status Led -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Correct alarm signaling (no spurious alarm signal). -Correct alarm signaling under burglary condition. -Correct anti-theft device activation/deactivation. -Any other discrepancy with the set cycle shall be considered as a malfunctioning.
	M2	-The unwanted acoustic alarm activation is not allowed (spurious alarms).

NOTES:
(1): The transmitter shall be positioned symmetrically to the receiver with reference to the maximum antenna radiation, 2 m away from the receiver and about 10 cm away from the ground plate.
For the radio frequency transmitters (433.92MHz central frequency) it is acceptable a malfunction detection at the transmission fundamental frequency within a ± 10MHz range.

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.9

IMMOBILIZER

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Engine startup enable (with the right key)
Operation Class:	CF1
Operating conditions:	Repetition of the following key recognition cycle: -set the key to ON for at least 2 s. -Turn the key back to OFF (and hold it for at least 5 s).
Monitored Parameters:	-Communication serial line to engine control; -check LED **(1)**. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Correct starting enable (the LED turns off after about 0.7 s from key ON)
	M2	-Missed starting enable is allowed

NOTES:
(1): The solid lighting of the LED signaling the missed starting enable, may be due to:
-no reading from the transponder on the key (“key not present” code issued by IMMO);
-no code request from the Engine Control (no transmission on the serial line from CCM);
-no answer to the code request from the engine control (no code transmission from IMMO);
-key code not correctly transmitted (no recognition by the engine control of the code transmitted by IMMO).

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system’s RSC.

HELP 8.10

ENGINE CONTROL
TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:		*condition 1* **(1)**	*condition 2* **(1)**
Function:		Engine control (injection, ignition)	Engine control (injection, ignition)
Operation Class:		CF1	CF1
Operating conditions:		Simulated input signal to obtain: idling engine; stopped vehicle.	Simulated input signal to obtain: engine at 3000 rpm; vehicle speed at 40Km/h
Monitored Parameters:		-Ignition coil signal -Injection time signal -Fault light -Any other parameter identified as useful for the tested device correct diagnosis	-Ignition coil signal -Injection time signal -Fault light -Any other parameter identified as useful for the tested device correct diagnosis
Acceptance Criteria For the behavior mode:	**M1**	-No variation of the injection time greater than ± 20% with reference to the nominal value; -No spurious or missed ignitions on the spark plugs; -No fault light on.	-No variation of the injection time greater than ± 20% with reference to the nominal value; -No spurious or missed ignitions on the spark plugs; - No fault light on.
	M2	-No solid fault light on	-No solid fault light on

NOTES:
(1): If the engine control requires for an IMMOBILIZER control unit (which performs the enabled starting key recognition) to allow for engine start, the starting enable related test required for the IMMOBILIZER shall also be executed.

Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.11

CRUISE CONTROL
TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*	*condition 3*
Function:	Vehicle speed automatic control	Vehicle speed automatic control	Vehicle speed automatic control
Operation Class:	CF1	CF1	CF1
Operating conditions:	Simulated signals to obtain a constant vehicle speed of 60 km/h (with cruise control active)	Simulated signals to obtain the cruise **deactivation** (set speed 60 km/h) by acting on the stop switch (or clutch); and cruise **activation** through the speed set control on the steering.	Simulated signals to obtain a vehicle speed set through the cruise control to 80 km/h, while the simulated vehicle's speed shall be kept to 60 km/h.
Monitored Parameters:	-Actuation signal; -Any other parameter identified as useful for the tested device correct diagnosis	-Actuation signal; -Any other parameter identified as useful for the tested device correct diagnosis	-Actuation signal; -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No unwanted cruise control condition deactivation. -No variation on the set speed (on actuation signal).	-Correct cruise deactivation/activation operation.	-No unwanted cruise control condition deactivation. -No variation on the set speed (on actuation signal).
	M2	-No variation of the speed set with cruise control active is allowed.	-No variation of the speed set with cruise control active is allowed.	-No variation of the speed set with cruise control active is allowed.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.12

AUTOMATIC TRANSMISSION CONTROL

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Gear shift control	Gear shift control
Operation Class:	CF1	CF1
Operating conditions:	Simulated input signals to obtain: idling engine, shift lever in "PARKING" position.	Simulated input signals to obtain: vehicle speed at 20km/h, shift lever in "DRIVE" position.
Monitored Parameters:	-Solenoid valve group on/off control. -Fault light (if present) -Any other parameter identified as useful for the tested device correct diagnosis	-Solenoid valve group on/off control. -Fault light (if present) -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No unwanted variation of the engaged gear; -No unwanted variations of the engaged gear digital display (if present); -No fault light on (if present).	-No unwanted variation of the engaged gear; -No unwanted variations of the engaged gear digital display (if present); -No fault light on (if present).
	M2	-No unwanted variation of the engaged gear.	-No unwanted variation of the engaged gear.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.13

