

KES

Control Unit

KES D-C654

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1. Purpose

This standard of development aims at securing proper quality by standardizing specifications.

2. Scope of Application

This standard specifies the electronic circuit control unit for automobile (hereinafter referred to as C/U).

3. Report of Evaluation Result

The quality evaluation results at each stage from development to mass production shall be submitted to KIA according to the Appendix.

4. Meaning of Terminology

- (1) Performance: Quantitative expression of necessary capability to fulfill the purpose (including degree).
Example: Buzzing time of buzzer 3.0 ± 0.5 sec.
- (2) Function: Qualitative expression of necessary capability to fulfill the purpose.
Example: On inserting the key, buzzer should sound.
- (3) Operation: To display the function specified in drawing.
- (4) Performance Warrant Range: Atmospheric conditions which can ensure the performance specified in drawings.
- (5) Operation warrant range: Atmospheric conditions which can ensure the operation specified in drawings.
- (6) Preservation warrant range: temperature condition which can ensure performance, function and operation (with power not applied).
- (7) Vehicle attaching condition: The conditions where connectors are assembled or attached from the attaching direction specified in drawings.
- (8) Specified test circuit: Test circuit which simulates the connection relations between power source and the load according to the system figure in drawing.
- (9) Malfunction: The functions other than the ones specified in drawing.
- (10) Heating Element: Those elements which generate heat such as Power TR or Resistor
- (11) No Smoke nor Ignition: There should be no more smoke than that which 1 cigarette emits when lit and left alone. And, no flame should be outside the case.
- (12) Noise: Unexpected sound.
- (13) Symbol

T_N : Normal Temperature ($20 \pm 15^\circ\text{C}$)

