International Standard 8093

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Road vehicles — Diagnostic testing of electronic systems

Véhicules routiers — Diagnostic des systèmes électroniques

First edition — 1985-04-01

UDC 629.113 : 620.1.05 **Ref. No. ISO 8093-1985 (E)**

Descriptors : road vehicles, electronic circuits, electronic components, diagnosis, specifications.

Price based on 3 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8093 was prepared by Technical Committee ISO/TC 22, *Road vehicles*.

Printed in Switzerland

Road vehicles — Diagnostic testing of electronic systems

1 Scope

This International Standard defines diagnostic provisions applicable to electronic systems in road vehicles.

2 Field of application

This International Standard applies to electronic systems including electronic control modules, associated input sensors, output actuators and indicators.

The measurement ranges specified exclude certain devices for which specific test equipment is required.

It does not apply to those systems which have built-in diagnostic capabilities and do not require compatibility with off-board equipment.

3 Reference

ISO 4092, *Road vehicles — Diagnostic systems for motor vehicles — Vocabulary.*

4 Definitions

For the purpose of this International Standard, the definitions of ISO 4092 apply.

5 General requirements

Where the functions to be tested are specified by the vehicle manufacturer, the test shall be carried out in accordance with the manufacturer's instructions, which shall take into account the principles of 5.1 to 5.3.

5.1 Accessibility of electronic systems

The electronic components of the system to be tested shall be designed so that it is possible to make the necessary connections to the test equipment. Relevant operational circuits shall be easily accessible and identifiable for test purposes. This may be made possible through the input and output connectors or by special connector(s).

5.2 Simulation of vehicle generated input signals

If output signals have to be observed under specific operating conditions, the possibility of substituting or overriding input signals is required.

5.3 Signals in output lines

Consideration should be given to the fact that, in some installations, output lines may also serve as input lines, and in that case shall conform to 5.2.

6 Requirements for the measuring equipment

Table

No.	Parameter	Range	Resolution (see 6.1)	Accuracy (see 6.2) a/b	Comments
1	DC voltage	0 to ±20 V	0,01 V	0,5/1,5	Input impedance : $R \geqslant 100$ kΩ $C \leqslant 0{,}01$ µF
		0 to ±50 V	0,1 V	0,5/1,5	
2	AC voltage	0 to ±20 $V_{ØP}$	0,2 V	5/5	Frequency : 0 to 20 kHz Input impedance : $R \geqslant 100$ kΩ $C \leqslant 0{,}001$ µF —
		0 to ±400 $V_{ØP}$	4 V	5/5	Measured at ignition coil primary terminal connected to the switching element, or equivalent terminal
3	DC current	0 to ±1 A	1 mA	0,2/2,5	Shunt $R \leqslant 10$ mΩ
		0 to ±20 A	20 mA	0,2/2,5	Shunt $R \leqslant 2$ mΩ
4	Resistance	0 to 100 Ω	0,1 Ω	0,2/5	Two wire systems — measuring current : ⩽ 10 mA
		0 to 10 kΩ	10 Ω		
		0 to 1 MΩ	1 kΩ		
5	Inductance [1]	0 to 100 mH	1 mH	10/5	Measuring frequency : 1 to 5 kHz Measuring current : ⩽ 1 mA
		0 to 1 H	10 mH		
6	Frequency	0 to 1 kHz	1 Hz	0,2/1	—
		0 to 100 kHz	100 Hz		Trigger level : (3 ±0,5) V
7	Time	0 to 10 ms	0,01 ms	0,2/1	Trigger level : (3 ±0,5) V —
		10 to 100 ms	0,1 ms		Min. retriggering time : 10 ms
		0,1 to 1 s	1 ms		
		1 to 10 s	10 ms		
8	Pulse ratio	5 to 95 %	0,1 %	2,5/−1	Trigger level : (3 ±0,5) V Min. retriggering time 0,5 ms Frequency range : 1 to 100 Hz
		20 to 80 %			1 to 300 Hz
		40 to 60 %			1 to 600 Hz
		5 to 95 %			1 to 1 000 Hz

1) The values given only apply if the inductive component under test meets the following requirements :

$$\frac{\text{Resonant frequency of component}}{\text{Measuring frequency}} > 30$$

$$\frac{\text{Magnetic saturation current}}{\text{Measuring current}} > 30$$

$$Q = \frac{1}{R}\sqrt{\frac{L}{C}} > 10$$

6.1 Resolution

Resolution is taken to mean the smallest change of parameter value resulting in a discernible display change (which requires a minimum display of 3 digits).

In the case of analogue displays, 1/5 of the scale division value is understood to be the resolution.

6.2 Accuracy

The figures given in the column accuracy (see the table) allow the worst case error to be calculated.

Measuring errors are caused by different factors. There are constant errors over the full measuring range and their values can be specified as a percentage of the full scale value. There are also errors proportional to the measured values.

For a given range and a given measured value within that range, the worst case error, E, is given by the equation

$$E = \left(\frac{a}{100}\right)R + \left(\frac{b}{100}\right)X$$

where

a is the constant error coefficient;

b is the proportional error coefficient;

R is the full scale value;

X is the measured value.

For the error coefficients, a and b, the following preferred values should be used :

0,1; 0,2; 0,5; 1; 1,5; 2,5; 5; 7,5; 10.

These are the worst case values in the temperature range 0 to 50 °C.