ELECTRONIC CLUTCH

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Clutch control	Clutch control
Operation Class:	CF1	CF1
Operating conditions:	Simulated input signals to obtain: vehicle speed nil, shift lever in "DRIVE" position (first gear engaged)	Simulated input signals to obtain: vehicle speed at 20 km/h, shift lever in "DRIVE" position (second gear engaged)
Monitored Parameters:	-Clutch control signal. -Clutch engage/disengage control. -Engaged gear digital display (if present). -Any other parameter identified as useful for the tested device correct diagnosis	-Clutch control signal. -Clutch engage/disengage control. -Engaged gear digital display (if present). -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No unwanted variation of the engaged gear; -No unwanted variation of the clutch control signal; -No unwanted variations of the engaged gear digital display (if present).	-No unwanted variation of the engaged gear; -No unwanted variation of the clutch control signal; -No unwanted variations of the engaged gear digital display (if present).
	M2	-No unwanted variation of the clutch control signal.	-No unwanted variation of the clutch control signal.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.14

4WD CONTROL UNIT

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*	*condition 3*
Function:	Electromagnetic joint control	Electromagnetic joint control	Electromagnetic joint control
Operation Class:	CF1	CF1	CF1
Operating conditions:	Simulated input signals to obtain: idling engine, vehicle speed 40 km/h, joint engaged through switch. Perform a cyclic joint engaging/disengaging by operating the stop light switch.	Simulated input signals to obtain: idling engine, vehicle speed 40 km/h, joint disengaged. Perform a cyclic joint engaging/disengaging by operating the stop light switch.	Simulated input signals to obtain: idling engine, vehicle speed nil, joint engaged through switch. Perform a cyclic joint engaging/disengaging by operating the stop light switch.
Monitored Parameters:	-Joint control. -System fault light. -Engaged joint light. -Any other parameter identified as useful for the tested device correct diagnosis	-Joint control. -System fault light. -Engaged joint light. -Any other parameter identified as useful for the tested device correct diagnosis	-Joint control. -System fault light. -Engaged joint light. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Electromagnetic joint correct activation. -No system fault light on.	-Electromagnetic joint correct activation. -No system fault light on.	-Electromagnetic joint correct activation. -No system fault light on.
	M2	-No spurious joint activation (unwanted).	-No spurious joint activation (unwanted).	-No spurious joint activation (unwanted).

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.15

SELF-LEVELING SUSPENSIONS

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Vehicle attitude (body height) control
Operation Class:	CF2
Operating conditions:	Simulated input signals to obtain: idling engine, shift lever in parking (for vehicles equipped with automatic transmission), vehicle speed nil, released hand brake, activated control unit in "STAND-BY" status, with remote activation of the hand brake switch.
Monitored Parameters:	-Charge/discharge fault lights. -Sensors output signals. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Sensors output signals within tolerance. -No fault light on.
	M2	-No unwanted activation.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.16

CONTROLLED SUSPENSIONS DAMPING

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Suspensions damping control	Suspensions damping control
Operation Class:	CF1	CF1
Operating conditions:	Simulated vehicle speed signal set to a proper value for placing the system in the “Automatic Control” zone, button set to "AUTO" and suspensions in ”SOFT" status. Simulate a sudden braking (short-circuited brakes circuit handcontact) in order to force the suspension system into the "HARD" status.	Simulated vehicle speed signal set to a proper value for placing the system in the “Automatic Control” zone and button set to "HARD".
Monitored Parameters:	-Control solenoid valves activity. -System fault light. -Any other parameter identified as useful for the tested device correct diagnosis	-Control solenoid valves activity. -System fault light. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No variation of the suspensions operating status with reference to the setup test (AUTO / HARD / SOFT); -No control solenoid valves spurious activation; -No system fault light on.	-No variation of the suspensions operating status with reference to the setup test (AUTO / HARD / SOFT); -No control solenoid valves spurious activation; -No system fault light on.
	M2	- No control solenoid valves spurious activation.	- No control solenoid valves spurious activation.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system’s RSC.