T_T : Evaluation Atmospheric Temperature

T_1 : Maximum Value of Operation Warrant Temperature

T_2 : Maximum Value of Operation Warrant Temperature

T_3 : Maximum Value of Performance Warrant Temperature

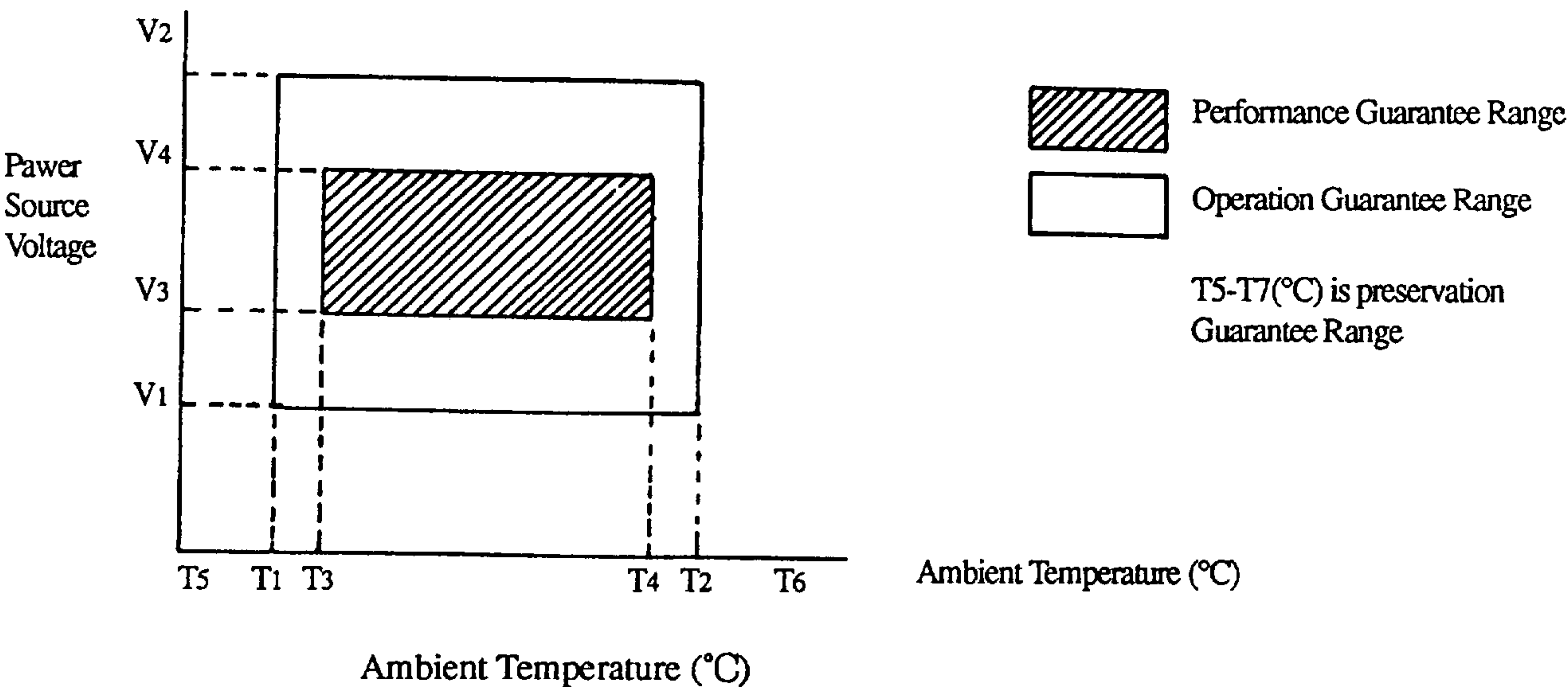
- T_4 : Maximum Value of Performance Warrant Temperature
 T_5 : Maximum Value of Preservation Warrant Temperature
 T_6 : Maximum Value of Preservation Warrant Temperature
 V_R : Evaluation Voltage
 V_1 : Minimum Value of Operation Warrant Temperature
 V_2 : Minimum Value of Operation Warrant Temperature
 V_3 : Minimum Value of Performance Warrant temperature
 V_4 : Minimum Value of Performance Warrant Temperature
 V_{OF} : Power Source Voltage During Engine Stand-Still
12V system - 12. Φ V, 24V system - 24.0 V
 V_{ON} : Power Source Voltage During Engine Revolution
12V system - 14.5 V, 24V system - 28.3V
 I_R : Rated Current
 I_T : Evaluation Current
 H_T : Evaluation Humidity

However, the temperature tolerance of T_1 - T_6 is $\pm 2^\circ\text{C}$, and voltage tolerance of V_1 - V_4 , V_{OFF} , V_{ON} is $\pm 0.5\text{V}$.

5. Specification Indicated in Engineering drawing

5.1 Warrant Range

- (1) Performance Guarantee Range Temperature: T_3 - T_4 ($^\circ\text{C}$), Voltage: V_3 - V_4 (Volt)
(2) Operation Guarantee Range Temperature: T_1 - T_2 ($^\circ\text{C}$), Voltage: V_1 - V_2 (Volt)
(3) Preservation Guarantee Range Temperature: T_5 - T_6 ($^\circ\text{C}$)



5.2 Rated Voltage

5.3 Rated Load and the Kinds of the Load

5.4 Performance: The performance shall be classified and instructed according to the following

- (1) The performance to be guaranteed during engine starting (during cranking)
- (2) The performance to be guaranteed other than engine starting

5.5 Function: The function shall be classified and instructed according to the following

- (1) The function to be guaranteed during engine starting (cranking)
- (2) The function to be guaranteed during engine stand-still and normal driving other than engine starting

