

KES

Alternator

KES D-A830

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1. Scope of Application

This standard specifies the Alternator with built in I.C Regulator (hereinafter referred to as the Alternator) for automobiles.

2. Purpose

This standard aims at securing proper quality by standardizing specification.

Remark: This standard and a drawing communicate together our requirements.

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 upon special request by Kia as well as at the specified submission timings.

4. Meaning of Terminology

- 1) Output characteristics during cool period: The output current when the Alternator voltage is 13.5V under the cool condition of the Alternator.
- 2) Output characteristics during hot period: The output current when the Alternator voltage is 13.5V under the hot condition of the Alternator with its temperature saturated.
- 3) Control voltage characteristics of the regulator: The Alternator terminal voltage controlled to be constant by the I.C. regulator.
- 4) Temperature slop characteristic of the regulator: The dependency of the regulated voltage on the atmospheric temperature of the Alternator.
- 5) Characteristics of the initial cutin speed: The speed of revolution at which point the Alternator begins to operate the charge indicator.
- 6) B Terminal(B): The terminal to which the power line is connected from the battery terminal (+).
- 7) L Terminal(L): The terminal to which the power line is connected from the charge indicator.
- 8) R Terminal(R): The terminal to which the power line is connected from the key switch.
- 9) S Terminal(S): The terminal to which the power line is connected in the voltage sensor part of the I. C regulator.
- 10) Diagnostic characteristics of the regulator: The alarm function activated when the breakdown mode of the Alternator is on.

5. Specification Indicated in Drawing

- 1) Output characteristics during cool period(guaranteed output characteristics, average capable output characteristics curve).
- 2) Output characteristics during that period (guaranteed output characteristics, average capable output characteristics curve).

- 3) Control voltage Characteristics of the regulator
- 4) Temperature slope characteristics of the regulator
- 5) Characteristics of initial cutin speed
- 6) Rated revolution speed, rated output current, continuous revolution speed limit
- 7) Maximum operational revolution speed, maximum output voltage, maximum revolution speed limit
- 8) Thermal resistance (atmospheric temperature, temperature limit of each part)
- 9) Electric fan in the Alternator mounted Automobile
- 10) Diode di and resistance r
- 11) Continuous operating time at excessive speed

6. Alteration of Specification

The alternator specification may be altered only after the revision of drawing or this standard including approved drawings.

7. Indication Method on Drawings

"The alternator specification shall conform to KES D-C830A" shall be entered into the specification column on the drawing. (The specification shall refer to the latest revision.)

※ In the case that the specifications other than those indicated in this standard are shown on the drawings, the drawings shall govern.

