

PURPOSE

To define the equipment to be used and the test procedures to be followed to bench tests the immunity from transient injected noise burst on power supply lines of the system under test.

The aim of the tests is the correct application on the vehicle of the component tested, for the concession of Design Release, Final Design Release and Qualification Certificate.

This Standard is composed of 31 pages

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PEL
Code
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Ch.
2
Edition

ChangeW

DateW

Description

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June 92O

Edition 1 - New, edited in accordance with the Technical Memory Procedure.
This standard supersedes point 1 of Std. 7.Z0890

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July 16
1997

Edition 2 - Updated.O (SS)



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Supplier :		D.L.C.

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STANDARD USE CRITERIA

This standard aims at checking the proper operation of the electric and electronic systems subject to feeding voltage changes generated during the thermal engine start-up and by key-switch bounces.

REGULATIONS REFERRED TO IN THE TEXT

Specifications 9.90110: Specifications concerning motor vehicle electronic devices

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EQUIPMENT REQUIRED FOR THE TEST

1- TEST ROOM

The room must be large enough to accommodate all instruments and the test bench and be, protected from electromagnetic noises that might affect test results.

The following ambient requirements are necessary:

Temperature:	23 ± 5 °C
Relative humidity:	$45 \div 70$ %
Atmospheric pressure:	$860 \div 1060$ mbars

2- PULSE GENERATOR

The generator must be able to supply the pulses defined in Helps **H2, H3, E14, E15** and **H6**. Allowed tolerances with respect to the specified values: $\pm 2\%$ for output resistance (R_i) and $+10\%$ and -0% for voltages.

3- DIGITAL OSCILLOSCOPE

It must have a passband larger than 200 MHz; with sampling rate per pulse of at least 400 Msample/s per channel.

It must also come with the following voltage probes:

attenuation:	$10 \times (R \geq 10 \text{ M}\Omega, C \leq 12 \text{ pF, max voltage } 500 \text{ V, passband } \geq 200 \text{ MHz});$
attenuation:	$100 \times (R \geq 10 \text{ M}\Omega, C \leq 2.5 \text{ pF, max voltage } 1500 \text{ V, passband } \geq 120 \text{ MHz}).$

4- GROUNDING BENCH

It must be made of a high electric conductivity sheet (copper, aluminum, brass, galvanized steel) of 1.5 mm minimum thickness with minimum dimensions of 2 x 1 m. The grounding bench must be connected to the ground line of the building with a suitable copper braid welded to the plane body.

5- TEST BENCH

It must be made of insulating material (e.g. wood) with sizes to accommodate the grounding bench.

6- POWER SUPPLY

It must be able to provide the voltage and the maximum current requested by the device to be tested.

It is advisable to use a power supply with adjustable voltage between 0 and 24 V, 40 A with an emergency buffer storage battery of 45 Ah, 225 A.

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DESCRIPTION OF ITEM UNDER TEST

SYSTEM :
 DRAWING NO. :
 CODE :
 IDENTITY No. OF CONTROL UNIT BOX.:
 SUPPLIER :
 PURPOSE :

Date: VIOLATION: YES ☐ NO ☐
 Name of engineer: Signature:

SIGNIFICANCE OF COMPONENTS UNDER TEST

TYPE OF COMPONENT	SIGNIFICANCE % VALUE A	% WEIGHT B	COMPONENT AFFECTING THE SIGNIFICANCE OF THE TEST	SIGNIFICANT CHARACTERISTICS	MINIMUM TECHNOLOG. LEVEL
Active		50	Control unit BOX	printed circuit box, if metal release software	B
Active		20	wirings	length section of cables	C
Active		30	Sensors and actuators	impedance	C

Significance of the system under test : $\text{sum} (A \times B) \% =$

For components not expected from the drawing, enter "0" into the boxes for significance and component weight.
 Date:

Name of engineer: Signature:

CALCULATIONS CHECKS

To date no tools are available to perform Electromagnetic Compatibility calculation checks.

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TEST PRE-REQUIREMENTS

1- CALIBRATION OF PULSE GENERATOR:

The calibration consists of adjusting electrical and timing amplitude characteristics of output pulses of the generator without any external load, as required by indications of Helps **H2, H3, H4, H5 e H6**.

The calibration has to be carried out according to the following procedure:

- 1.1- Connect the oscilloscope to the outlet of the pulse generator. Engineer: []
- 1.2 Select test pulses and adjust, with the test fixture disconnected from the generator, electric characteristics (sizes and times) of pulses as seen on the oscilloscope as indicated in **H2, H3, H4, H5 e H6**. Engineer: []

2- EQUIPMENT SETUP:

- 2.1- Keep on hand the technical documentation needed for the test, including:
 - working particularities of the system under test
 - exciter system (when needed).
 - parameters monitored and their tolerances (listed as diagrams **H7** to **H23**).
 - definition of faults (listed as diagrams H7toH23).
 - system connection lay-out during the test. Engineer: []
- 2.2- Prepare needed instruments for the test (listed in the dedicated form "INSTRUMENTS NEEDED FOR THE TEST"), according to diagrams reported in H1. Engineer: []
- 2.3- Put the system under test, with its cables and any auxiliary equipment needed for best working conditions (sensors and actuators) to a distance of 50 ± 5 mm on the grounding bench but insulated from earth as described in **H1**.
 If the earth grounding connection on the case of the system or on one of the sensors/actuators is mandatory, the connection must run the shorter way possible. Engineer: []
- 2.4 Prepare the power line (positive and negative) of the device under test going to the pulse generator outlet with two copper wires (Cu) of the section of $2,5 \text{ mm}^2$, length 500 ± 50 mm, parallel to each other at a distance of 20 ± 2 m, at a distance of 50 ± 5 mm from the grounding bench. Engineer: []
- 2.5 Connect all sensors and actuators of the device to be tested. They should be all the parts indicated on the drawings to be used on the vehicle, powered and monitored as designed for the final mounting with all signal and control cables if they are not already fitted together with the power cables (common connector for power and signal/commands lines), with the cables crossing at $90^\circ \pm 15^\circ$ if they run separately. Engineer: []
- 2.6 Connect the negative lead of the storage battery and of the power supply to the grounding bench and connect the power wires of the system to be tested to the outlet of the pulse generator Engineer: []