5.6 System Drawing: The system drawing including fuse capacity and value capacity

5.7 Input Signal: Input signal from various sensors according to necessity

5.8 : Whether to supply power source B or whether to evaluate

5.9 Name of Each Terminal

5.10 Amount of Output Terminal Voltage Drop: The amount of voltage drop

5.11 Kinds of Power Source Variation: Kinds of power source wave form on engine starting

5.12 Shape Appearance Attaching Direction

5.13 Endurance: Endurance mode, No. of cycles of endurance mode, or endurance time, endurance load

5.14 Whether to Evaluate Performance after the Evaluation of Power Source Reverse Connection

5.15 Special Atmospheric Evaluation Conditions

5.16 Attaching Position

5.17 Whether to Measure the Case Temperature

6. Evaluation item, Evaluation method, Evaluation Standard

Evaluation item, evaluation standard and evaluation method to be in accordance with Table 1.

Remarks 1. How to read evaluation item and evaluation method shall be in accordance with the following example.

- 2. The quality ranks are represented by A, AR, B or C and its definition shall be in accordance with KES Q-A 002 (Determination and Use of Quality Rank).

6.1 Common Evaluation Conditions

(1) Temperature, humidity condition

Unless otherwise specified the standard atmospheric condition for testing shall be the normal temperature and normal humidity, that is grade 5 ($20\pm5^{\circ}\text{C}$) and grade 20 ($65\pm20\%$) respectively specified in KS A 0006 (Standard Atmospheric Condition for Testing).

(2) In case there is no temperature indication in evaluation condition.

After leaving evaluation item at normal temperature and normal humidity, start the test. In case there is temperature indication, start the test after leaving evaluation item at the specified atmosphere for more than 1 hour.

(3) How to set voltage

The evaluation voltage shall be set between C/U power source terminal and earth terminal when applying the load. However when applying the load, the normal power source variation between C/U power source terminals should be below 0.5 V.

