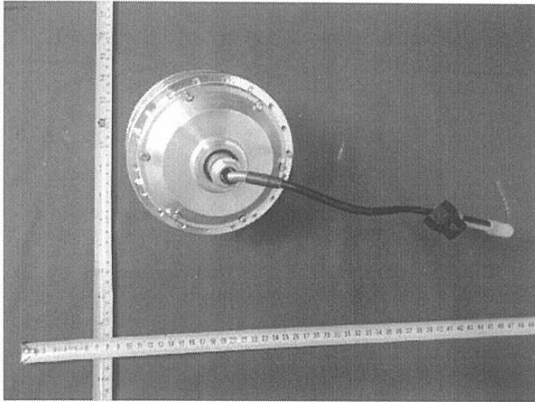
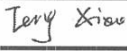
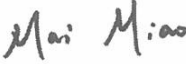



Prüfbericht-Nr.: <i>Test Report No.:</i>	16802659 001	Auftrags-Nr.: <i>Order No.:</i>	1140009358	Seite 1 von 15 <i>Page 1 of 15</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	439636	Auftragsdatum: <i>Order date:</i>	2013-09-11	
Auftraggeber: <i>Client:</i>	Changzhou Lipeng Motor Technology Co., Ltd Wujiawei Industrial Park, Furong Town, Changzhou city, Jiangsu 213000, P.R. China			
Prüfgegenstand: <i>Test item:</i>	Permanent Magnet Brushless DC motor			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	LPQ01,LPQ02,LPH01,LPH02,LPH03,LPH04			
Auftrags-Inhalt: <i>Order content:</i>	AK Certificate			
Prüfgrundlage: <i>Test specification:</i>	EN 15194:2009+A1			
Wareneingangsdatum: <i>Date of receipt:</i>	2013-09-11			
Prüfmuster-Nr.: <i>Test sample No.:</i>	Engineering sample			
Prüfzeitraum: <i>Testing period:</i>	2013-09-18			
Ort der Prüfung: <i>Place of testing:</i>	Tianjin Bicycle Research Institute			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (China) Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
2013-10-09	Feng Xiao/ PE		2013-10-09	Mai Miao/ TC
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
				
				Unterschrift <i>Signature</i>
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet		Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested		
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST REPORT EN 15194:2009 Cycles – Electrically power assisted cycles – EPAC Bicycles	
Report Reference No.	16802659 001
Date of issue.....	See Cover page
Total number of pages	See Cover page
CB/CCA Testing Laboratory	See Cover page
Address	See Cover page
Applicant's name	Changzhou Lipeng Motor Technology Co., Ltd
Address	Wujiawei Industrial Park, Furong Town, Changzhou city, Jiangsu 213000, P.R. China
Manufacturer's name	Changzhou Lipeng Motor Technology Co., Ltd
Address	Wujiawei Industrial Park, Furong Town, Changzhou city, Jiangsu 213000, P.R. China
Factory's name	Changzhou Lipeng Motor Technology Co., Ltd
Address	Wujiawei Industrial Park, Furong Town, Changzhou city, Jiangsu 213000, P.R. China
Test specification:	
Standard.....	EN 15194:2009+A1
Test procedure.....	Type approval
Non-standard test method.....	N/A
Test Report Form No.	EN 15194_1B
Test Report Form(s) Originator.....	TÜV Rheinland (China) Ltd.
Master TRF.....	Dated 2009-03
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Test item description	Permanent Magnet Brushless DC motor
Trade Mark	
Manufacturer.....	Changzhou Lipeng Motor Technology Co., Ltd
Model/Type reference	LPQ01,LPQ02,LPH01,LPH02,LPH03,LPH04
Ratings	DC 36V, 7A, Pcr=180W

Copy of marking plate

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPQ01-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPH01-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPQ02-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPH02-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPH03-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Permant Magnet Blushless DC Motor For E-bike	
Model number :LPH04-180	
Rated voltage:36VDC	Rated power:180W
Rated current:7A	Rated speed:200 1/min
IP44	The F class insulate grate
Produce date: Y M D	
Changzhou Lipeng Motor Technology Co., Ltd	

Summary of testing:

This motor was specially designed for EPAC, all tests was done according to EN 15194:2009+A1, motor was tested on load bench, special controller provided by manufacturer. Input voltage set at DC 36V and output power 180W according to declaration.