NOTE: When applying pulses Fiat 1 and 2, only keyed power lines (+15) are to be connected to the output of the pulse generator, while the permanent power supply (+30), if fitted, must be connected to the positive side of the battery

Date:

NON RESPECT: YES [] NO []

Name of Engineer:

Signature:

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TESTING

1- TURNING ON THE DEVICE TO BE TESTED

- 1.1 Connect and power up the device to be tested as shown in the drawing or as required by specifications
Engineer: []
- 1.2 Provide all electric inputs and sensing probes with the right signals enabling effective working conditions of the system;
Engineer: []
- 1.3 Set the system to the appropriate working state, static (stable input signals) or dynamic (sequence of variable input signals duly affecting the state or the response of the system) according to the planned procedure for the test as described in the drawings or required by specifications.
Engineer: []
- 1.4 Keep on hand all characteristics parameters of the signals from the actuators to be used as reference data during the test.
Engineer: []

2- APPLICATION OF PULSE

Repeat the following procedure for each one of the various pulses types required.

- 2.1 Set the pulse generator for the proper values of pulses-at the minimum selectable level.
Engineer: []
 - 2.2 Check the good working conditions of the device under test, at the particular setting to be tested, comparing all characteristic parameters of the signals from the sensors with their reference data.
Engineer: []
 - 2.3 If the device is working properly, increase the level of the output signal first without load (tested device not connected to the generator) and repeat step 2.2 up to the voltage level (Amplitude) required by Standard 9.90110
Engineer: []
- NOTE: The increase of level signal of the generator must be less than or equal to the point where it is wanted to know the possible fault limit of the device under test
- 2.4 At the end of pulses application, reached or surpassed the application time or the quantity of pulses required by the Standard 9.90110, prepare a recorded table with voltage level reached, actual duration of test and any faulty condition observed.
Engineer: []

NOTE: If the device under test is not fitted with keyed power supply (+15), pulses Fiat 1 and 2 are not to be applied.

If the device under test is mounted on vehicles where all alternators are fitted with Zener diodes, the test with pulses Fiat 5 must be carried out using a suppresser on the output line of the pulse generator (paralleled with the tested device) cutting the pulses to 40 V (typical voltage for Zeners used in alternators).

Date:

VIOLATION: YES [] NO []

Technician's Name:

Signature:

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DATE PROCESSING

1- ACCEPTABILITY LIMITS

At each test condition and for each type of pulses applied the device tested must be proved immune from voltage levels as required by Specifications 9.90110.

2- SPACE FOR GRAPHICS, TABLES, DIAGRAMS, ETC.

Attach here all tables related to tests done, diagram, etc.

Table I: test results.

PULSE	TEST CONDIT.	AMPLITUDE	Number of pulse (duration test)	Type of faulty condition	NOTES
FIAT 1					
FIAT 2					
FIAT 3a					
FIAT 3b					
FIAT 5					

RESTORING THE TESTED ITEM/TEST BENCH ORIGINAL CONDITIONS

- | | | |
|---|-----------------------------------------------------------------------------------------------------------------|------------------------------------|
| 1 | Disconnect all sensors, actuators, probes and any other peripheral which is not an integral part of the system. | Engi |
| | neer: <input type="checkbox"/> | |
| 2 | Restore any connections modified for the tests. | Engineer: <input type="checkbox"/> |
| 3 | prepare the test bench for the next use | Engineer: <input type="checkbox"/> |

Date:

VIOLATION: YES ☐ NO ☐

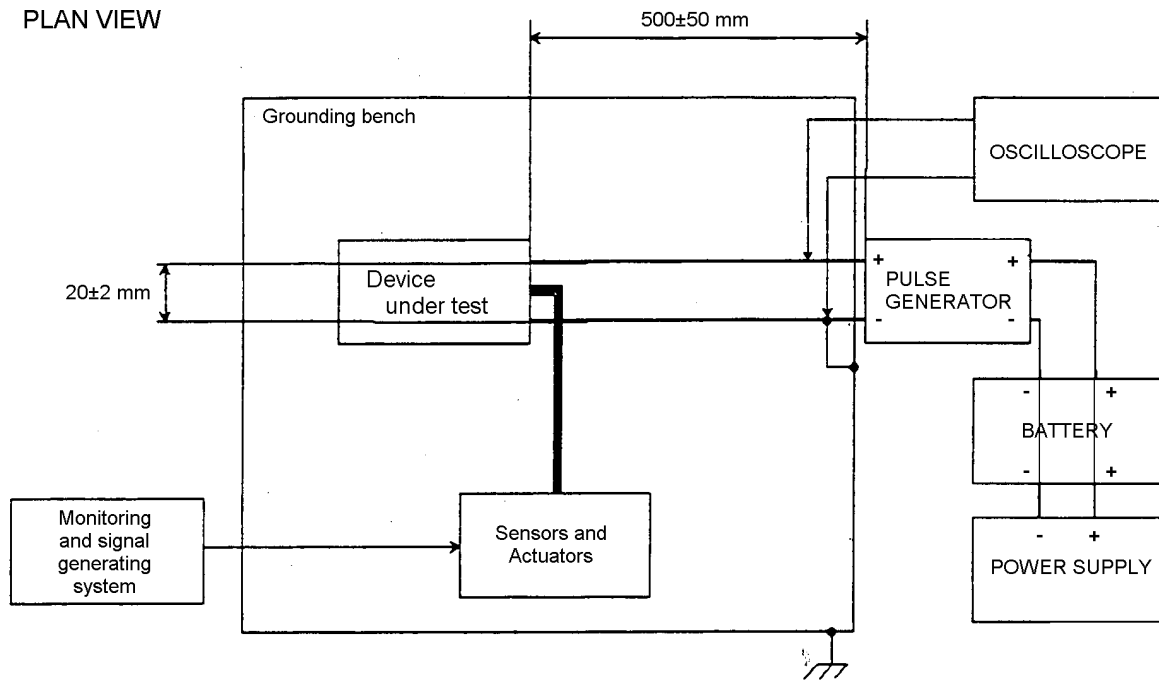
Technician's Name:

