

KES

Control Unit for Air Conditioning

KES D – C457

(EST.) 1991 – 05 – 30

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1. Purpose

This standard is to have proper quality by standardize options.

Remark : This standard notifies the option paper and requesting options from our company.

2. Scope of Application

This standard determines controlling unit for air conditioning (C/U from now on).

3. Evaluation Result Report

From developing to manufacturing, submit quality evaluation result by each level to KIA according to the appendix.

4. Determination of Terms

(1) Performance

Expressing amount of ability that is needed to satisfy the purpose of use.

(Accuracy included)

Ex : Buzzer's buzzing time : 3.0 ± 0.5 s

(2) Function

Expressing characteristics of ability that is needed to satisfy the purpose of use.

Ex : It buzzes while it is pushed.

(3) Operating

It satisfies the functions that drawing indicates.

(4) Normal Operation Range

Environmental state that guaranties the performance that drawing indicates.

(5) Operation Range

Environmental state that guaranties the functions that drawing indicates.

(6) Maintaining Range

Temperature that guaranties performance and functions after leaving it without power

(7) Vehicle Condition

Condition that connector is installed to the direction indicated on drawing.

(8) Set Test Circuit

Testing circuit that connects power and load according to the system indicated on drawing.

(9) Malfunction

Operating as other than the drawing indicates

(10) Heating Element

Element that emits heat such as power transistor or resistor

(11) Smoking and Firing

Smoking : When a cigarette burns, smoke comes out of the case.

Firing : Fire comes out of the case.

(12) Different Noise

Abnormal noise

(13) Short Symbols

T1 : Minimum-maintaining temperature

T2 : Minimum-operating temperature

T3 : Minimum normal operation temperature

T4 : Maximum normal operation temperature

T5 : Maximum operation temperature

T6 : Maximum maintaining temperature

V1 : Minimum-operating voltage

V2 : Minimum normal operation voltage

V3 : Maximum normal operation voltage

V4 : Maximum operating voltage

VOF: Power voltage when system stops

12 V system → 12.0 V

24 V system → 28.3 V

VON : Power voltage when system performs

12 V system → 14.5 V

24 V system 28.3 V

Here, the allowance of temperature T1 - T6 and voltage V1 – V4 shall be each $\pm 2^\circ\text{C}$ and $\pm 0.5\text{V}$.

5. Options indicated on Option Paper Drawing**(1) Nominal Voltage****(2) Nominal load and load type****(3) Performance and Function**

Indicate its performance and function as following.

Ex :

(a) Performance that shall be needed when engine starts (Cranking).

(b) Performance that shall be needed other than when engine starts (Cranking).

- (4) System Drawing
System drawing that includes fuse capacity and bulb capacity.
- (5) Input Signal
Needed input signal from various sensors and actuators.
- (6) Dark current
Whether there is supply from B power supply for evaluation
- (7) Name of Each Terminal
- (8) Output terminal voltage drop amount
Voltage drop amount between each output terminal and power supply or earth terminal
- (9) Power Wave Shape
- (10) Shape, appearance, install direction
- (11) Durability
Durability mode, durability mode cycle or durability time and load
- (12) Need of performance evaluation of reversed power connection test
- (13) Special environment evaluation condition
- (14) Install location
- (15) Using part of passenger or truck
- (16) Performing mode when performing test for low, high and extremely high temperature resistance

6. Evaluation Standard

Follow table 1 for C/D evaluation standard.

Remark 1. Direction to read evaluation items and evaluation rules on table 1 shall be as following.

Evaluation Item			Evaluation method	
Dura- bility	Vibration	First evaluation	7.5.1	First evaluation method
	Resistance			
	· Operating force of slider	Second evaluation (Evaluation item tested after evaluating vibration resistance)	· 7.3.1	Second evaluation method
	· Linking	Third evaluation (Evaluation item tested after evaluating operating force)	·· 7.3.7	Third evaluation method

Remark 2. Quality grade shall be indicated by A, AR, B or C.
Follow KES Q-A002 (Quality grade decision and operation)

Table 1.

