



Engine Control Unit

KES D-A872

(EST.) 1991-12-20

(REV.) 1992-04-25

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1. Scope of Application

This standard specifies a control unit(hereinafter referred to as the "unit") laid out, in the compartment and used for the powertrain control system for automobiles.

2. Purpose

This standard aims at securing proper quality by standardizing specifications.

Remark: This standard and a drawing communicate together Kia's requirements.

3. Report of Evaluation Result

The result of quality evaluation at each stage from the development to mass production shall be submitted to Kia according to the Appendix.

4. Definition of Terminology

(1) Performance

A quantitative rate, including the performance indicated in the drawing, for necessary capacity of a product required to satisfy its usage.

(2) Malfunction

The product output that is different from the output indicated in the drawing when the product is worked under the working condition specified in the evaluation method in item 7.

(3) Smoking

Generation of smoke from the unit in excess of a cigarette

(4) Ignition

Flame coming out of the unit

(5) Circuit designated for testing

Evaluation circuit simulating the connections of power source, input sensor and load according to the outside connection diagram

- (6) ON switch
Conductive state of a switch
- (7) Standard bracket
General bracket used for various devices and designated by the concerned engineering department and the supplier.

5. Specifications Indicated in Drawings

- (1) Performance (including tolerance)
- (2) Installation condition
- (3) Evaluation temperature T1(°C), T2(°C), T3(°C), T4(°C)
- (4) Outside connection diagram (test circuit)
- (5) Variable Vsl (V) and Tsl (msec) for pulse waveform of power source
- (6) Necessity of performance evaluation following abnormal voltage and resistance (A) test
- (7) Input device condition for an working test in 7.4
- (8) Performance evaluation method
- (9) Bracket installation in 7.4.2

6. Evaluation Standard

Evaluation standard of the unit shall conform to the Table 1.

Remark 1. The way of reading evaluation items and methods in Table 1 shall conform to the following example.

Example :

Evaluation Item		Evaluation Method	
Dura- bility	Vibration resistance	1st evaluation	7.5.1 1st evaluation method
	• Operating force of slider	2nd evaluation (Evaluation item tested after evaluating the vibration resistance)	• 7.3.1 2nd evaluation method
	•• Noise	3rd evaluation (Evaluation item tested after evaluating the operating force)	•• 7.3.7 3rd evaluation method

Remark 2. The quality rank shall be represented by A, AR, B, or C.
The definitions shall conform to KMS Q410001(Determination and Procedure of Quality Ranking).

Table 1

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	Radiant noise	Inductive voltage of the radio antenna shall be 20 dB μ V or less at AM band and 0 dB μ V or less at FM band. Shall have no abnormality after testing the unit under the vehicle condition.	B	7.2.1
Stren- gth	Impact resistance	Shall have no cracks on the body and parts	A	7.3.1
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Terminal strength	Shall have no cracks on the exterior and body. No deformation damaging the performance of C/U.	A	7.3.2
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
Envir- onmen- tal resis- tance	Vibration resistance	Shall have no malfunction nor abnormality during the test.	A	7.4.1
	Sweep vibration resistance	Shall have no cracks on the exterior, body, and parts. No deformation damaging the performance of C/U.	A	7.4.2
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Working durability at high temperature	Shall have no malfunction during the test	A	7.4.3
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Environmental resistance	Working durability at low temperature	Shall have no malfunction during the test	A	7.4.4
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	High temperature exposure resistance	Shall have no cracks on the external surface and body No deformation damaging the performance of C/U.	A	7.4.5
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Low temperature exposure resistance	Shall have no cracks on the external surface and body No deformation damaging the performance of C/U.	A	7.4.6
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Thermal shock resistance	Shall have no cracks on the external surface and body No deformation damaging the performance of C/U.	A	7.4.7
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Humidity resistance	Shall have no malfunction during the test Shall have no cracks on the external surface and body No deformation damaging the performance of C/U.	A	7.4.8
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Dusts resistance	Shall satisfy the performance tolerance indicated in the drawing	A	7.4.9
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Environmental resistance	Abnormal voltage resistance (A)	No smoke nor ignition during the test	A	7.4.10
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Abnormal voltage resistance (B)	No smoke nor ignition during the test	A	7.4.11
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Abnormal voltage resistance (C)	No smoke nor ignition during the test	A	7.4.12
	Earth floating resistance	No smoke nor ignition during the test	A	7.4.13
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Water resistance	No smoke nor ignition during the test	A	7.4.14
	• Performance	Shall satisfy the performance tolerance indicated in the drawing	A	• Conform to the drawing
	Strong electromagnetic field resistance	Shall have no malfunction while performing the test. Shall have no abnormality after testing the unit under the vehicle condition.	A	7.4.15
	Noise resistance	Shall satisfy one of the following three standards after applying noise: (1) At the moment of having noise at the input part of AC-DC converter, max. voltage level shall be (1 bit or same X 0.5) or less. (2) At the moment of having noise at the input of comparison measuring instrument, max. voltage level shall be (tolerance X 0.5) or less.	A	7.4.16

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Environmental resistance	Noise resistance	(3) The output signal of the C/U shall satisfy the tolerance indicated in drawing.	A	7.4.16
	Noise durability	To satisfy the tolerance of the performance indicated in the drawing.	A	7.4.17
	Static electricity resistance	To satisfy JASO D-001	A	7.4.18
	Variation of power voltage resistance	Shall have no malfunction during test	A	7.4.19

7. Evaluation Standard

7.1 Common evaluation standard

7.1.1 Standard atmospheric condition for testing

Unless otherwise specified, the standard atmospheric condition shall be a standard temperature condition of 20°C, class 15(20 ± 15°C) and a standard humidity condition of 65%, class 20(65 ± 20%) specified in KS A 0006(Standard Atmospheric Conditions for Testing).

7.1.2 Temperature tolerance

When the evaluation temperature is specified in this standard but the tolerance are not specified, apply temperature class 5(± 5°C) of KS A 0006.

7.1.3 Test voltage

Unless otherwise specified, test voltage of 12V system and 24V system shall be 14.5 ± 0.5V and 28.5 ± 0.5V, respectively.

7.2 Performance

7.2.1 Radiant noise

Measure the atmospheric radiant electric field strength at the position 50cm away from the unit. When this measurement method is not applicable, evaluate the radiant noise in the vehicle.