Tests performed (name of test and test clause):

4.2.2	Battery
4.2.3	Electric cables and connections
4.2.7	Maximum power measurement

Test item particulars	Permanent Magnet Brushless DC motor
IP protection class	IP44
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	2013-09-11
Date(s) of performance of tests	2013-09-11 to 2013-09-20
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
General product information:	
This motor was specially designed for EPAC, all tests was done according to EN 15194:2009+A1. The structure of LPQ02, LPH01, LPH02, LPH03, LPH04 and characteristic are the same with tested model LPQ01, only the outside shape for configuration to EPAC is different.	

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
4.1	GENERAL		N/A
	Electrically power-assisted bicycles shall comply with clause 4, 5 and 6 of the European Standard EN 14764:2005 in addition to the specific requirements in Clause 4.2 of this standard.	DC motor see clause 4.2.7 for detail.	N/A
4.2	EPAC specific additional requirements		P
4.2.1	Electric circuit	DC motor only	N/A
	The electrical control system shall be designed so that, should it malfunction in a hazardous manner, it shall switch off power to the electric motor.		N/A
	If symbols are used, their meaning shall be described in the instructions for use. Their function is one described in ISO 2575, their design shall be in accordance to that standard.		N/A
4.2.2	Battery		N/A
4.2.2.1	Requirements	DC motor specially designed for EPAC according to EN 15194:2009+A1	N/A
	EPAC and pack of batteries shall be designed in order to avoid risk of fire, mechanical deterioration resulting from abnormal use. Compliance is checked by the test described in 4.2.2.2		N/A
	During the test the EPAC and the batteries shall not emit flames, molten metal or poisonous ignitable gas in hazardous amounts and any enclosure shall no damage that could impair compliance with this European Standard.		N/A
	Safety and compatibility of the combination battery/charger combination shall be ensured, according to the manufacturer's specifications.		N/A
	The battery terminals shall be protected against creating an accidental short circuits. Care shall be taken to ensure that the batteries are protected against overcharging. An appropriate overheating and short circuit protection device shall be fitted.		N/A
	Batteries and the charger unit shall be labelled in order to be able to check their compatibility.		N/A
4.2.2.2	Test method		N/A
	1) Battery terminals are short-circuited with the batteries in a fully charged condition.		N/A
	2) Motor terminals are short-circuited; all commands are in ON position, whilst the batteries are fully charged.	DC motor only, s-c of motor terminal test should be evaluated on final EPAC with battery and controller	N/A
	3) The EPAC is operated with the electric motor or drive system locked up so as to fully discharge the battery or until the system stops.	See table 4.2.2 for detail	P

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
	4) The battery is charged for double the recommended charging period or for 24 hours depending upon which is the longest period.		N/A
4.2.3	Electric cables and connections		P
4.2.3.1	Requirements	DC motors with cable	P
	Cable and plug temperature shall be lower than that specified by the manufacturer of the cables and plugs. There shall be no corrosion on plug pins and no damage to cable and plug insulation.		N/A
4.2.3.2	Test method		P
	Discharge the fully charged EPAC battery to the discharging limit specified by the EPAC or ESA manufacturer at the maximum current allowable by the system and record it, giving consideration the the electric motor and/or the controller and/or the battery controller. Measure the cable and plug temperature and ensure, by examination, that there is no deterioration of the insulation on either assembly.	DC motor, battery charging process not verified.	N/A
4.2.3.3	Wiring		P
	a) Wire ways shall be smooth and free from sharp edges.	Bushing or protection tube provided for motor outlet wiring.	P
	b) Wires shall be protected so that they do not come into contact with burrs, cooling fins or similar sharp edges that may cause damage to their insulation. Holes in metal through which insulated wires pass shall have smooth well-rounded surfaces or be provided with bushings.	See above	P
	c) Wiring shall be effectively prevented from coming into contact with moving parts.	Evaluation should be done at final equipment	N/A
	Separate parts of the EPAC that can move in normal use or during user maintenance relative to each other, shall not cause undue stress to electrical connections and internal conductors, including those providing earthing continuity.		P
	Compliance with a), b), c) shall be checked by inspection.		P
	d) If an open coil spring is used, it shall be correctly installed and insulated. Flexible metallic tubes shall not cause damage to the insulation of the conductors contained within them.		N/A
	Compliance with d) shall be checked by inspection and by the following test method.		N/A
	If flexing occurs in normal use, the appliance is placed in its normal operational position and is supplied at rated voltage under normal operation.		N/A
	e) The movable part is moved backwards and forwards, so that the conductor is flexed through the largest angle permitted by its construction.	No such parts	N/A