HELP 8.17

SERVOTRONIC Steering Control

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Power steering assist control	Power steering assist control
Operation Class:	CF2	CF1
Operating conditions:	Simulated input signals to obtain: stopped vehicle and idling engine	Simulated input signals to obtain: vehicle speed 40km/h
Monitored Parameters:	-Control solenoid valve signal -Fault light -Any other parameter identified as useful for the tested device correct diagnosis	-Control solenoid valve signal -Fault light -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No control solenoid valve spurious activation. -No system fault light on.	-No control solenoid valve spurious activation. -No system fault light on.
	M2	-No control solenoid valve spurious activation	-No control solenoid valve spurious activation

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.18

ELECTRONIC POWER STEERING (E.P.S.)

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Power steering control	Power steering control
Operation Class:	CF1	CF1
Operating conditions:	Key inserted with stopped vehicle. Steering blocked to obtain a steering torque of 3 Nm (check the applied torque by means of the proper diagnosis instrument)	Key inserted with stopped vehicle. Free steering.
Monitored Parameters:	-Fault light. -Motor driving current (measured through a Shunt on the battery +) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault light. -Motor driving current (measured through a Shunt on the battery +) -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No fault light on (check the stored errors by means of the proper diagnosis instrument) -Motor driving current variations lower than ± 20%	-No motor driving current.
	M2	-No fault light on (check the stored errors by means of the proper diagnosis instrument) -Motor driving current variations lower than ± 50%	-No motor driving current.

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.19

AIRBAG / SIDEBAG / PRE-TENSIONER

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Airbag/Sidebag/Pre-tensioners control
Operation Class:	CF1
Operating conditions:	Key inserted with stopped vehicle
Monitored Parameters:	-Fault light. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No fault light on (check the stored errors by means of the proper diagnosis instrument)
	M2	-No Airbag activation (explosive charge blast)

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.20

A.B.S.

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Self-test	Braking control
Operation Class:	CF1	CF1
Operating conditions:	Repetition of the following self-test cycle: -hold the key set to ON for at least 5s. -Reset the key to OFF.	Simulated input signal to obtain a constant vehicle speed of 50 km/h.
Monitored Parameters:	-Fault lights (ABS, EBD) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault lights (ABS, EBD) -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No fault lights on; -No errors stored.	-No fault lights on; -No errors stored; -No solenoid valves opening (if monitored).
	M2	-No EBD light on.	-No EBD light on; -No solenoid valves opening (if monitored).

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.21

A.B.S. with T.C.

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:		*condition 1*	*condition 2*	*condition 3*
Function:		Self-test	Braking control	Traction Control (TC)
Operation Class:		CF1	CF1	CF1
Operating conditions:		Repetition of the following cycle: -hold the key set to ON for at least 5s. -Reset the key to OFF.	Simulated input signals to obtain a constant vehicle speed of 50 km/h.	Simulated input signals to obtain a constant vehicle speed of 30 km/h.
Monitored Parameters:		-Fault lights (ABS, EBD and TC) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault lights (ABS, EBD and TC) -Solenoid valves control signals (if possible) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault lights (ABS, EBD and TC) -Solenoid valves control signals (if possible) -Any other parameter identified as useful for the tested device correct diagnosis
Acceptance Criteria For the behavior mode:	**M1**	-No fault check light on; -No stored error.	-No fault check light on; -No stored error; -No solenoid valves opening (if monitored).	-No fault check light on; -No stored error; -No solenoid valves opening (if monitored).
	M2	-No EBD light on.	-No EBD light on; -No solenoid valves opening (if monitored).	-No EBD light on; -No solenoid valves opening (if monitored).

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.22

A.B.S. with A.S.R.

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*	*condition 3*
Function:	Self-test	Braking control	Anti-skid control
Operation Class:	CF1	CF1	CF1
Operating conditions:	Repetition of the following cycle: -hold the key set to ON for at least 5s. -Reset the key to OFF.	Simulated input signal to obtain a constant vehicle speed of 50 km/h.	Simulated input signal to obtain a constant vehicle speed of 90 km/h.
Monitored Parameters:	-Fault lights (ABS, EBD and ASR) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault lights (ABS, EBD and ASR) -Solenoid valves control signals (if possible) -Any other parameter identified as useful for the tested device correct diagnosis	-Fault lights (ABS, EBD and ASR) -Solenoid valves control signals (if possible) -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No fault light on; -No errors stored.	-No fault light on; -No errors stored; -No solenoid valves opening (if monitored)	-No fault light on; -No errors stored; -No solenoid valves opening (if monitored)
	M2	-No EBD light on.	-No EBD light on; -No solenoid valves opening (if monitored)	-No EBD light on; -No solenoid valves opening (if monitored)

