

KS

KOREAN INDUSTRIAL STANDARD

Starter switches for automobiles

KS R 5043 : 1986

Korean Agency for Technology and Standards
Ministry of Commerce, Industry and Energy

2, Joongang-dong, Kwachon-city,
Kyunggi-do, 427-010 Rep. of Korea

Translation without guarantee. In the event of any doubt arising,
the original standard in Korea is to be evidence

KOREAN INDUSTRIAL STANDARD

KS R 5043 : 1986

(confirmed in 1996)

Starter Switches for Automobiles

1. Applicable Scope : This standard defines starter switches (hereafter referred to as "Switches") for automobiles.

Remarks : The switches in this standard shall be as followings.

- (1) Ignition and starter switches of nominal voltage of 12V used for primary ignition circuits and starter circuits of gasoline automobiles, and those for opening/closing circuits at other electric apparatus.
- (2) Rotary ignition and starter switches for diesel automobiles, and those for opening/closing circuits at other electric apparatus.
Ignition and starter switches (rotary-type) for diesel automobiles are also described in the annex.
- (3) Any units or numerical values within parentheses { } are of the International Unit System (SI Unit) for reference only.

2. Classes and symbols : Classes and symbols of switches are classified according to type of conversions (refer to figure), maximum connection load, connection terminals and terminal symbols as shown in **table 1**.

Referred standards : KS A 0006 : Standard atmospheric conditions for testing

KS B 0211 : Limits of size and tolerances for metric coarse screw threads

KS B 0214 : Limits of size and tolerances for metric fine screw threads

KS C 1301 : Insulation resistance testers (Magneto generator operated)

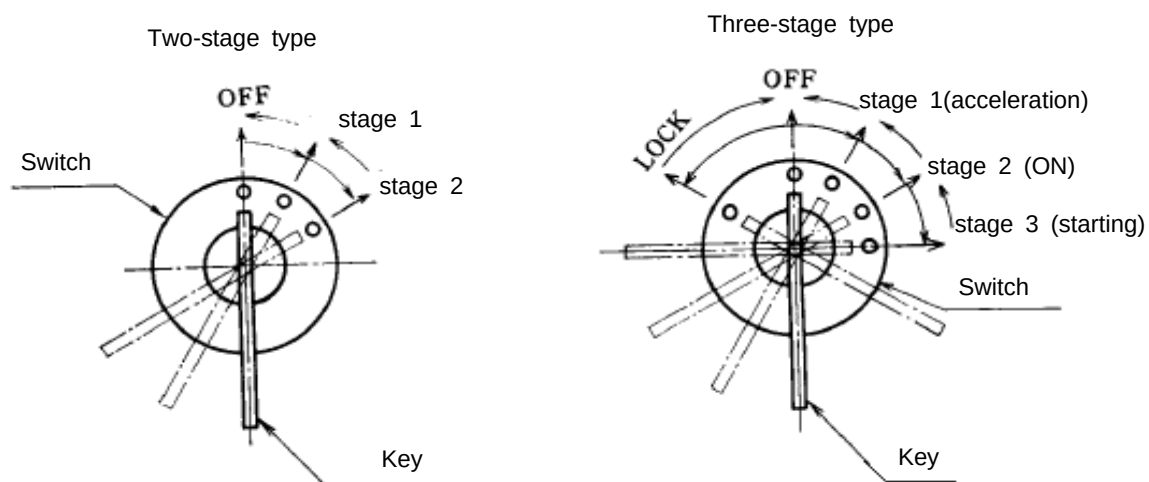
KS C 1302 : Insulation resistance testers (Battery operated)

KS C 1303 : Indication analogue electrical measuring instruments and their accessories

KS R 0013 : General rules of electroplating of automobile parts

KS R 1034 : Vibration testing methods for automobile parts

KS R 5016 : Cable terminals for automobiles



Figure

Table 1

Unit : W

Class	Type	Symbol	Existence of R terminal and volume of load	Connection terminals, terminal symbols and maximum loads				
				Battery	Ignition coil	Ignition coil (for starting) ⁽¹⁾	Starter relay or starter magnetic coil	Radios and air-conditioners
				B	1G	R	ST	ACC
G1 class	Two-stage type	1LR	R for low load installed	-	120	60	120	-
		1L	R for low load not installed	-	120	-	120	-
		1HR	R for high load installed	-	240	60	120	-
		1H	R for high load not installed	-	240	-	120	-
G2 class	Three-stage type	2LR	R for low load installed	-	120	60	120	120
		2L	R for low load not installed	-	120	-	120	120
		2HR	R for high load installed	-	240	60	120	240
		2H	R for high load not installed	-	240	-	120	240

Note ⁽¹⁾ Terminal directly connected to ignition coil not through a resistor when starting.