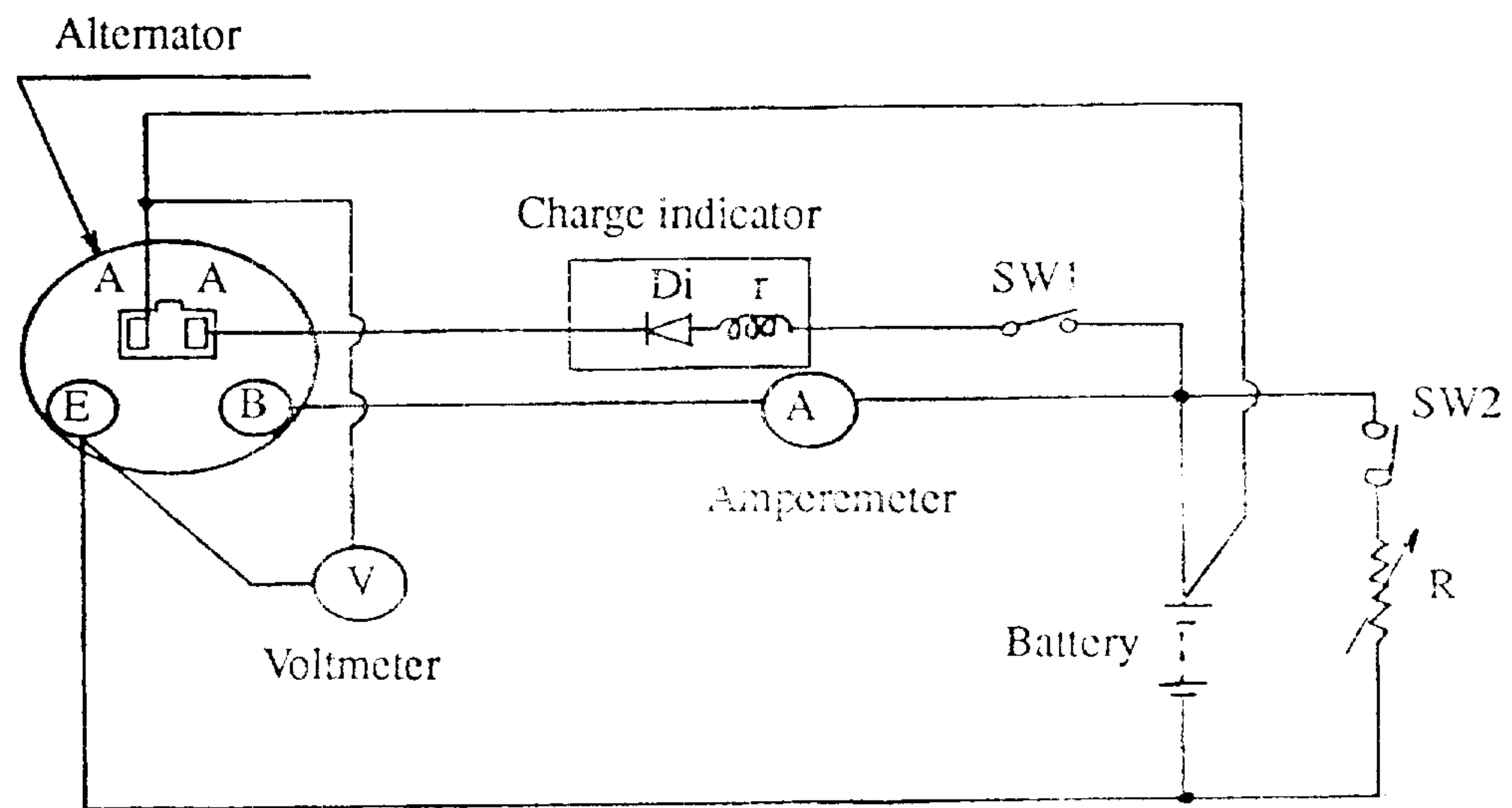
8. Standard Quoted:

- 1) KS D 9502 (Salt spray testing method)
- 2) KS R 0015 (Testing method for humidity resistance and water resistance of automobile parts)
- 3) KS A 0006 (Standard atmospheric conditions for testing)
- 4) JIS D 0270 (Rules of dust-proof and dust resistance testing for automobile parts)
- 5) KES Q A001 (Determination and procedure of quality ranking)

