GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 43.040.10

T 36

GB/T 32691-2016

Automobile A/C electromagnetic clutch

汽车空调电磁离合器

Issued on: June 14, 2016 **Implemented on: January 01, 2017**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;

Standardization Administration of the People's Republic of China.

Table of Contents

Automobile A/C electromagnetic clutch

1 Scope

This Standard specifies terms and definitions, requirements, test methods, inspection rules and marks, packaging, transport and storage of automobile A/C electromagnetic clutch (hereinafter referred to as the clutch).

This Standard is applicable to the electromagnetic clutch used for automobile air conditioning compressor.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 2423.17, *Environmental testing for electric and electronic products - Part 2: Test method - Test Ka: Salt mist*

GB/T 2828.1, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit(AQL) for lot-by-lot inspection*

GB/T 9286, *Paints and varnishes - Cross cut test for films*

GB/T 18655-2010, *Vehicles boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers*

GB/T 21360-2008, *Refrigerant compressor for motor vehicle air condition*

GB/T 21437.2-2008, *Road vehicles - Electrical disturbances from conduction and coupling - Part 2: Electrical transient conduction along supply lines only*

GB/T 28046.2-2011, *Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads*

GB/T 30038-2013, *Road Vehicles - Degrees of Protection (IP-Code) - Protection of Electrical Equipment Against Foreign Objects, Water and Access*

Product of the mass (g) of the components due to manufacturing accuracy and the centroid distance from center of mass (mm) (applicable to pulley assembly, drive disc assembly).

3.4 pull-in voltage

Minimum voltage to eliminate maximum air gap in static state.

3.5 initial static friction torque

Before the clutch is used, the maximum friction torque of the drive disc and the pulley slips relative to each other within 90° after suction.

3.6 static friction torque after running-in

After running-in of the clutch, the maximum friction torque within 90° of relative slippage between the drive disc and the pulley is combined.

3.7 pull-in noise

After the clutch is energized, the sound produced by the drive disc and the pulley when they are engaged.

3.8 separation noise

After the clutch is powered off, the sound produced when the drive disc is separated from the pulley.

3.9 disconnection period

Time required from when the clutch is de-energized until the working surface of the drive disc completely disengages from the working surface of the pulley.

3.10 connection period

Time required from when the clutch is energized to when the drive disc is moved to synchronize with the pulley.

4 Requirements

4.1 Product drawings and technical documents

The clutch shall be manufactured in accordance with the drawings and technical documents approved by the prescribed procedures.

4.2 Appearance and assembly requirements

4.2.1 The shape and installation dimensions of the clutch shall meet the

5mA.

4.15 Coil temperature rise

The temperature rise of the coil in the clutch should not be greater than 105°C.

4.16 Pull-in noise

4.16.1 The noise (sound pressure level) generated by the reed-connected drive-type clutch when it is energized and pulled-in shall not be greater than 100dB(A) (Nc is 1800r/min).

4.16.2 The noise (sound pressure level) generated by the rubber-connected drive-type clutch when it is energized and pulled-in shall not be greater than 80dB(A) (Nc is 1800r/min).

4.17 Separation noise

After the clutch is powered off, there is no trailing noise when the drive disc and the pulley are separated.

4.18 Electromagnetic compatibility

4.18.1 Conducted disturbance limits - Voltage method

Conduct the conducted disturbance test to the clutch. The limits shall not exceed the requirements of Level 3 in Table 5 and Table 6 of 6.2.3 in GB/T 18655-2010.

4.18.2 Radiation disturbance limit - ALSE method

Conduct the radiation disturbance test to the clutch. The limits shall not exceed the requirements of Level 3 in Table 9 and Table 10 of 6.4.4 in GB/T 18655-2010.

4.18.3 Electrical transient immunity along power lines

The clutch conduction immunity test adopts specific pulse type, severity level and test conformity determination agreed by the supplier and the purchaser through negotiation.

4.19 Water resistance

The clutch shall meet the requirements of 4.4, 4.8, 4.11, 4.13, 4.14 after the water resistance test.

4.20 Water protection performance

The coil assembly in the clutch (excluding the connector part) shall be tested

5.9 Test of static friction torque after running-in

Test the torque of the clutch assembly after running-in under the following conditions. The test methods are same with 5.8:

- Rotation speed: (4500 ± 200) r/min;

- Compressor suction pressure / exhaust pressure: 0.2MPa/1.4MPa;

- On/off cycle time (ON/OFF): 5s/5s;

- Number of cycles: not less than 100 times.

5.10 Air gap test

When the clutch is installed correctly, use a thickness gauge to measure the air gap.

5.11 Pull-in voltage test

When the clutch is installed as normal, take the maximum value for air gap according to Table 3. Power it on. The voltage is boosted at a speed of 0.5V/s from 0V. Use DC regulated power supply to regulate voltage. Use a voltmeter to measure and record the voltage value when the air gap is eliminated. Disconnect the power. Rotate the pulley 120° and measure again according to the above process. Measure 3 times in total. Calculate the average of 3 voltages.

5.12 Static imbalance test

Use a static balance measuring machine to test the imbalance amount of pulley assembly and drive disc assembly.

5.13 Insulation resistance test

Use a megohmmeter to apply 500V DC between the coil case and the conductor. Measure the insulation resistance value.

5.14 Withstand voltage test

The withstand voltage test of the clutch is carried out in accordance with 4.11.2 in GB/T 28046.2-2011.

5.15 Coil temperature rise test

Fix the coil on the compressor front cover. Put the coil without a fuse in a 120°C±2°C constant temperature box (put the coil with a fuse at 90°C±2°C). Measure the coil resistance R_0 after the temperature stabilizes. And then apply the test voltage to the coil. The duration is not less than 2h. Measure the current

Table 3 for the air gap. Operate according to the test conditions in Table 8. Under the condition that the ambient noise is not greater than 60dB(A), disconnect power after applying test voltage to the clutch and distinguish audio with human ears.

5.18 Electromagnetic compatibility test

5.18.1 Conducted emission - Voltage method test

Test the coil assembly in the clutch in accordance with 6.2 of GB/T 18655-2010.

5.18.2 Radiated emission - ALSE test

Test the clutch according to the method specified in 6.4 of GB/T 18655-2010.

5.18.3 Electrical transient conducted immunity test along power lines

Test the coil assembly in the clutch in accordance with Clause 5 of GB/T 21437.2-2008.

5.19 Water resistance test

Immerse the clutch assembly in normal temperature water for 24h. The immersion depth is 100mm. Then remove and blow dry. Test in accordance with 5.4, 5.8, 5.11, 5.13, 5.14.

5.20 Water protection performance test

Test according to Figure 9 in GB/T 30038-2013 and level 9K in Table 7.

5.21 Temperature resistance performance test

5.21.1 Low-temperature resistance storage performance test

The clutch is in a normal installation state, without power on. Maintain 24h at -40°C.

5.21.2 High-temperature resistance performance test

5.21.2.1 High-temperature resistance storage performance test

The clutch is in a normal installation state, without power on. Maintain 48h at 150°C.

5.21.2.2 High-temperature resistance operation performance test

The clutch is in a normal installation state. Access to 12V or 24V power supply in forced air circulation environment. Maintain 96h at 120°C.

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------