

# EV BLDC DRIVING SYSTEM INSTRUCTION

MODEL NO: HJ-ZW1-3KW

VERSION: 16.02

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EV BLDC DRIVING SYSTEM				
Model No	HJ-ZW1-3KW		Version No.	16.02
Product Type	BLDC			
Apply for	New Energy Electric Vehicles			
Test Standard	GB/T18488.1-2015≤EV DRIVING SYSTEM PART ONE:TECHNICAL CONDITIONS≥GB/T18488.2-2015≤EV DRIVING SYSTEM PART ONE:TECHNICAL CONDITIONS PART TWO: TEST METHOD≥			
1, Main Parameters				
Motor Parameters	Name	BLDC MOTOR	Model No	HJ-ZW1-3KW
	Standard	GB/T18488.1-2015	Cooling Method	air cooling
	Connect Method	Y	Made in	China
	Rated Power(kW)	3	Peak Power(kW)	5.5
	Rated Torque(Nm)	18.5	Peak Torque(Nm)	38
	Rated Voltage(VDC)	24	Insulation Grade	F
	Protection Grade	IP65	Working Method	S9
	Weight(Kg)	≤22Kg	Dimension(mm)	244×218×243.5

2, Test Result					
Test Report					
Test Items		Standard Requirements	Test Result	Compatibility	Remark
General Requirements		Drive Motor should have flexible performance with no load; no friction between rotor and stator thus abnormal noise. Motor controller should have communication function and fault diagnosis function for EV.	Drive Motor has flexible performance with no load; no friction between rotor and stator thus abnormal noise. motor controller has communication function and fault diagnosis function for EV.	OK	
General Test Items	Dimension (mm)	Motor Dimension	244×218×243.5	OK	see drawing
		Controller Dimension		OK	
	Weight(Kg)	Motor Weight	≤22kg	OK	
	Housing Mechanical Intensity	Should be tolerable of no less than 10Kpa without plastic deformation	No demonstrable plastic deformation	OK	
	Motor Stator Winding Cold DC Resistor	as product technical specification	Ru= 0.0056Ω RV= 0.0056Ω RW= 0.0058Ω	OK	