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
	For conductors that are flexed in normal use, flex movable part for 10000 cycles at a test frequency of 0,5 Hz.		N/A
	For conductors that are flexed during user maintenance, flex the movable part for 100 cycles at the same frequency at (20±5) °C.		N/A
	The wiring and its connections shall withstand the electrical strength test. The test voltage expressed in V shall be equal to (500+2XVr) for 2 min and applied between live parts and other metal parts only.	DC 572V tested between input terminal of motor and metal frame for 2 minutes.	P
	f) The insulation of internal wiring shall withstand the electrical stress likely to occur in normal use.		P
	g) In case of integrated battery charger, electric safety of battery charger applied.		N/A
4.2.3.4	Power cables and conduits		P
	Conduit entries, cable entries and knock-outs shall be constructed or located so that the introduction of the conduit or cable does not reduce the protection measures adopted by the manufacturer. Compliance is checked by inspection.	Bushing and protection tube used for internal wiring.	P
4.2.3.5	External and internal electrical connections		P
	Electrical connection shall comply with IEC 60364-5-52:2001, Clause 526.1 and 526.2.		P
4.2.3.6	Moisture resistance		P
	The EPAC are subjected to the test of IEC 60529 as follows: IPX4 appliances as described in Clause 14.2.4.a.	IP44 for DC motor	P
4.2.3.7	Mechanical strength	Not considered for DC motor	N/A
	EPAC shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use. Compliance is checked by:		N/A
	- applying impacts to the battery pack mounted on the EPAC by means of the spring hammer as specified in IEC 60068-2-75. The battery pack is rigidly supported and three impacts are applied to every point of the enclosure that is likely to be weak with an impact energy of (0,7±0,05)J. After the test the battery pack shall show no damage that could impair compliance with this European Standard;		N/A
	- detachable battery packs are submitted to free fall at a height of 0,90 meter in three different positions. After the test the battery pack shall show no damage that could lead to emission of dangerous substances (gas or liquid) ignition, fire or overheating.		N/A
4.2.4	Power management	DC motor only	N/A
4.2.4.1	Requirements		N/A

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
	When tested by the method described in 4.2.4.2 the recordings shall show that:		N/A
	a) Assistance shall be provided only when the cyclist pedals forward. This requirement has to be checked according to the test methods described in 4.2.4.2.2 a);		N/A
	b) Assistance shall be cut off when the cyclist stops pedalling forward such that the cut off distance does not exceed 5 m with the use of brake lever cut off switch or 2 m without the use of brake lever cut off switch. This requirement has to be checked according to the test methods described in 4.2.4.2.2 b);		N/A
	c) The output or assistance shall be progressively reduced (see Annex B) and finally cut off as the vehicle reaches the maximum assistance speed as designed. This requirement has to be checked according to the test methods described in 4.2.4.2;		N/A
	d) The assistance shall be progressively and smoothly managed.		N/A
4.2.4.2	Test method – Electric motor management		N/A
4.2.4.2.1	Test conditions		N/A
	a) The test may be performed either on a test track, a test bench or on a stand which keeps the motor driven wheel free of the ground. b) The test track shall be according to EN 14764:2005, Clause 4.6.8.5.1.1. c) The time-measuring device shall have an accuracy of $\pm 2\%$. d) The ambient temperature shall be between 5 °C and 35 °C. e) Maximum wind speed shall not exceed 3 m/s. f) The battery shall be fully charged according to the manufacturer's instructions.		N/A P
4.2.4.2.2	Test procedure		N/A
	a) Check that there is no electric motor assistance when pedalling backwards. The test to ensure the compliance to this clause shall be adapted to the technology used. For example, pedal backwards and check the no load current point or that no torque is delivered on the driving wheel.		N/A
	b) Worst case conditions of gear ratio and speed shall be applied.		N/A
	c) Worst condition for speed is defined as 90% of cut off speed.		N/A
	d) Measure the distance travelled from cessation of pedalling and actuating the switch brake simultaneously (if any) to no power corresponding to no load current point provided by the electric motor by using: – speed versus time measurement, – direct or indirect torque versus distance measurement (e.g. motor current), – or any other appropriate method.		N/A