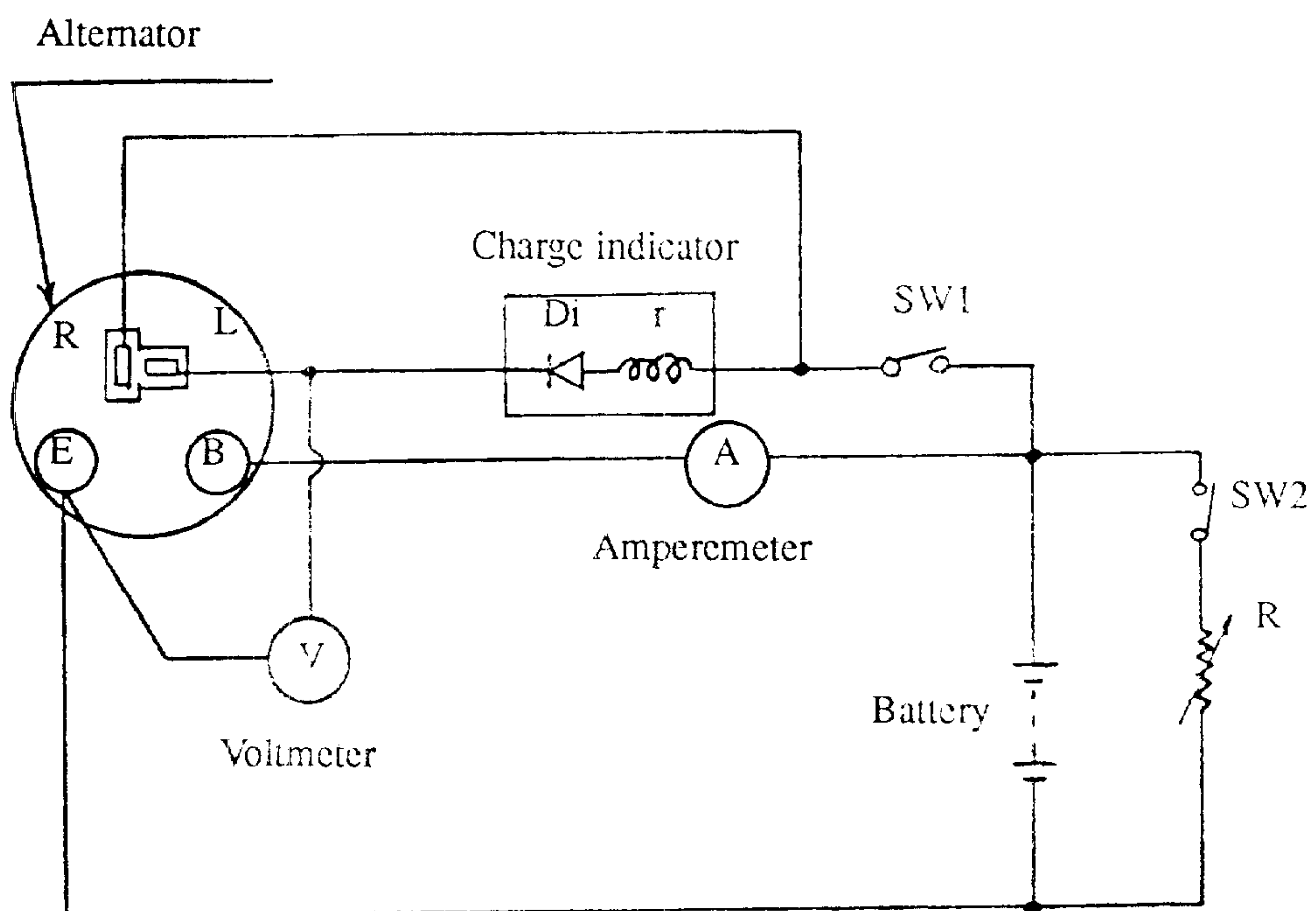
9. Evaluation Method

- (1) Unless otherwise specified in the evaluation method, the standard atmospheric conditions for testing shall be the normal temperature and normal humidity, that is the standard temperature grade 15 of 20°C ($20 \pm 1.5^{\circ}\text{C}$) and the standard humidity grade 20 of 65% ($65 \pm 20\%$). Also, the allowance of the temperature shall be, unless otherwise specified, $\pm 5^{\circ}\text{C}$.
- (2) The basic performance of the alternator shall be measured with the electric circuit shown in Table 1.

1) Battery sensor type alternator



2) L terminal sensor type alternator



* Remark: The resistance of the wire in the circuit shall be $10\text{m } \Omega$ or less between B terminal and the + terminal of the battery and $5\text{m } \Omega$ or less between E terminal and the + terminal of the battery.

Fig. 1 Alternator Circuit

No.	Evaluation Item		Testing Method	Evaluation Standard	Quality Rank	Sample Size	
						Develop-ment	Mass Produc-tion
9-1	Basic Performance	Output Characteristics During Cool Period	The switches SW1 and SW2 of the circuit shown in Fig.1 shall be set to ON position and the revolution speed shall be set to the rated speed indicated in the specification drawing. The output current shall be measured by adjusting the load resistance R so that the terminal voltage V of the alternator becomes 13.5V. The revolution speed shall be measured within 1 minute when high speed is reached beginning from low speed.	To conform to the standards indicated in the specification drawing.	B	5	5
9-2		Output Characteristics During Hot Period	The switches SW1 and SW2 of the circuit shown in Fig.1 shall be set to ON position and the revolution speed to 5,000 rpm. The output current shall be measured by adjusting the load resistance R so that the terminal voltage V of the alternator becomes 13.5V and operating continuously until the saturation temperature is reached (i.e.stable output). The measurement method shall be the same as that of 9.1.	To conform to the standards indicated in the specification drawing.	B	5	3
9-3		Control Voltage Characteristics of the Regulator	The switch SW1 of the circuit shown in Fig.1 shall be set to ON position and the revolution speed to 5,000 rpm.	To conform to the standards indicated in the specification drawing.	B	5	5

