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**Electrical wire harness assemblies for motorcycles and
mopeds**

摩托车和轻便摩托车用电线束总成

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Table of Contents

Foreword	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Requirements	11
5 Test methods	19
6 Others.....	35
Annex A (informative) Basic requirements for wire harness conductors	36

Electrical wire harness assemblies for motorcycles and mopeds

1 Scope

This document specifies the requirements and test methods for electrical wire harnesses and connectors for motorcycles and mopeds.

This document applies to low-voltage (voltage not higher than 60V) connectors and high-voltage (voltage not higher than 60V but not higher than 600V) connectors for wire harnesses and electrical equipment of motorcycles and mopeds (hereinafter referred to as motorcycles), including in-line connectors and device connectors.

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 2423.5, *Environmental testing - Part 2: Test methods - Test Ea and guidance: Shock*

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

GB/T 4208, *Degrees of protection provided by enclosure (IP code)*

GB/T 5337, *Nomenclature and terminology for automotive electrical equipment, lighting and instrumentation*

GB 11118.1, *Hydraulic fluids of L-HL, L-HM, L-HV, L-HS and L-HG type*

GB 11121, *Gasoline engine oils*

GB 12981, *Motor vehicle brake fluids*

GB 17930, *Gasoline for motor vehicles*

GB 19147, *Automobile diesel fuels*

GB/T 25085 (all parts), *Road vehicles - Automotive cables*

QC/T 1067.1-2017, *Connector used in automobile wire harness and electrical*

3.9 device connector (female)

An input (harness-side) connector that connects to the device connector (male).

3.10 locking device

A device in a connector that maintains mechanical automatic locking and manual opening of its mating parts.

4 Requirements

4.1 Basic requirements

4.1.1 The wire harness shall be manufactured according to product drawings or technical documents approved through the prescribed procedures and shall comply with the provisions of this document.

4.1.2 The wire harness conductors of low-voltage (voltage not higher than 60V) connectors and high-voltage (voltage not higher than 60V but not higher than 600V) connectors shall comply with the regulations of GB/T 25085 (all parts), or be determined by negotiation between the supplier and the purchaser. The flame-retardant performance of wire harness wires shall be confirmed by the wire harness assembly manufacturer and shall comply with the requirements of GB/T 25085 (all parts). For the color, specifications, etc. of wires in the wire harness, the content in Annex A can be used first.

4.2 Size requirements

The length of the main stem and protective casing shall not be less than 100 mm and shall be a multiple of 10. For example, it shall be 100 mm, 110 mm or 120 mm, etc. The length of the lateral shall not be less than 30 mm. The distance between the wire junctures, the distance between the juncture and the embranchment point shall not be less than 20 mm. When an insulating sleeve needs to be installed at the connection between the wire and the terminal, the length of the insulating sleeve shall not be less than 20 mm. The limit deviation of the basic dimensions (L) of the above electrical wire harness assembly shall comply with the requirements in Table 1.

4.8 Terminal retention in shell body

After each terminal is inserted into the shell cavity and plugged into place, a constant force of 60 N (100 N if the nominal cross-sectional area of the high-voltage connector wire conductor is greater than 8 mm²) is applied in the axial direction of the connection

between the terminal and the wire. Keep it for 10_0^{+2} s. Terminals must not be removed from the shell or damaged.

Depending on the mating force, materials and design requirements, greater retention forces may be required. To seal a connector, the force exerted by the seal shall be included.

4.9 Contact resistance (voltage drop)

Each pair of terminals shall plug into place. The maximum contact resistance after initial plugging is 5 mΩ. After 10 times of plugging and unplugging, current cycling, temperature and humidity cycling, vibration and salt spray tests, the maximum contact resistance is 10 mΩ, or 150% of the initial measurement value, selected by the user.