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
	e) Carry out the test ten times and then average.		N/A
4.2.4.3	Start up assistance mode		N/A
4.2.4.3.1	Requirements		N/A
	EPAC can be equipped with a start up assistance mode up to 6 km/h designed speed or lower values as specified by the manufacturer. Unauthorized use shall be prevented. This mode shall be activated by the voluntary and maintained action of the user either when riding without pedalling or when the user is pushing the cycle.		N/A
4.2.4.3.2	Test method		N/A
4.2.4.3.2.1	Test conditions		N/A
	a) The test may be performed either on a test track, a test bench or on a stand that keeps the motor driven wheel free of the ground. b) The speed-measuring device shall have the following characteristics: – Accuracy: $\pm 2\%$ – Resolution: 0,1 km/h c) The ambient temperature shall be between 5 °C and 35 °C. d) Maximum wind speed: 3 m/s. e) The battery shall be fully charged according to the manufacturer's instructions.		N/A
4.2.4.3.2.2	Test procedure		N/A
	a) Pre-condition the EPAC by running it for 5 min at 80% of the maximum assistance speed as declared by the manufacturer, then stop.		N/A
	b) Activate the start up assistance mode and verify that the speed increases up to 6 km/h maximum designed speed or lower value.		N/A
	c) Verify that speed is going down to 0 km/h when start up assistance mode is deactivated and the current drops to a value equal to or less than no load current point when free rolling.		N/A
	d) Activate the start up assistance mode and maintain it for 1 min.		N/A
	e) Verify that speed is equal to or less than 6 km/h.		N/A
4.2.6	Maximum speed for which the electric motor gives assistance		N/A
4.2.6.1	Requirements	DC motor only, evaluation should be done with final EPAC and controller.	N/A
	The maximum speed for which the electric motor gives assistance may differ by $\pm 5\%$ of the speed indicated on the label described within Clause 5 when determined according to the test method described in 4.2.6.2, from 25km/h or lower values as specified by the manufacturer.		N/A
	During a production conformity check, the maximum speed may differ by $\pm 10\%$ from the above –mentioned determined value.		N/A

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
4.2.6.2	Test method		N/A
4.2.6.2.1	Test conditions		N/A
	a) The test may be performed either on a test track, a test bench or on a stand that keeps the motor driven wheel free of the ground.		N/A
	b) The speed-measuring device shall have the following characteristics: - Accuracy: $\pm 2\%$		N/A
	- Resolution: 0,1km/h		N/A
	c) The ambient temperature shall be between 5°C and 35°C.		N/A
	d) Maximum wind speed: 3m/s		N/A
	e) The battery shall be fully charged according to the manufacturer instructions.		N/A
4.2.6.2.2	Test procedure		N/A
	Any appropriate method for checking for this requirement is acceptable; one solution is to measure the cut-off speed, another being to measure the torque output. The following example describes the cut-off speed test.		N/A
	a) Pre-condition the EPAC by running it for 5 min at 80% of the maximum assistance speed as declared by the manufacturer.		N/A
	b) Record continuously the current and note the speed at which the current drops to a value equal to or less than "no load current point".		N/A
	c) Whilst pedalling, ride steadily to reach a speed equal to 1,25 times (if possible by design) the maximum assistance speed as declared by the manufacturer.		N/A
	d) Verify the noted value in b) is equal to or less than the maximum speed declared by the manufacturer.		N/A
4.2.7	Maximum power measurement		P
4.2.7.1	Measurement at the engine shaft	Measurement done at the engine shaft. See table 4.2 for detail	P
	The maximum continuous rated power shall be measured according to EN 60034-1 when the motor reaches its thermal equilibrium as specified by the manufacturer.	Maximum continuous rated power is 180W declared by the manufacturer tested according to EN 60034-1.	P
	In circumstance where the power is measured directly at the shaft of the electronic motor, the result of the measurement shall be decreased by 1,10 to consider the measurement uncertainty and then by 1,05 to include for example the transmission losses, unless the real values of these losses are determined.		P