(4) Operation during the evaluation

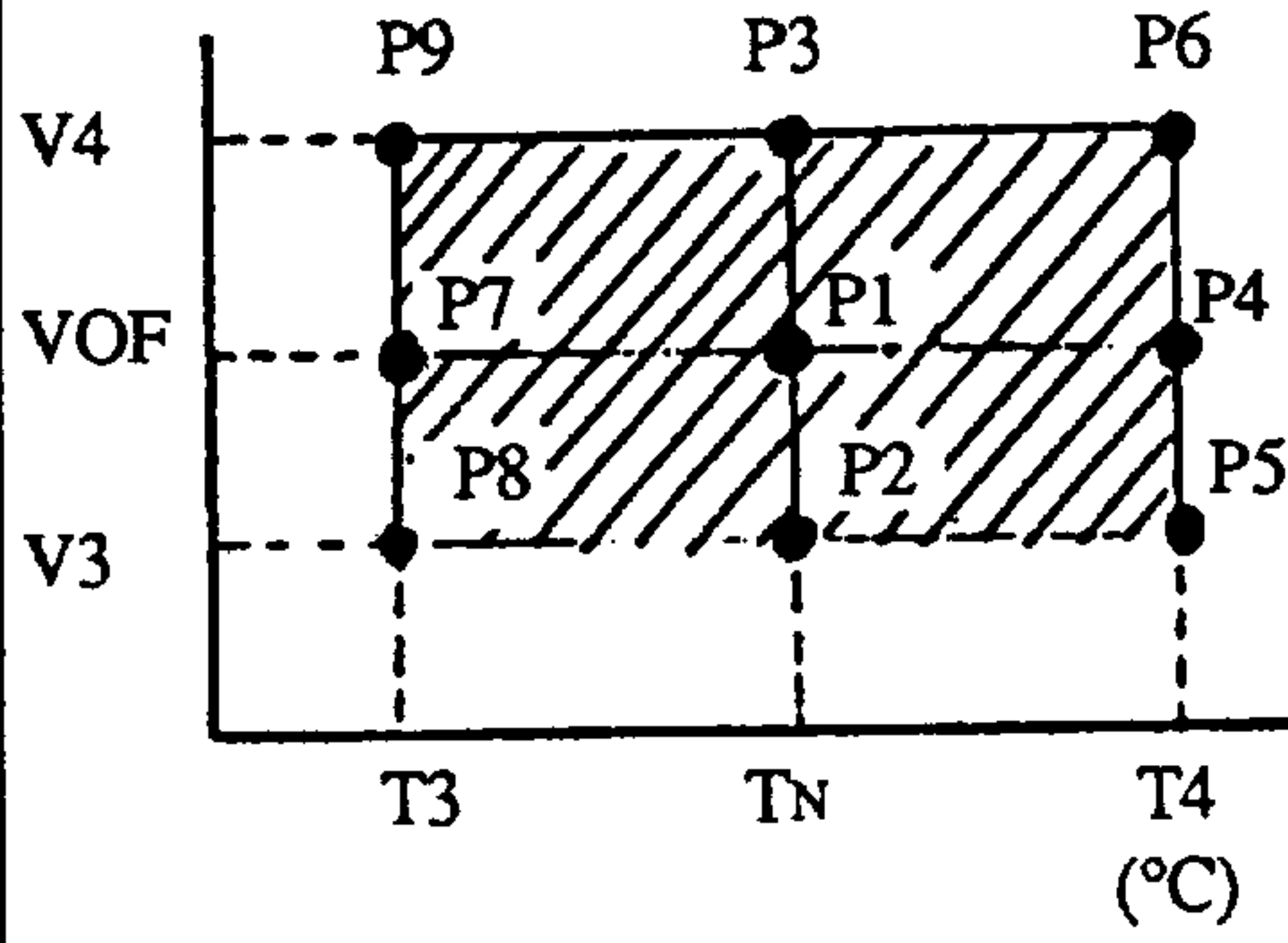
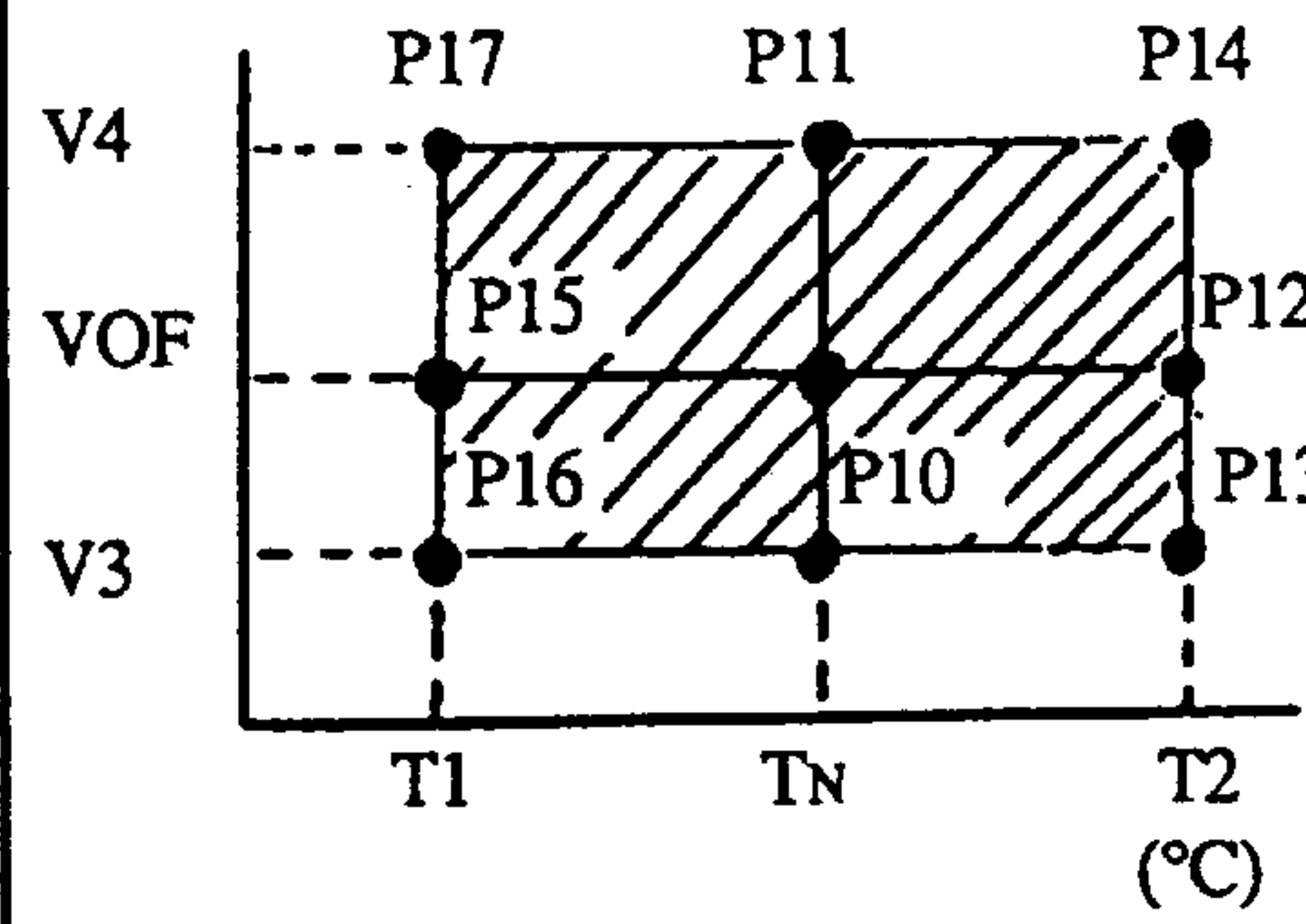
In case there are no indications in evaluation item of C/U operation, perform the evaluation according to endurance evaluation voltage, load, and operation mode as shown in 6.14.