4.10 Waterproof performance

4.10.1 Water tightness

After the sealed connector is tested in accordance with the provisions of 5.10.1, when the applied voltage is 48 V, the leakage current shall not exceed 50 μA, and there shall be no water immersion. The tests shall be completed in the order shown in Table 6. After the splash-proof connector is tested in accordance with the provisions of 5.10.1, there shall be no water accumulation. The tests shall be completed in the order shown in Table 6.

completed in the order of Table 6.

4.19 Heat aging

After testing the specimen in accordance with the provisions of 5.19, the test shall be completed in the order of Table 6.

4.20 Mechanical shock

The duration of contact resistance greater than $7\ \Omega$ shall not exceed $1\ \mu\text{s}$. After testing the specimen in accordance with the provisions of 5.20, the test shall be completed in the order of Table 6.

4.21 Drop

After testing the specimen in accordance with the provisions of 5.21, the test shall be completed in the order of Table 6.

4.22 Dust

After testing the specimen in accordance with the provisions of 5.22, the test shall be completed in the order of Table 6. There shall be no visible damage after removal.

4.23 Rapid temperature changes

After conducting the test in accordance with the provisions of 5.23, the test shall be completed in the order of Table 6. The duration during which the measured contact resistance is greater than $7\ \Omega$ shall not exceed $1\ \mu\text{s}$.

4.24 Chemical fluid

After conducting the test in accordance with the provisions of 5.24, the test shall be completed in the order of Table 6.

5 Test methods

5.1 Preparation before test

5.1.1 Sample pretreatment

Before starting all tests, the samples shall be kept at room temperature of $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and relative humidity of 45%~75% for 24 h.

5.1.2 Test conditions

5.1.2.1 All tests shall be conducted at room temperature of $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ and relative humidity of 45%~75%. Unless otherwise specified, connectors shall be tested together. All cavity locations shall be tested.

All tests shall use terminals with cable attachment. Wire crimping shall comply with the requirements of QC/T 29106. The size of the sample shall comply with the requirements of the product drawing approved according to the prescribed procedures.

5.1.6 Resistance to flame retardation

The flame-retardant performance test of wire harness wires shall be conducted in accordance with the provisions of GB/T 25085 (all parts).

5.2 Size inspection

Use a universal measuring tool to check dimensions.

5.3 Visual inspection

Perform a visual inspection of all connectors and terminals. Inspectors shall have normal vision and normal color discrimination abilities. Under natural light or equivalent lighting conditions (40W×2 fluorescent lamp) from 8:00 to 16:00, conduct a visual inspection at a distance of about 40cm from the sample. The results shall meet the requirements of 4.3.

5.4 Insertion and extraction force

5.4.1 When the mating connector is subjected to the plug-in/out test according to the provisions of 4.4.1 or 4.4.2, it shall be plugged and unplugged at a constant speed in the range of 50 mm/min~150 mm/min. When only the terminal is subjected to the insertion and extraction force test, the insertion and extraction force shall be ensured along the center line of the terminal during the test. The applied speed shall be recorded in the test report.

5.4.2 Plug and unplug the connector without locking device 10 times. Measure the 1st insertion force, 1st extraction force and 10th extraction force.

5.4.3 Plug and unplug connectors with locking devices for the first 10 times. The locking device is operated every time when plugging or unplugging. Measure the 1st insertion force, 1st extraction force and 10th extraction force. The strength test of the locking device shall be carried out in accordance with the provisions of 5.6 for the 11th plugging and unplugging.

5.5 Pull-off force of crimp connectors

5.5.1 Use appropriate test equipment. The test is carried out at a constant speed in the range of 50 mm/min~150 mm/min. The applied speed shall be recorded in the test report. If the terminal has an electrical conductor insulation drum, it shall be made mechanically ineffective. When multiple conductors are crimped to a single terminal, the force specified in Table 4 is applied individually to each conductor.

5.5.2 For high-voltage connector wires crimped with metal ferrules, use an appropriate

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