Signature:

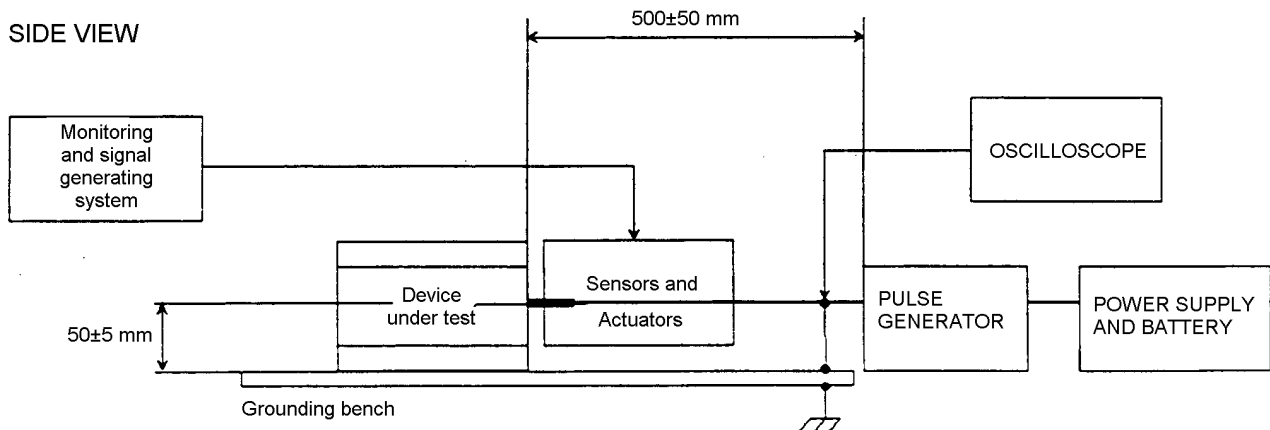
HELP 1

EQUIPMENT SET-UP FOR THE TESTS

PLAN VIEW

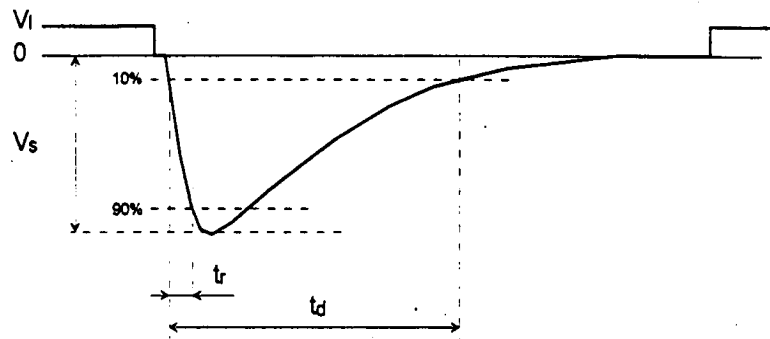
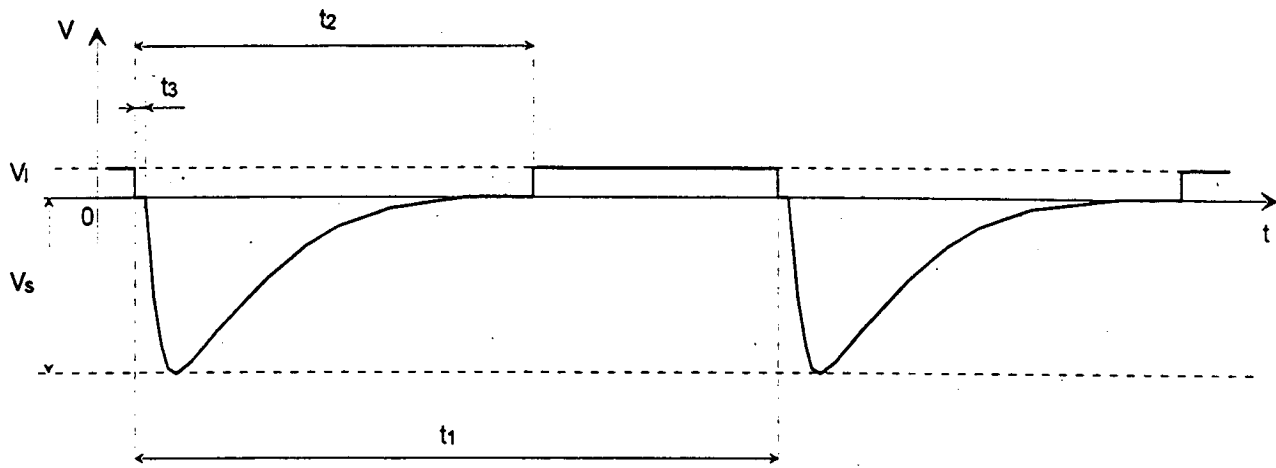


