编号：TRA-2YJ21372-001

**试 验 报 告**

**Test Report**

**Stator shrink fit test**

**苏州英特模汽车科技有限公司检测中心**

**Testing Center of Suzhou Itimotor Technology Co., Ltd**

**声 明**

**Statement**

1. 试验报告无“检测专用章”无效。

The test report is invalid without special seal for inspection.

1. 试验报告无编制、审核、批准人签字无效。

The test report is invalid without signatures of the writer、reviewer and approver.

1. 试验报告涂改无效。

The test report is invalid if it has been modified.

1. 对试验报告若有异议，应于收到试验报告之日起五日内向检验单位提出，逾期不予受理。

Disagreement should be presented to the test center within 5 days since clients receive the test report.

1. 试验报告仅对来样的检测结果负责。

The test report is responsible only for the results of sample provided by the customers.

1. 报告中以※标注为客户提供的信息，中心不对其真实性负责，对试验结果有效性有影响的信息，中心不对试验结果的有效性负责。

The center shall not be responsible for the authenticity of the information provided by customers marked with ※ in the report, and the center shall not be responsible for the validity of the test results for the information that has an impact on the validity of the test results.

试验单位信息

Information of the test company

单位名称：苏州英特模汽车科技有限公司检测中心

Company Name: Testing Center of Suzhou Itimotor Technology Co., Ltd

地 址：江苏省苏州市常熟经济技术开发区马桥路6号22幢

Address: Building 22, no.6 Maqiao road, Changshu Economic Development Zone,Suzhou City,Jiangsu Province

电 话（Tel）：0512-52561916

※委托单位信息

Information of the attorney company

委托单位：苏州英特模汽车科技有限公司

Company Name: Suzhou Itimotor Technology Co., Ltd

地 址：江苏省苏州市常熟经济技术开发区马桥路6号22幢

Address: Building 22, no.6 Maqiao road, Changshu Economic Development Zone,Suzhou City,Jiangsu Province

电 话（Tel）：0512-52561916

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| --- | --- | --- | --- | --- | --- | --- | --- |
| ※产品型号Sample name | 电机定子 | | | 送样时间 Sample delivery time | 2021/11/8 | | |
| 中心样品编号  number | S-2YJ21372(001) | | | 送样者  Sample delivery | 焦军 | | |
| 样品数量/状态 Sample quantity/ Status | 1/满足试验条件  1/Meet the test requirements | | | 试验类型  Test Types | 力学  Mechanics | | |
| 委托单位 Client | 华域麦格纳电驱动系统有限公司 HASCO MAGNA ELECTRIC DRIVE SYSTEM CO., LTD | | | 试验地点Test site | 苏州英特模汽车科技有限公司检测中心 Testing Center of Suzhou Itimotor Technology Co., Ltd | | |
| 试验时间  Start and end date | 2021/11/9~2021/11/10 | | | 试验人员Test operator | 曹铁 | | |
| 试验依据Test standard | 根据客户大纲  According to Test Plan | | | 试验项目Test item | Stator shrink fit test | | |
| 试验结论 Test result | 试验过程符合客户要求，最终结果由客户自行判定.  The test process meets customer requirements,and the final result is determined by customers themselves. | | | | | | |
| 目 录  Catalogue | [1 试验目的TEST BOJECTIVE 4](#_Toc26143)  [2 试验照片TEST PHOTOS 5](#_Toc782)  [3 试验条件TEST METHOD 7](#_Toc19549)  [4 试验设备TEST FACILITY 8](#_Toc8017)  [5 试验曲线TEST CURVE 9](#_Toc11327)  [6 试验结果 TEST RESULTS 22](#_Toc31942) | | | | | | |
| 编制/日期  Compiler |  | 审核/日期  Reviewer |  | | | 批准/日期  Approver |  |

1. 试验目的 Test objective

根据客户要求所需，完成试验。

According to customer requirements, Completed test.

**样品安装如下图**

**Sample installation is shown below**

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| 微信图片_20211217110206 |
| 微信图片_20211217110238 |

2.试验照片Test photos:

1#样品试验前照片：

1# Photos before sample test:

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1#样品试验前照片：

1# Photos after sample test:

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3.试验条件 Test condition:

将组件安装到试验台上，并在100-110℃保温4h；

Install the components on the test table and keep them warm at 100-110℃ for 4h;

1. 降温并保持温度在95-100℃，然后进行静扭试验；

Cool down and keep the temperature at 95-100℃, then carry out the static torsion test;

1. 在定子上施加 545N·m\*20 秒，并记录 定子的扭矩曲线和组件温度，最大扭矩斜率：100 N·m/s；

Apply 545N·m\*20 seconds on the stator, and record the stator torque curve and component temperature, the maximum torque slope: 100 N·m/s;

1. 增加扭矩，直到定子组件相对冷却套或转子旋转达到 1900 N·m，并记录扭矩曲线和组件温度；

Increase torque until stator assembly rotation relative to cooling sleeve or rotor reaches 1900 N·m, and record torque curve and component temperature;

1. 在定子上施加 -545N·m\*20 秒，并记录 定子的扭矩曲线和组件温度，最大扭矩斜率：100 N·m/s；

Apply -545N·m\*20 seconds on the stator, and record the stator torque curve and component temperature, the maximum torque slope: 100 N·m/s;

1. 以相反方向增加扭矩，直到定子组件相对于冷却套或转子旋转-1900 N·m，并记录扭矩曲线和组件温度；

Increase torque in the opposite direction until the stator assembly rotates -1900 N·m relative to the cooling jacket or rotor, and record the torque curve and component temperature;

1. 在整个测试过程中，组件的温度不应低于 95℃。

The temperature of the component should not be lower than 95℃ throughout the test.