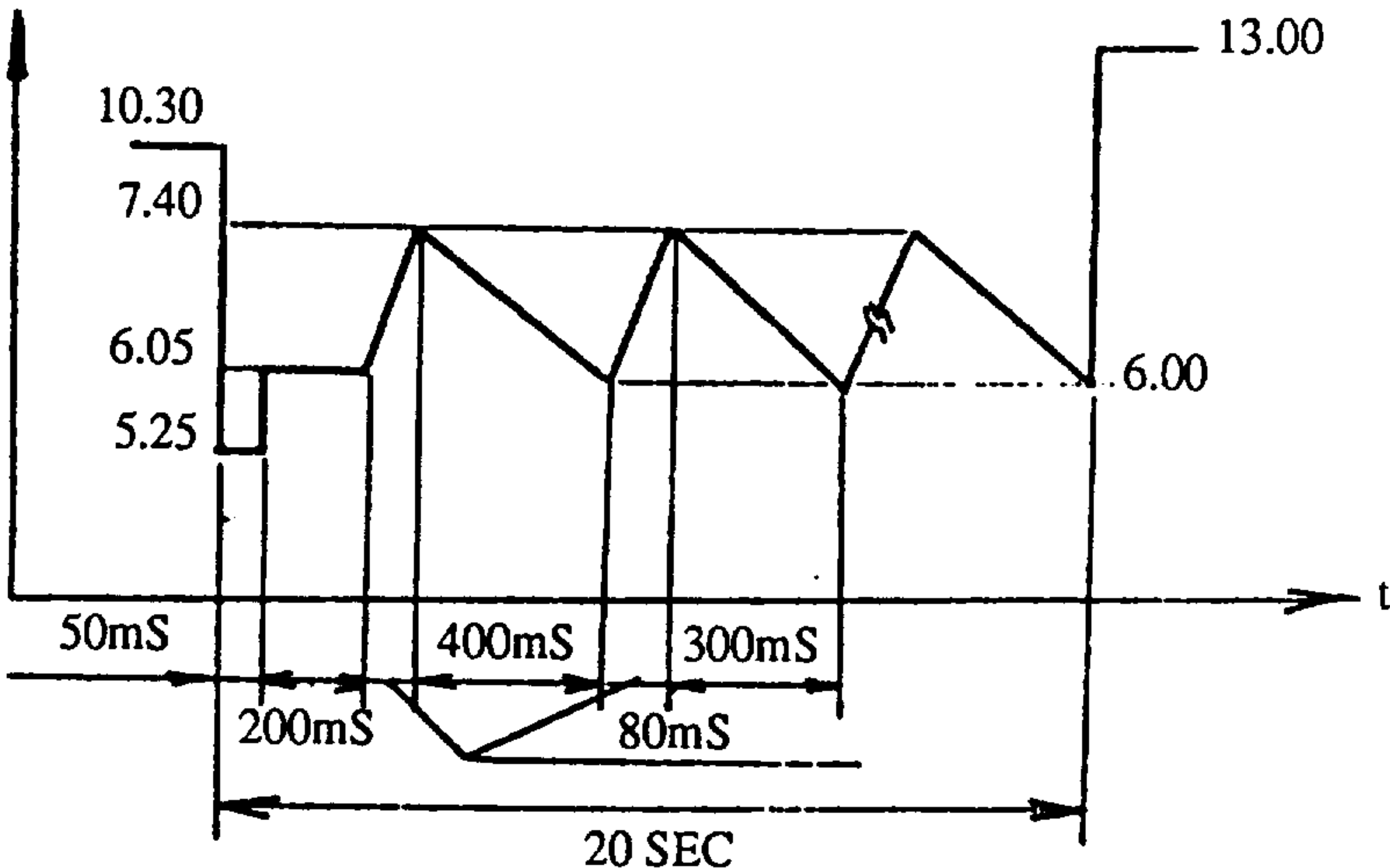
(5) The test circuit having no indication shall be the ones specified in the drawing.