SIDE VIEW



HELP 2**"FIAT 1" PULSE***

Low frequency transients caused by disconnection of inductive loads from power supply line.



$$V_1 = 13.5V$$

$$V_s = \text{Amplitude}$$

$$R_i = 10 \Omega \text{ (internal resistance of generator)}$$

$$t_d = 2 \text{ ms}$$

$$t_r = 1 \mu s$$

$$t_1 = 0.5 \text{ s}$$

$$t_2 = 200 \text{ ms}$$

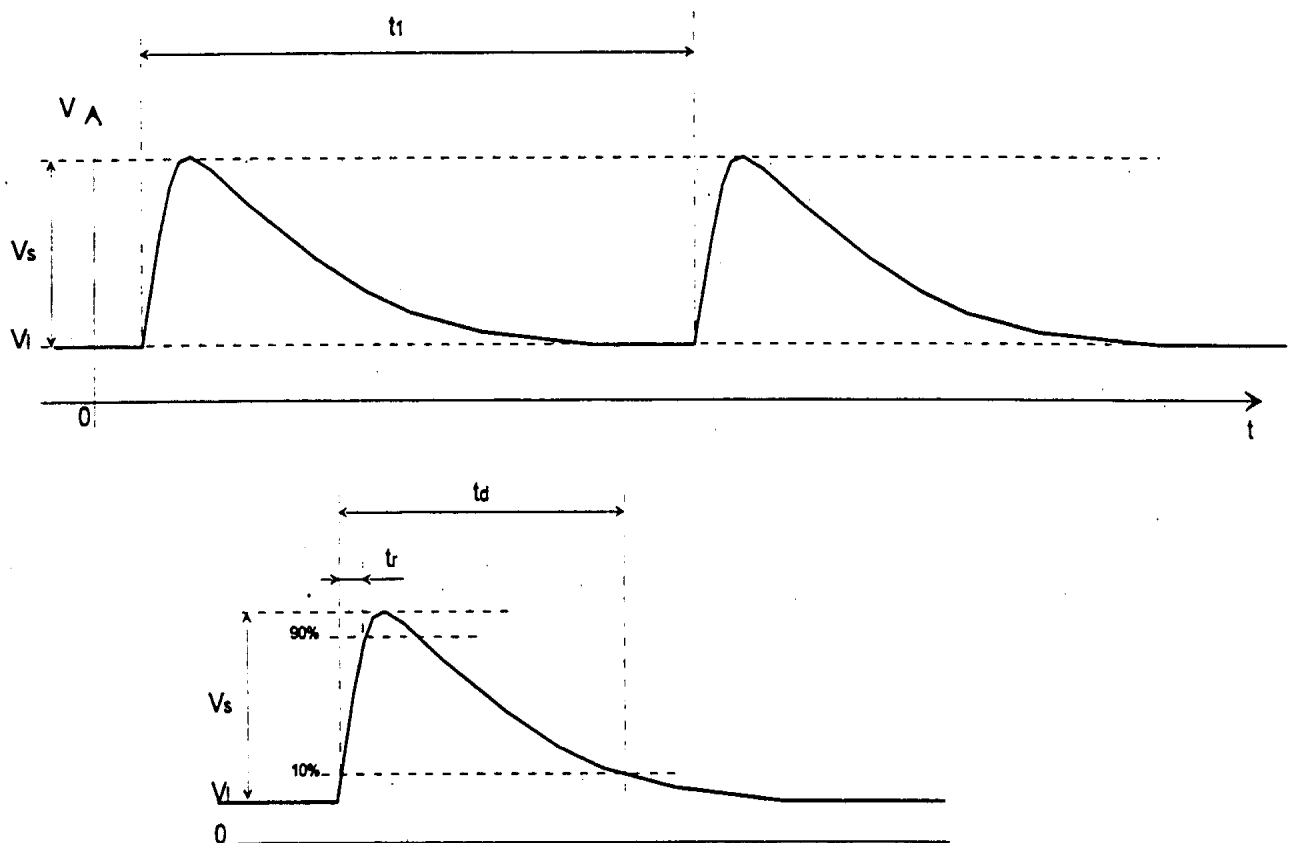
$$t_3 \leq 10 \mu s$$

*: apply the pulse only to keyed power supply lines (+ 15)

HELP 3

“FIAT 2” PULSE*

Low frequency transients caused by disconnection of inductive loads from power supply line.