**4. 试验设备 Test facility:**

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| 名称 name | 设备型号  Equipment type | 设备编号  Number | 校准有效期  Calibration validity | 设备精度  Equipment Accuracy |
| 电液伺服扭转疲劳试验台 | BC-P10000B型 | ITI-EV24-FZ-002 | 2021.6~2022.6 | a.扭矩传感器HBM TB2列，精度等级为0.03  b.最大扭矩±10000 N·m  c.最大转角：±45°  d.转角精度：±0.5%F.S  e.扭角分辨率：±0.01°  f.液压站：系统压力21Mpa流量240升/分  g.摆动频率范围：1~15Hz |

5.试验曲线 Test curve:

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| 1# 样品扭矩随转角变化曲线（545N·m 10 N·m/s）  1# Sample torque curve with Angle (545N·m 10 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（545N·m 10 N·m/s）  1# Sample torque Angle curve with time (545N·m 10 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（-545N·m 10 N·m/s）  1# Sample torque curve with Angle (-545N·m 10 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-545N·m 10 N·m/s）  1# Sample torque Angle curve with time (-545N·m 10 N·m/s) |
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| --- |
| 1# 样品扭矩随转角变化曲线（545N·m 100 N·m/s）  1# Sample torque curve with Angle (545N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（545N·m 100 N·m/s）  1# Sample torque Angle curve with time (545N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（-545N·m 100 N·m/s）  1# Sample torque curve with Angle (-545N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-545N·m 100 N·m/s）  1# Sample torque Angle curve with time (-545N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（1000N·m 10 N·m/s）  1# Sample torque curve with Angle (1000N·m 10 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（1000N·m 10 N·m/s）  1# Sample torque Angle curve with time (1000N·m 10 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（-1000N·m 10 N·m/s）  1# Sample torque curve with Angle (-1000N·m 10 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-1000N·m 10 N·m/s）  1# Sample torque Angle curve with time (-1000N·m 10 N·m/s) |
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| --- |
| 1# 样品扭矩随转角变化曲线（1000N·m 100 N·m/s）  1# Sample torque curve with Angle (1000N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（1000N·m 100 N·m/s）  1# Sample torque Angle curve with time (1000N·m 100 N·m/s) |
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| --- |
| 1# 样品扭矩随转角变化曲线（-1000N·m 100 N·m/s）  1# Sample torque curve with Angle (-1000N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-1000N·m 100 N·m/s）  1# Sample torque Angle curve with time (-1000N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（1500N·m 100 N·m/s）  1# Sample torque curve with Angle (1500N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（1500N·m 100 N·m/s）  1# Sample torque Angle curve with time (1500N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（-1500N·m 100 N·m/s）  1# Sample torque curve with Angle (-1500N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-1500N·m 100 N·m/s）  1# Sample torque Angle curve with time (-1500N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（1900N·m 100 N·m/s）  1# Sample torque curve with Angle (1900N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（1900N·m 100 N·m/s）  1# Sample torque Angle curve with time (1900N·m 100 N·m/s) |
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| 1# 样品扭矩随转角变化曲线（-1900N·m 100 N·m/s）  1# Sample torque curve with Angle (-1900N·m 100 N·m/s) |
|  |
| 1# 样品扭矩转角随时间变化曲线（-1900N·m 100 N·m/s）  1# Sample torque Angle curve with time (-1900N·m 100 N·m/s) |
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| 1# 升温曲线图  1# Heating curve |
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6.试验结果 Test results

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| 试验运行记录  Test run record | |  |  |  |  |  | | --- | --- | --- | --- | --- | | 定子静扭信息统计表 | | | | | | 样品编号  number | 静扭（N·m） | 时间  Time | 现象  phenomenon | 备注  remark | | 1# | 545N·m 10 N·m/s | 2020/1/10 | 无明显相对滑移  No obvious relative slip | / | | -545N·m 10 N·m/s | | 545N·m 100 N·m/s | | -545N·m 100 N·m/s | | 1000N·m 10 N·m/s | | -1000N·m 10 N·m/s | | 1000N·m 100 N·m/s | | -1000N·m 100 N·m/s | | 1500N·m 100 N·m/s | | -1500N·m 100 N·m/s | | 1900N·m 100 N·m/s | | -1900N·m 100 N·m/s | | |
| 扭转方向示意图  Torsional  direction  diagram | 逆时针方向（-）  anticlockwise（-） | 顺时针方向（+）  clockwise（+） |
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