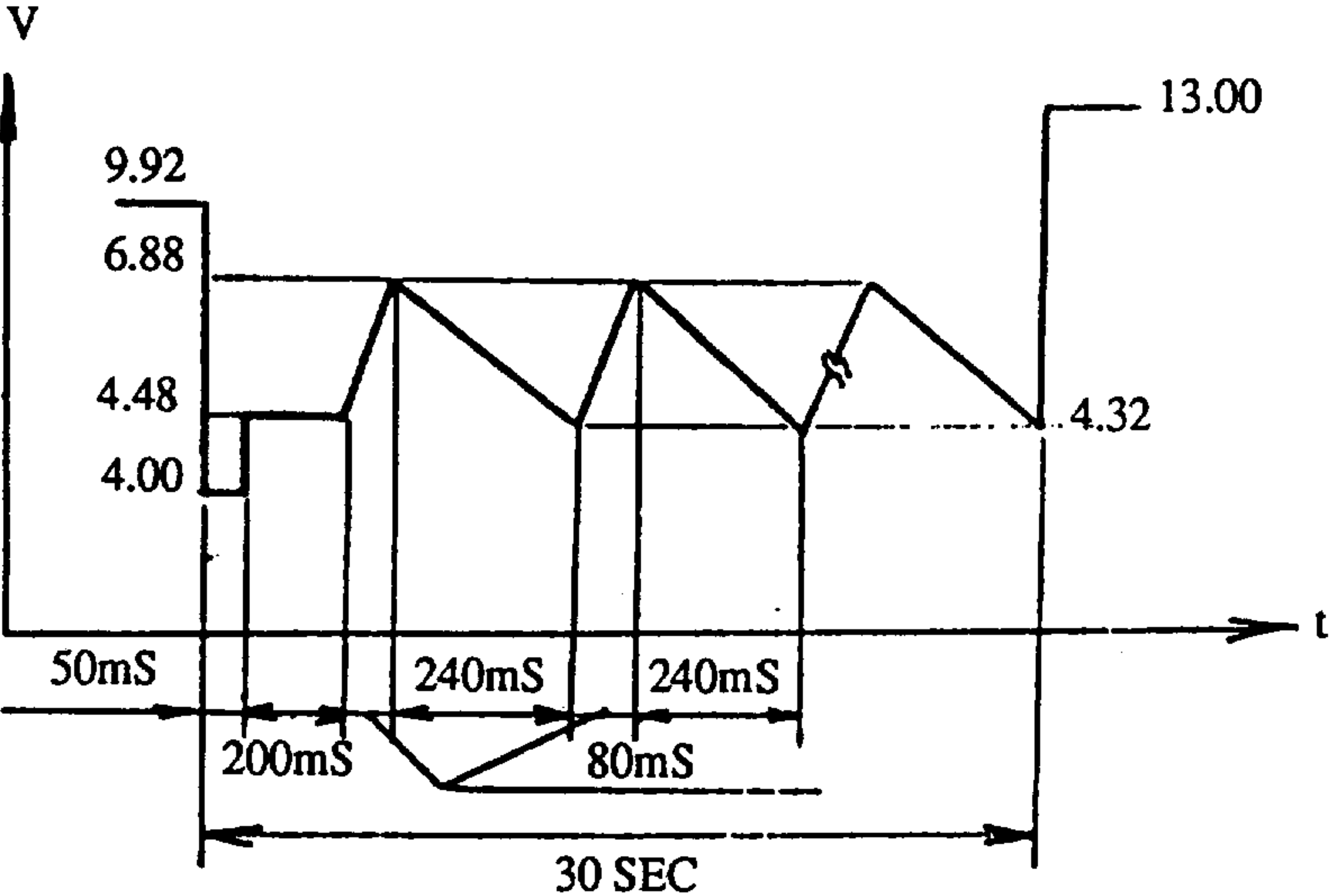
(6) Endurance load

Actual load when installed in the vehicle.

In case of no actual load, obtain load current wave form from KIA, make the current wave form, and perform evaluation after receiving the approval from KIA.

Evaluation No.	Evaluation Item	Evaluation Method	Evaluation Standard	Quality Rank	Remark
6.2	Performance	To be in accordance with following Figure			
6.2.1	Performance	Evaluate by applying the temperature and the voltage of P1-P9 as shown in below figure. 	To specify in the drawing	B	
6.2.2	Function	Evaluate by applying the temperature and the voltage of P10-P17 as shown in below figure 	To specify in the drawing	B	
6.3		Evaluate by applying the voltage of V_{OFF}. However, it is applicable only to the C/U of which voltage is supplied by power source B.	To specify in the drawing	B	

Evaluation No.	Evaluation Item	Evaluation Method	Evaluation Standard	Quality Rank	Remark
6.4	Malfunction due to power source variation.	Below power source wave form indicates 12V system, and when evaluating 24V system evaluate with two times as high voltage.	-	-	
6.4.1	Malfunction when engine starting (only applies to the model where ACC, IG2 is not connected C/U)	To evaluate by applying below voltage to each power source terminals according to the power source wave form a or b specified in the drawing. (a) 	Normal function	B	

Evaluation No.	Evaluation Item	Evaluation Method		Evaluation Standard	Quality Rank	Remark
	(b)					
6.4.2	Malfunction when engine starting (Only applies to the model where IG2 is connected C/U)	Apply below voltage to each power source terminal according to the power source wave form a or b specified in the drawing, and then evaluate at mode 1 and 2.		Normal function	B	
		Terminal	Mode			
			12			
		B, IG1, TNS	a or b a or b			
		ACC, IG2	VON 0			
			12			
6.4.3	Malfunction due to power source ripple	Evaluate by applying below voltage to each power source terminals		Normal function	B	