$$V_i = 13.5 \text{ V}$$

$$V_s = \text{Amplitude}$$

$$R_i = 10 \, \Omega \text{ (internal resistance of generator)}$$

$$t_i = 1 \text{ s}$$

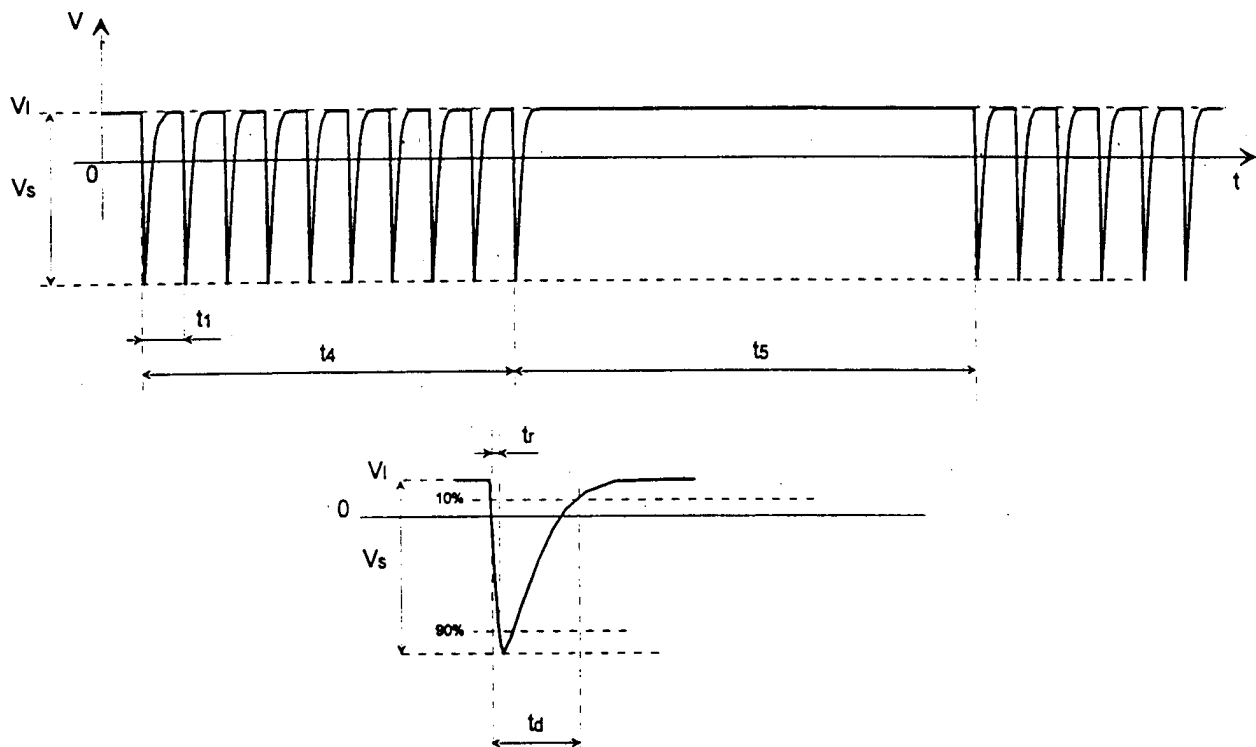
$$t_d = 0.05 \text{ ms}$$

$$t_r = 1 \, \mu\text{s}$$

*:apply the pulse only to keyed power supply lines (+ 15)

HELP 4**“FIAT 3a” PULSE**

High frequency negative transients caused by disconnection of inductive loads from power supply line.



$$V_1 = 13.5V$$

$$V_s = \text{Amplitude}$$

$$R_i = 50 \, \Omega \text{ (internal resistance of generator)}$$

$$t_d = 0.1 \, \mu s$$

$$t_r = 5 \, ns$$

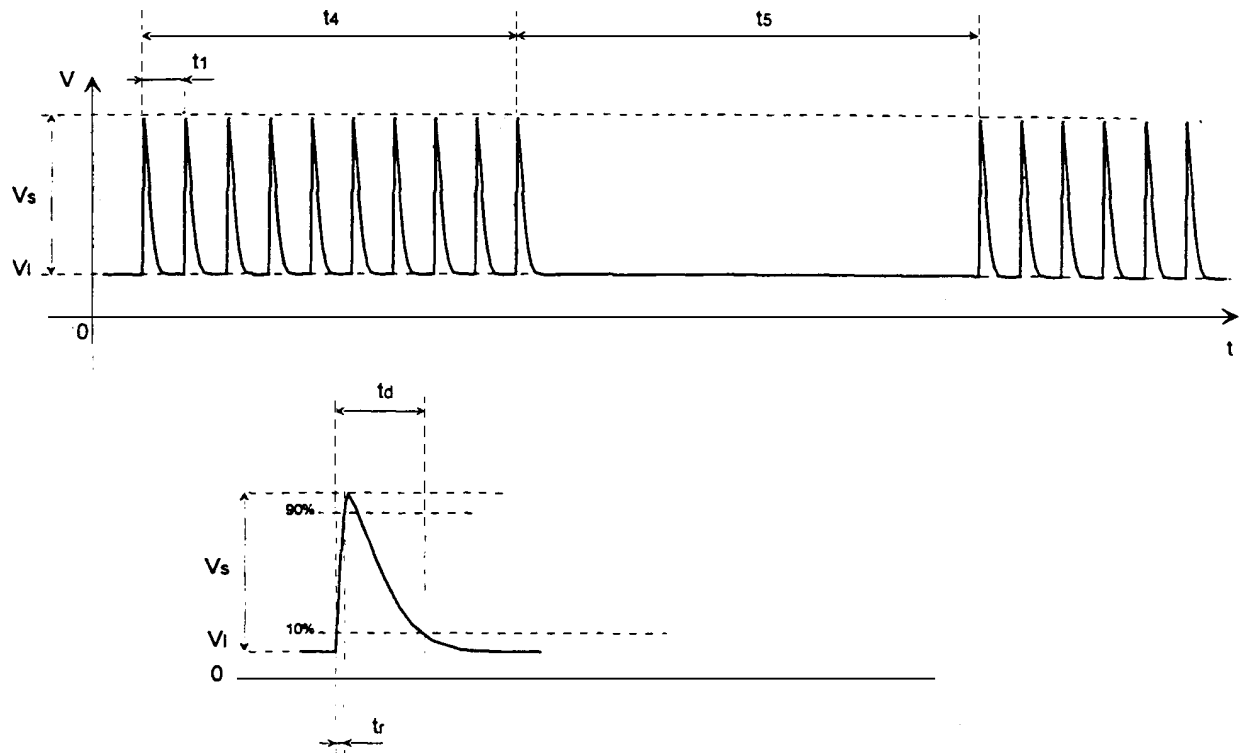
$$t_1 = 100 \, \mu s$$

$$t_4 = 10 \, ms$$

$$t_5 = 90 \, ms$$

HELP 5**“FIAT 3b” PULSE**

High frequency positive transients caused by disconnection of inductive loads from power supply line.