Evaluation item		Evaluation standard	Quality rank	Evaluation method
—	Dark current	It shall be indicated on drawing.	C	7.2
—	Insulating resistance	Minimum 1 MΩ	C	7.3
—	Temperature rising	It shall be less than 40°C	C	7.4
Malfunctioning due to unstable power	When engine starts (A) for the sample that ACC and IG2 are not connected	There shall be no malfunctioning.	B	7.5.1
	When engine starts (B) for the sample that ACC and IG2 are connected	There shall be no malfunctioning.	B	7.5.2
	Power ripple	There shall be no malfunctioning.	B	7.5.3
	Voltage difference	There shall be no malfunctioning.	B	7.5.4
	Ignition key chattering	There shall be no malfunctioning.	B	7.5.5
	Momentum power disconnection	There shall be no malfunctioning.	B	7.5.6
—	Output voltage drop	It shall be indicated on drawing.	C	7.6
—	Link	There shall be no linkage.	C	7.7
—	Appearance	There shall be no shape change, cracks or shrinkage.	C	7.8
Electrical environment resisting	Surge resisting	1. It shall satisfy the performance and function indicated on drawing. 2. There shall be no breakage.	B	7.9.1
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Power reverse connection resisting	There shall be no smoking and firing. *	A	7.9.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	Inside wrong power(A)	1. It shall satisfy the performance and function indicated on drawing. 2. There shall be no smoking and firing.	A	7.9.3

Table 1 (Continued)

Evaluation item		Evaluation standard	Quality rank	Evaluation method
Electrical environment resisting	• Insulating resistance	Minimum 1Mohm	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Over voltage resisting(B)	There shall be no smoking and firing. *	A	7.9.4
	Over current resisting	There shall be no smoking and firing. *	A	7.9.5
	Earth unstability resisting	There shall be no current overflow.	B	7.9.6
	Power unstability	1. There shall be no malfunctioning or damage. 2. It shall satisfy the performance and function after evaluation.	B	7.9.7
Strength	Fix strength	There shall be no breakage such as shape change and damage.	B	7.10.1
	Cable strength (For the testing sample that cable shows on)	There shall be no damage, mis-linkage, lack, or bad soldering.	C	7.10.2

* If this evaluation standard does not satisfy domestic developing level and abroad 2PP level, execute the following: Kia shall decide approval or rejection of report after evaluating car assembly.

Table 1 (Continued)

Evaluation item		Evaluation standard	Quality rank	Evaluation method
Strength	Fixed strength For the testing sample with J connector	1. It shall satisfy the performance and function indicated on drawing. 2. There shall be no damage or shape change.	C	7.10.3
Durability	Vibration durability	There shall be no shape change, damage or floating.	B	7.11.1
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Performance durability	It shall satisfy the performance and function indicated on drawing.	B	7.11.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
Environment resisting	Freeze resisting	It shall satisfy the performance and function indicated on drawing.	B	7.12.1
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Heat resisting	It shall satisfy the performance and function indicated on drawing.	B	7.12.2
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Functioning at low temperature	1. There shall be no malfunctioning. 2. It shall satisfy the performance and function indicated on drawing.	B	7.12.3
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6

Table 1 (Continued)

Evaluation item		Evaluation standard	Quality rank	Evaluation method
Environment resisting	Functioning at high temperature	1. There shall be no malfunctioning. 2. It shall satisfy the performance and function indicated on drawing.	B	7.12.4
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than $\pm 20\%$.	C	• 7.6
	Short term functioning at extremely high temperature	Report the test result to MC.	B	7.12.5
	Heat resistance cycle	1. There shall be no malfunctioning. 2. It shall satisfy the performance and function indicated on drawing.	B	7.12.6
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than $\pm 20\%$.	C	• 7.6
	Cycle of heat resistance and humidity	1. There shall be no malfunctioning. 2. It shall satisfy the performance and function indicated on drawing.	B	7.12.7
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than $\pm 20\%$.	C	• 7.6
	Heat impact resisting	It shall satisfy the performance and function indicated on drawing.	B	7.12.8
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than $\pm 20\%$.	C	• 7.6

Table 1 (Cntinued)

Evaluation item		Evaluation standard	Quality rank	Evaluation method
Eviro- nment resisting	Humidity resisting	1. There shall be no malfunctioning. 2. There shall be no current leakage. 3. It shall satisfy the performance and function indicated on drawing.	B	7.12.9
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Vibration resisting	It shall satisfy the performance and function indicated on drawing.	B	7.12.10
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6
	Water resisting	It shall satisfy the performance and function indicated on drawing.	B	7.12.11
	• Dark current	It shall be indicated on drawing.	C	• 7.2
	• Insulating resistance	Minimum 1 MΩ	C	• 7.3
	• Output terminal voltage drop	Altering rate against the initial value shall be less than ±20%.	C	• 7.6

7. Evaluating Rule

7.1 Common Condition of Evaluation

7.1.1 Standard condition of testing site

Unless it is determined, the standard conditions are standard temperature condition 20°C, grade 15 (20±15°C) and standard humidity condition 65%, grade 20 (65±20%) of KS A 0006 (Standard condition of testing site).

7.1.2 Installed testing sample condition

When it is determined that the testing sample is installed in same condition as the real car, it shall be installed by installing instrument with the same type of car state.

7.1.3 Power Voltage

Applying voltage is nominal unless it is determined.