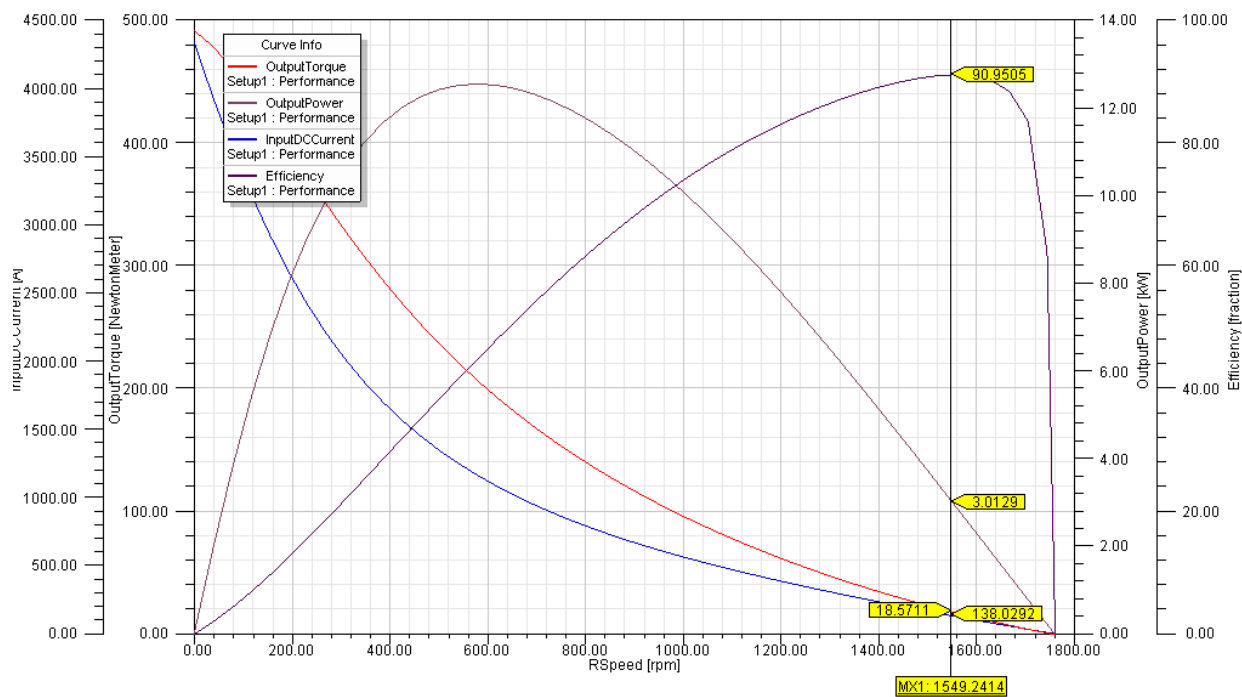
General Test Items	Insulation Resistance	Insulate resistance between motor stator winding and motor housing	Cold DC resistance should be >150MΩ	250MΩ	OK	
			Hot DC resistance should be > caculated value as standard	200MΩ	OK	
		Insulate resistance between motor stator winding and temprature sensor	Cold DC resistance should be >20MΩ	200MΩ	OK	
			Hot DC resistance should be > caculated value as standard	200MΩ	OK	
		Motor Controller Insulation Resistance	Cold resistance between dynamic terminal and housing, signal termical and housing, dynamical terminal and signal terminal should be > 1MΩ	200MΩ	OK	
			Hot resistance between dynamic terminal and housing, signal termical and housing, dynamical terminal and signal terminal should be > 1MΩ	200MΩ	OK	
			Power frequency voltage between motor winding & tempratur sensor should be tolerable of 1500V power frequencyvolt resistance test and no breakdown. Leakage current <5mA.	tolerable of 1500V power frequency voltage resistance test and no breakdown. Leakage current 3mA	OK	
	Temprature Rise Test		Motor temprature rise should be within limit as regulation in GB775-2008 Term 8.10 under defined working method	winding temprature: 90	OK	

Input and Output Features	Working Voltage Range		as product technical specification: 18-27V		OK	
	Torque-Speed		as product technical specification	as picture 1	OK	
	Continous Torque		as product technical specification	8Nm at rated speed and work continously	OK	
	Continoud Power		as product technical specification	3kw at rated speed and work continously	OK	
	Peak Torque		as product technical specification	Tmax=38 N.m normal in 1 min	OK	
	Peak Power		as product technical specification: 6kW. Normal under peak power within period as regulation.	6 kW work at normal,10s	OK	
	Efficiency	Max efficiency	higher than designed value at rated voltage	90%	OK	
		High Efficient Working Range	At rated voltage, high efficient working range should be wider than designed value	Picture 1	OK	
Working Environment Test	Storage at low temprature		should be tolerable of -40 and low temprature continous test within 2h, after that rechecked insulation resistance should meet requirements of 5.2.7 in standard. After recovery, can still work at normal state with rated voltage, continous torque and continous power.	after low temprature continous test 2h, After that rechecked insulation resistance is 200MΩ. After recovery, work at normal state with rated voltage, continous torque and continous power.	OK	
	Working under low temprature		can be started at normal after 2h under -40 , and after test, rechecked insulation resistance should meet requirements of 5.2.7 in standard.	can be started at normal after 2h under -40 , and after test, rechecked insulation resistance is 200MΩ	OK	