$$V_1 = 13.5V$$

V_s = Amplitude

$R_i = 50 \Omega$ (internal resistance of generator)

$$t_d = 0.1 \mu s$$

$$t_r = 5 \text{ ns}$$

$$t_l = 100 \mu s$$

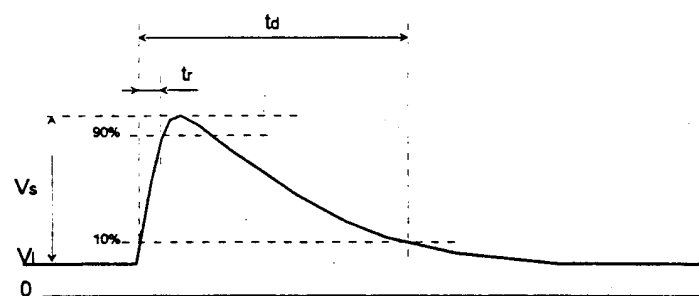
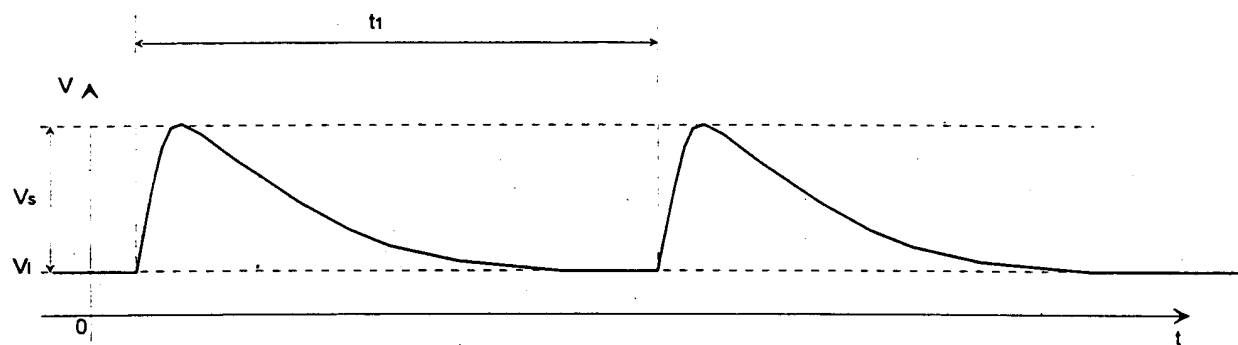
$$t_4 = 10 \text{ ms}$$

$$t_5 = 90 \text{ ms}$$

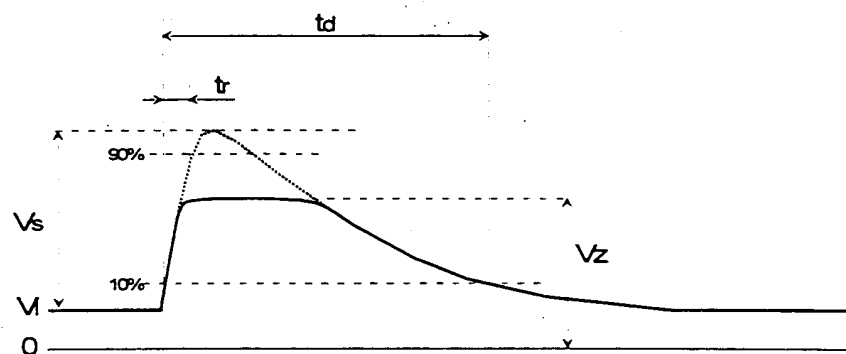
HELP 6

“FIAT 5” PULSE

Voltage increase from loaded alternator, caused by storage battery disconnection (load-dump).



Load Dump from alternator with Zener diodes



$$V_1 = 13.5V$$

$$V_s = \text{Amplitude}$$

$$V_z = 40V$$

$$R_i = 2\Omega \text{ (internal resistance of generator)}$$

$$t_d = 400\text{ ms}$$

$$t_r = 4 \div 5\text{ ms}$$

$$t_1 = 60\text{ s}$$

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HELP 7

POWER WINDOW CONTROL UNIT (ACCCY929)	
Amplitude of noise	As per Standards 9.90110
Number of pulse (test duration)	As per Standards 9.90110
Operating conditions of device under test.	<u>condition 1:</u> Window glasses half open <u>condition 2:</u> Remote operation for opening/closing window glasses
Parameters monitored	- Window glasses movement - Other possible parameters, judged useful for diagnostic of the device examined
<p>NOTES:</p> <p>FAULTY CONDITIONS:</p> <p>Incorrect operation of opening/closing action (functional class F1)</p> <p>Unwanted change from position (functional class F2).</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 8

ELECTRONIC ANTITHEFT (AB7ZY922)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	<p>Simulating motor not running, repeat the following antitheft cycle:</p> <ul style="list-style-type: none"> - physical break-in alarms (with space sensors if fitted, or with door contacts) -deactivation of the protection -Activation of theft protection, going to next frequency <p>Note: every 3 steps of frequency the break-in must come from contact of a door or of the bonnet</p>
Parameters monitored	<ul style="list-style-type: none"> - Blinkings lights (Blinker) - Antitheft siren. - Led antitheft state <p>- Other possible parameters, judged useful for diagnostic test of the device examined.</p>
<p>NOTES:</p> <p>FAULTY CONDITIONS (Functional class F1): Incorrect alarms signaling (false alarms). Missing report of alarm at breaking-in. Missing activation and/or deactivation of theft protection system. Any other difference with the regular cycle must be considered as faulty condition.</p> <p>Other possible testing conditions for special cases not indicated for routine testing. and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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Supplier :		D.L.C..