3. Performance

3.1 Insulation resistance : Insulation resistance between the frame and the terminal of a key, or between terminals shall be greater than 1 MΩ under room temperature and humidity.

3.2 Connection resistance : Voltage drop caused by connection resistance when applying load of 10A between an input terminal and an output terminal with the key turned on shall be lower than the values in **table 2**.

Table 2

Unit : V

Item	Voltage drop
Before durability test	0.15
After durability test	0.25

3.3 Temperature resistance : Switches and handle locking devices shall be free from malfunction in the temperature range of -30°C ~ 80°C, and normally operated in -20°C ~ 60°C. Also, connection resistance of switches shall satisfy the values before durability defined in **3.2**.

3.4 Temperature rise : With the switch turned on, apply 19A between the input terminal and the output terminal for low load, and 38A for high load, and then wait till temperature on each component is stabilized. Difference between temperature on the conductive section and the temperature prior to apply the load shall be lower than the values in **table 3**.

1G terminal with ST terminal or R terminal installed are excluded from this criteria.

Table 3

Unit : °C

Contact materials	Temperature difference
Copper or copper alloy	40
Silver or silver alloy	65

3.5 Vibration resistance Testing in accordance with step 4 defined in **KS R 1034** (Vibration testing methods for automobile parts) with the switch on the drive location shall not generate connection of the contact, vibration or abnormal noise.

3.6 Durability : Switches and locking devices shall satisfy the requirements in **3.1**, **3.2** and **4.3** after normal 25,000 operations. A single operation of key is defined as a full travel of a key.

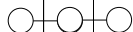
4. Structure

4.1 Common structure : Switches and handle locking devices shall be operated with keys, simple and robust for handling, and shall not be loosened during use.

Key shall not be removed at any stage of switch except OFF location.

4.2 Conversion connection circuit : The conversion connection circuit of a switch shall be as indicated in **table 4**:

Table 4

type	Key location	Connection terminal														
		R terminal not installed				R terminal installed					R terminal installed					
		B	1G	ST	ACC	B	1G	R ⁽²⁾	ST	ACC	B	1G ₁	R	1G ₂	ST	ACC
Two-stage type	OFF															
	stage 1															
	stage 2															
Three-stage type	OFF															
	stage 1															
	stage 2															
	stage 3															

Note ⁽²⁾ The dotted line in the table indicates overlapping during conversion.

4.3 Operation, susceptibility and automatic return : Operation of switches and locking devices shall be smooth, and stop location of the switches (positions indicated in **fig. 2**; "Stop position") shall easily be susceptible with hands at locations of OFF, stage 1 for two-stage type, and OFF, stage 1 and stage 3 for three-stage type (hereafter referred to as "Susceptibility"). Maximum torque at intermediate position of keys traveling from OFF → stage 1 → OFF, and OFF → stage 3 → OFF shall be 1.5~3.5 kgf·cm {0.15~0.34 N·m}.

Intermediate location between stop positions shall be free from catching, creak or sudden movement. Keys shall smoothly rotate when turning keys from the stop position of stage 1 to stage 2 clockwise for both of two-stage type and three-stage type. When releasing a hand from the key, the key shall automatically be returned to the stop position at stage 1.

The maximum torque at this operation shall be smaller than 6 kgf·cm {0.59 N·m}.

4.4 Shape and dimensions : The shape and the major dimensions of the handle locking device of a switch shall be those illustrated in the appendix figure.

4.5 Key margin : Margin angles of switches and locking devices at each stage from the frames and keys in rotating direction shall be smaller than 10°. However, stage 2 of the switch is excluded from this provision.

4.6 Strength of terminal : Applying vertical static load 5 kgf {49N} on the lead connection of the switch terminal under normal operation shall not generate deformation, sudden movement of the terminal fixing section, or other defects.

Apply static load 5 kgf {49N} on parallel terminals or soldered leads in outbound direction of the lead.

4.7 Strength of affixed section : The affixation sections of switches and handle locking devices shall be installed in normal operation conditions, and applying vertical static load (W) 5 kgf {49N} on the end of the frame (See the appendix figure) for one minute shall not generate defects on the affixation sections.

4.8 Cylinders shall be of pin tumbler cylinder, and count of the pins shall be greater than six. Types of pins may be determined upon agreement between concerned parties.

Number of keys shall be three, the key sill inside the cylinder shall be deeper than 1mm, and precision of the keys shall be **HRC 80** or higher.

5. Materials and coating : Materials and coating of main components of a switch shall, in principle, be as in **table 5**.

Coating shall be carried out pursuant to **KS B 0013** (General rules of electroplating of automobile parts).