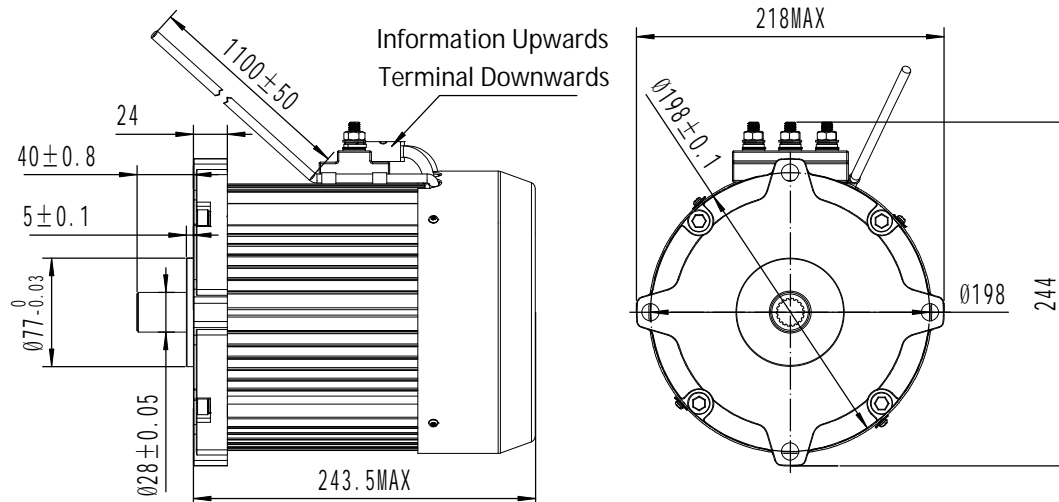
Working Environment Test	Storage at high temperature	should be tolerable of 85 and high temperature continuous test within 2h, no oil leak out of motor . After that rechecked insulation resistance should meet requirements of 5.2.7 in standard. After recovery, can still work at normal state with rated voltage, continuous torque and continuous power.	after high temperature continuous test 2h, no oil leak out of motor . After that rechecked insulation resistance is 200MΩ. After recovery, work at normal state with rated voltage, continuous torque and continuous power.	OK	
	Working under high temperature	can work at normal after 2h under 55 , and after test, rechecked insulation resistance should meet requirements of 5.2.7 in standard.	work at normal after 2h under 55, rechecked insulation resistance is 200MΩ.	OK	
	waterproof and dust proof	can meet IP44 at least	motor protection grade is IP65 and controller is IP67	OK	
Reliability		Test done as GB/T29307- 2012 reliability test diagram 1 and parameters selection table 1.	Driving system works at rated voltage, test speed $n_s$ at 1.1 time as rated speed $N$ , that is, $n_s=1.1nN$ , keep this loading in 320h	OK	
			Driving system works at max voltage, test speed $n_s$ at 1.1 times as rated speed $N$ , keep this loading 40h.	OK	
			Driving system works at min voltage, test speed $n_s$ at (min voltage/worknging voltage) $\times nN$ , keep this loading 40h.	OK	
			Driving system works at rated voltage, highest speed, and rated power, keep 2h.	OK	

Picture 1:



Picture 2:





Item	Current (A)	Power (W)	Speed (rpm)	Torque(NM)	Efficiency (%)
No Load	$\leq 8$	$150 \pm 10\%$	$1800 \pm 10\%$		
Rated Load	138A REF	3000REF	$1500 \pm 10\%$	18.3	89REF

Internal Spline Parameters		
Modulus	m	1
Teeth Qty	Z	18
Pressure Angle	$\alpha$	$20^\circ$
Pitch Diameter	d	18
Big Diameter	da	$20_{-0.041}^{+0.020}$
Small Diameter	d <sub>f</sub>	$18_0^{+0.018}$
Modification Coefficient	x	0.8
Pin Distance	M	$16.067_0^{+0.071}$
Pin Diameter	d	2.00
Centering Method	by side of tooth	
Tooth Roughness	Ra	$3.2 \sqrt{\text{ }}$

					HJ-ZW1-3KW				
						Drawing Signs		Weight	Ratio
									1:1
		Version No				Total Page: 1		Page: 1/1	
Designed by	Checked by	Approved by							
			Date						