HELP 9

PASSENGER COMPARTMENT AIR CONDITIONER (ACGAT751)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	<u>Condition 1:</u> set fan speed to mid position; air distribution to "BI-LEVEL", air temperature to HI. <u>Condition 2:</u> motors running alternately for air mixing and distribution, up to breaker cutoff.
Parameters monitored	<ul style="list-style-type: none"> - Compressor control - Motors of actuators - Other possible parameters, judged useful for diagnostic test of the device examined.
<p>NOTES:</p> <p>FAULTY CONDITIONS::</p> <p>For condition 1 it is required that the settings are not changed while the noise is generated and that the compressor is not called on. (functional class F2).</p> <p>For condition 2 it is required that the operation of the actuators go on without any problem due to noise or to the compressor starting (functional class FI).</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 10

MULTIPLE TOOL (ACDAY50)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	Simulated input signals for all indicators at mid scale and all indicating lights unlit.
Parameters monitored	Position of indicators and state of indicating lights. - Other possible parameters, judged useful for diagnostic test of the device examined.
<p>NOTES:</p> <p>FAULTY CONDITIONS:</p> <p>For dial and numerical indicators a difference $\pm 10\%$ of the value reported (functional classes F1 and F2).</p> <p>For warning lights and the testing of lights, any wrong lighting of indicating lamps/LEDs (functional class F1).</p> <p>For distance meter, any change of values shown or resetting to zero (functional class F2).</p> <p>Other possible testing conditions for special cases such as board instruments not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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Supplier :		D.L.C.

HELP 11

LIGHT CONTROL UNIT (ACDAY752)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	Break-light switch activated, blinking lights right/left turned on.
Parameters monitored	<ul style="list-style-type: none"> - Brake-lights and blinking lights. - Other possible parameters, judged useful for diagnostic test of the device examined.
<p>NOTES:</p> <p>FAULTY CONDITIONS (Functional class F2): Changes in assigned operational characteristics (changes of frequency, intermittence, turning off, etc.)</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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Supplier :		D.L.C.

HELP 12

4WD CONTROL UNIT (AB7ZY751)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test.	<p>Simulated input signals for:</p> <p><u>Condition 1:</u> motor running at minimum rpm, car speed 40 km/h, transmission joint connected by switch</p> <p><u>Condition 2:</u> motor running at minimum rpm, car speed 40 km/h, transmission joint disconnected</p> <p><u>Condition 3:</u> motor running at minimum rpm, car speed zero, transmission joint connected by switch</p> <p>Operate cyclic connection/disconnection of the joint using the switch for brake-lights</p>
Parameters monitored	<ul style="list-style-type: none"> - Electromagnetic joint command. - Warning light for system fault. - Warning light joint connected. <p>Other possible parameters, judged useful for diagnostic tests of the device examined</p>
<p>NOTES:</p> <p>FAULTY CONDITIONS (Functional class F2):</p> <p>Faulty connections or missing connection/disconnection of electromagnetic joint.</p> <p>Warning light for system fault coming on.</p> <p>Other possible testing conditions for special cases not indicated for routine testing. and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 13

AUTOMATIC SHIFT GEAR CONTROL UNIT (AA0AZ914)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test (with air conditioner off)	<p>Simulated input signals for:</p> <p><u>Condition 1:</u> motor running at minimum rpm, shift gear in position "PARKING"</p> <p><u>Condition 2:</u> car speed 20 km/h, shift gear in position "DRIVE".</p>
Parameters monitored	<ul style="list-style-type: none"> - Command insert / detach of the solenoid valve group. - Fault warning light (when fitted) - Other possible parameters, judged useful for diagnostic tests of the device examined
<p>NOTES</p> <p>FAULTY CONDITION (Functional class F2): Unwanted shifting of the speed gear; Unwanted changes of the digital indication of the speed gear selected (when fitted); Fault warning light coming alive (when fitted).</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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Supplier :		D.L.C..

HELP 14

PASSENGERS COMPARTMENT AIR CONDITIONER/ WINDOW DEFROSTER (ACGAT751)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	<ul style="list-style-type: none"> - set the fan speed to mid position; - air temperature to HI; - compressor button to OFF; - re-circulation to ON.
Parameters monitored	<ul style="list-style-type: none"> - compressor controlling signal; - fan controlling signal (PWM); - mixer feed back; - fan controlling signal as output from the regulator. - Other possible parameters, judged useful for diagnostic test of the device examined.
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F2):</p> <ul style="list-style-type: none"> - any change of the conditions assigned. <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 15

SERVOTRONIC steering controller (AB7ZY916)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test.	Simulated input signals for: <u>Condition 1:</u> motor running at minimum rpm <u>Condition 2:</u> car speed 40Km/h
Parameters monitored	- Signal of controlling solenoid valve - Fault warning light - Other possible parameters, judged useful for diagnostic tests of the device examined
NOTES FAULTY CONDITIONS (Functional class F2) - Faulty operations of the controlling solenoid valve. - System fault warning light lit. Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.	

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HELP 16

MOTOR CONTROL UNIT (ACDAZ913)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test(with air conditioner off)	Simulated input signals for: <u>Condition 1:</u> motor running at minimum rpm <u>Condition 2:</u> motor running at 3000 rpm
Parameters monitored	- Ignition coil signal - Injection time signal - Fault warning light - Other possible parameters, judged useful for diagnostic tests or the device examined
NOTES FAULTY CONDITIONS (Functional class F2): <ul style="list-style-type: none"> - Injection time changes higher than $\pm 20\%$ compared with nominal value; - Faulty firing or missing firing of spark plugs; - Fault warning light always on. Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions. can be considered and assessed with the supplier and with the system RSC as the need arises.	