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.23

PASSENGERS COMPARTMENT AIR CONDITIONER

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Ventilation, compressor, temperature and air circulation control	Air distribution and mixing doors control
Operation Class:	CF2	CF2
Operating conditions:	Set the fan speed to mid scale; set air distribution to "BI-LEVEL" and air temperature to HI	Alternate actuation till end of scale of the air mixing and distribution blower motor.
Monitored Parameters:	-Compressor control -Actuation electric motors -Any other parameter identified as useful for the tested device correct diagnosis	-Compressor control -Actuation electric motors -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No variation of the selected settings -No compressor insertion	-Correct motor actuation -No compressor insertion
	M2	-No compressor insertion	-No compressor insertion

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.24

PASSENGERS COMPARTMENT CLIMATE CONTROL / WINDSCREEN DEFROSTER

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Ventilation, compressor, temperature and air distribution control
Operation Class:	CF2
Operating conditions:	-set the fan speed to mid scale; -air temperature set to HI; -compressor button OFF; -recirculation ON.
Monitored Parameters:	-compressor control; -blower control signal (PWM); -mixer feedback; -blower control signal at the regulator output. -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-No variation of the selected settings -No compressor insertions
	M2	-No compressor insertions

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.25

TACHOMETRIC SENSOR

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	Tachometer
Operation Class:	CF1
Operating conditions:	Simulate a vehicle speed of 60 km/h
Monitored Parameters:	-Vehicle speed signal at sensor output -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-Output signal period variation less than ±5%
	M2	-The signal shall never drop to zero

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.26

OIL LEVEL SENSOR

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*
Function:	oil level indication
Operation Class:	CF2
Operating conditions:	Oil level gauge set to mid scale
Monitored Parameters:	-Oil level gauge -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-The gauge shall keep its position
	M2	-Gauge position variations are allowed

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.27

RAIN SENSOR

TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Rain sensor	Rain sensor
Operation Class:	CF2	CF2
Operating conditions:	-Key ON	-Key ON, windscreen wiper set to intermittent
Monitored Parameters:	-Enable signal from the rain sensor to the wiper -Any other parameter identified as useful for the tested device correct diagnosis	-Enable signal from the rain sensor to the wiper -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-the rain sensor enable signal shall remain absent	-Correct rain sensor enabling to the wiper
	M2	-Rain sensor enabling to the wiper is allowed	-Correct rain sensor enabling to the wiper

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

HELP 8.28

PARKING SENSOR
TEST PARAMETERS

Noise amplitude:	As required by specifications 9-90110.
Number of pulses (test duration):	As required by specifications 9-90110.

FUNCTIONS CLASSIFICATION AND MONITORING

Test mode:	*condition 1*	*condition 2*
Function:	Reverse motion sensor	Reverse motion sensor
Operation Class:	CF2	CF2
Operating conditions:	-Reverse gear control engaged -No obstacle present (buzzer off)	-Reverse gear control engaged -Obstacle present (timed buzzer alarm based on distance)
Monitored Parameters:	-Buzzer signal driven by the control unit -Any other parameter identified as useful for the tested device correct diagnosis	-Buzzer signal driven by the control unit -Any other parameter identified as useful for the tested device correct diagnosis

Acceptance Criteria For the behavior mode:	**M1**	-no buzzer signal shall be activated	-the buzzer signal shall keep the correct timing
	M2	-no buzzer signal shall be activated	-buzzer signal timing variation is allowed

NOTES:
Any other testing conditions providing for special cases, which are not covered in the standard, and therefore giving a different evaluation of the malfunctioning criteria, can be examined and evaluated each time with the Supplier and the system's RSC.

Test Data Transmission

Fiat Auto S.p.A.	**TEST DATA TRANSMISSION**	**DATE:**
DIREZIONE TECNICA F.V. - S.I.E.E. SPERIMENTAZIONE APPLICAZIONI VEICOLO	**PROTOCOL N. :**	**INTERNAL N.:**
	JOB REFERENCE: **Test date from**	**VIOLATION**

DT-FV-RSV
DT-FV-SIEE-RPA
DT-FV-SIEE-TL
DT-FV-SIEE-TLS
DT-FV-SIEE-RSC

DT - SIEE - S.
DT - SIEE - P.

STANDARD N°: 7-Z0444

STANDARD'S TITLE: Electric and electronic systems: bench tested immunity to voltage changes on feeding lines.

ABS:
CHASSIS N.:
VEHICLE TYPE:
ENGINE TYPE:
COMPONENT:
SUPPLIER:

PBS:

SERIES
SK.N.:
CC:
TECHNOLOGICAL LEV.:
DRAWING N.:
LAST CHANGE DATE:

Test result :

for :

TECHNICIAN'S SIGNATURE: **T.L./RESP.:**

Att. mod. : **Num. pages :**