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict
4.2.7.2	Alternative method	Not used.	N/A
	When the power is measured at the wheel, the result of the measurement is the reading value, Annex D gives guidance on how to measure the power at the wheel.		NA

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict

4.2	TABLE: temperature rise measurements				P
	t1 (°C)	27.0			—
	t2 (°C)	27.0			—
	test voltage (V)	36VDC			—
	Input current for DC motor(A)	6.79			—
	Rated continuous power on shaft	180W			
	winding temperature rise measurements:				P
	insulation class	See below			—
	temperature rise dT of winding:	R ₁ (Ω)	R ₂ (Ω)	dT (K)	required dT (K)
	DC Motor Winding (Yellow - Blue)	0.3038	0.4024	84.8	110
					F

4.2.3.3	TABLE: Electric strength tests for wiring			P
	Test voltage applied between:	Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No
	Input terminal of controller – Metal frame	DC	572V	No
	Supplementary information: 500+2XVr for 2min, Vr is the rated voltage.			

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict

4.2.2	TABLE: Fault condition tests			P
	Ambient temperature (°C)	25		—
Fault No.	Fault	Supply voltage(V)	Test time	Observation
4.2.2-1)	Battery terminal s-c	--	--	
4.2.2-2)	Motor input (Controller DC output) two terminals s-c	--	--	
4.2.2-3)	Motor block	36VDC	30min	Motor was tested on load bench, load increase from rated load 8.7 to 30 N.m, rotation speed decrease from 204 1/min to 194 1/min, Output power in shaft increase from 180W to 245W, Discharge test of battery should be evaluate in final system.
4.2.2-4)	Battery over charging	--	--	
Supplementary information:				

4.2.2/4.2.3	TABLE: Batteries			N/A
Is it possible to install the battery in a reverse polarity position?			No	N/A
Rechargeable batteries				
Charging		Discharging		
	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.
Max. current during normal condition				
Test results:				Verdict
- Chemical leaks				
- Explosion of the battery				
- Emission of flame or expulsion of molten metal				
- Electric strength tests of equipment after completion of tests				
Supplementary information:				

EN 15194:2009+A1			
Clause	Requirement + Test	Result - Remark	Verdict

4.2.4.1	TABLE: Power Management	N/A
Test condition: Worst condition of lowerest gear ratio and 90% cut off speed as below, brake lever cut off switch for rear wheel operate. Limit distance for this condition is 5 meters.		
t1=	S1= Vavr X t1	
t2=	S2= Vavr X t2	
t3=	S3= Vavr X t3	
t4=	S4= Vavr X t4	
t5=	S5= Vavr X t5	
t6=	S6= Vavr X t6	
t7=	S7= Vavr X t7	
t8=	S8= Vavr X t8	
t9=	S9= Vavr X t9	
t10=	S10= Vavr X t10	
Savr =(S1+S2+... + S9+S10)/10=		
Note:		

End of test report

Measurement and Test Equipment List

Used MTE

Revision: 20 July, 2007/ G.Luebken

Attachment:

Report No.: 16802659 001

Order No.: 1140009358

Description	MTE Type/model Internal ID	Next Calibration Date
<i>Voltage withstand tester</i>	CS9914B/E006	2014-3-05
<i>Digital Power Meter</i>	WT210/E010	2014-3-29
<i>Motor Load</i>	ZJHM/50NM	--
<i>Multimeter</i>	15B/E014	2014-3-06
<i>DC source</i>	JYSY-600KH/ JYSY600KH1000001	--

Date and Signature: 2013-09-10 *Mai Miao*