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HELP 17

CRUISE CONTROL (AB7ZY913)	
Amplitude of noise	As per standards 9.90110
Number of pulses(test duration)	As per standards 9.90110
Operating conditions of device under test	<p>Simulated input signals for:</p> <p><u>condition 1:</u> maintaining car speed of 60 km/h (with cruise control on)</p> <p><u>condition 2:</u> Deactivating cruise control (memorized speed 60 km/h) using the switch for brake-lights (or clutch); activating cruise control setting the speed by steering wheel commands.</p> <p><u>condition 3:</u> Speed set on cruise control at 80 km/h, while the e simulated speed of the vehicle must be kept at 60 Km/h.</p>
Parameters monitored	<ul style="list-style-type: none"> - Controlling signal; - Other possible parameters, judged useful to for diagnostic test of the device examined
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F2)</p> <ul style="list-style-type: none"> - Unwanted deactivation of cruise control action. - Incorrect intervention of deactivation/activation of cruise control device. - Constant speed requested not maintained (variations of controlling signal). <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 18

ELECTRONIC CLUTCH (AB7ZY895)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test (with air conditioner off)	<p>Simulated input signals for:</p> <p><u>Condition 1:</u> car speed zero, gear shift in position “DRIVE”.</p> <p><u>Condition 2:</u> car speed 20km/h, gear shift in position “DRIVE”.</p>
Parameters monitored	<ul style="list-style-type: none"> - Clutch command signal. - Command engage / disengage the clutch. - Digital indication of gear selected (when fitted). - Other possible parameters, judged useful for diagnostic tests the device examined
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F2):</p> <ul style="list-style-type: none"> - Unwanted changes of selected gear; - Unwanted changes of the command signal for the clutch; - Changing digital indications of the gear selected (when fitted) . <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 19

IMMOBILIZER (AB7ZY921)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test (with key correctly memorized)	Carry out the following operations: - set the key to ON for at least 2 s. - take back the key to OFF.
Parameters monitored	- serial line signal; - LED state signal. - Other possible parameters, judged useful for diagnostic tests of the device examined.
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F2): transponder not reading the key (LED remains lit, code for "key not present" signaled); - key code not transmitted correctly (LED remains lit, motor control unit does not recognize the code transmitted); - no answer to the request for code by the motor control unit (LED remains lit. code not transmitted). - no request for code by the motor control unit (LED remains lit, no transmissions on serial line)</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 20

AUTOLEVELING SUSPENSIONS (AB7Z7917)	
Amplitude of noise	As per Standards 9.90110
Number pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test (with air conditioner off)	Simulated input signals for: motor running at minimum rpm, shift gear in parking (for cars with automatic gear), car speed zero, parking break released, active control unit on "STAND-BY", with remote activation by the switch of the parking brake.
Parameters monitored	<ul style="list-style-type: none"> - Fault warning lights for loaded and unloaded. - Output signals from sensors. - Other possible parameters, judged useful for diagnostic tests of the device examined
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F1):</p> <ul style="list-style-type: none"> - Fault warning light lit - Output signals from sensors out of tolerance limits. <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 21

CONTROLLED SHOCK ABSORBING SUSPENSIONS (AB7ZY924)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of device under test	<p>Simulated input signals for a speed value to keep the controlling system in the range for "Automatic control"</p> <p><u>Condition 1:</u> button in position "AUTO" and suspensions in conditions: "SOFT"</p> <p><u>Condition 2:</u> button in position "AUTO"</p> <p>Simulated emergency braking (braking circuit contact shorted) so as to shift suspensions to condition "HARD".</p>
Parameter monitored	<ul style="list-style-type: none"> - Action of control solenoid valves - System fault warning light - Other possible parameters, judged useful for diagnostic tests of the device examined
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F2):</p> <ul style="list-style-type: none"> - Changes of working conditions of the suspension system from the setting assigned (AUTO / HARD / SOFT) - Faulty activity of controlling solenoid valves - System fault warning light lit <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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HELP 22

A.B.S. (AB7ZY918)	
amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Operating conditions of the vehicle	Simulated input signals for: <u>Condition 1:</u> simulated braking with ABS intervention <u>Condition 2:</u> simulated braking without ABS intervention
Parameters monitored	- Command signals for solenoid valves (when possible) - Fault warning light - Other possible parameters, judged useful for diagnostic tests of the device examined
<p>NOTES Exciters that can be activated with a cycle simulating braking conditions are attached to electromagnetic pickups of the phonic wheel (LaCour) producing ABS intervention. Particular characteristics of this cycle are agreed with the supplier.</p> <p>FAULTY CONDITIONS:</p> <ul style="list-style-type: none"> - Unwanted fluctuations of the command signal for solenoid valves at conditions 1 and 2 (Functional class F2); - Fault warning light lit (Functional class F2); - Solenoid valves opening at normal braking conditions (Functional class F3). <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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AIRBAG (AB7ZY759)	
Amplitude of noise	As per Standards 9.90110
Number of pulses (test duration)	As per Standards 9.90110
Parameters monitored	<ul style="list-style-type: none"> - Fault indicator. - Other possible parameters, judged useful for diagnostic tests of the device examined
<p>NOTES</p> <p>FAULTY CONDITIONS (Functional class F3): Fault indicator lit (check with Fiat/Lancia tester the errors recorded).</p> <p>Other possible testing conditions for special cases not indicated for routine testing, and a consequent different evaluation of faulty conditions, can be considered and assessed with the supplier and with the system RSC as the need arises.</p>	

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