No.	Evaluation Item		Testing Method	Evaluation Standard	Quality Rank	Sample Size	
						Develop-ment	Mass Produc-tion
	Basic Performance		The terminal voltage of the alternator shall be measured at the charging current of 5A or less and under battery load.				
9-4		Temperature Slope Characteristics of the Regulator	The switch SW1 of the circuit shown in Fig.1 shall be set to ON position and the revolution speed to 5,000 rpm. The terminal voltage of the alternator when the atmospheric temperature is changed within the range of -30 ~ 110°C shall be measured. The charging current shall be 5A or less. The temperature slope of the regulator shall be calculated as follows: Temperature slope = $\frac{V1 - V2}{T1 - T2} \times 10^3 \text{ (mV/°C)}$ where; T1,T2: Atmospheric temperatures(°C) of the regulator V1:Regulator voltage (V) at T1 V2:Regulator voltage (V)at T2	To conform to the standards indicated in the specification drawing	B	5	

No.	Evaluation Item		Testing Method	Evaluation Standard	Quality Rank	Sample Size	
						Develop-ment	Mass Produc-tion
9-5	Basic Performance	External Load Characteristics of the Regulator	1) The switch SW1 and SW2 of the circuit shown in Fig.1 shall be set to ON position and the revolution speed to 5.000rpm. The terminal voltages of the alternator when the current is set to 90% of the rated current by adjusting the load resistance R and when the battery load was applied at the charging current of 5A or less with the switch SW2 put off shall be measured and their difference calculated. Also the switching frequency for each terminal voltage shall be measured. 2) After this, the voltage difference ΔV and the switching frequency when the atmospheric temperature is changed within the range of -30~110°C shall be measured in the same way. However, the load resistance R shall be adjusted so that the output current becomes: $(Rated\ output\ current) \times \left(1 - \frac{2}{100} \cdot \frac{T}{10} \right) \times 0.9$ T is the atmospheric temperature of the regulator.	Voltage difference shall be within the range of $\pm 0.5 V$. Switching frequency shall be 25 hz or more.		B	5

No.	Evaluation Item		Testing Method	Evaluation Standard	Quality Rank	Sample Size	
						Develop-ment	Mass Produc-tion
9-6	Basic Performance	Speed Characteristics of the Regulator	1) The switch SW1 of the circuit shown in Fig 1 shall be set to ON position and the changing current to 5A or less using battery load. The voltages at the revolution speed of 1,500 rpm and 10,000 rpm respectively and their difference shall be measured. 2) After this, the difference of the voltage ΔV when the atmospheric temperature of the alternator is changed within the range of $-30 \sim 110^{\circ}\text{C}$ shall be measured in the same way.	The voltage difference shall be within the range of $\pm 0.3\text{V}$.	B	5	
9-7		Excessive Voltage Characteristics of the Regulator	1) The switch SW1 of the circuit shown in Fig. 1 shall be set to ON position and the revolution speed to 12,000 rpm. Instead of the load resistance, the electric fan of the alternator-mounted automobile shall be attached and the switch SW2 shall be set to ON position. Then the voltage shall be measured when the connection between the alternator and the battery is cut off. 2) After this, the difference of the voltage ΔV when the atmospheric temperature of the alternator is changed within the range of $-30 \sim 110^{\circ}\text{C}$ shall be measured in the same way.	Less than 20V	B	5	

No.	Evaluation Item		Testing Method	Evaluation Standard	Quality Rank	Sample Size	
						Develop-ment	Mass Produc-tion
9-8	Basic Performance	Initial Cutin Speed	1) The switch SW1 of the circuit shown in Figure 1 shall be set ON position and the battery to voltage to 12V. Increasing the revolution of the alternator, the voltage between the terminals L and E shall be brought to 12V or more, at which point the speed of revolution shall be measured. However the specification for Diode Di and r shall be those indicated in the specification drawing. 2) After this, the speed of revolution when the atmospheric temperature of the alternator is changed within the range of -30~110°C shall be measured in the same way.	1) At standard atmospheric temperature, the measurement shall conform to the indicated value in the specification drawing. 2) When the temperature was changed within the range of -30~40°C, the speed of revolution shall be less than 120% of the one indicated in the specification drawing.	B	5	5