TEST REPORT
EN ISO 12100:2010
Safety of machinery –General principles for design- Risk assessment and risk reduction

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Manufacturer's name	JINHUA JOYOR VEHICLE CO.,LTD.
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Factory's name	JINHUA JOYOR VEHICLE CO.,LTD.
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Test specification:	
Standard	EN ISO 12100:2010
Test procedure	N/A
Non-standard test method…..:	N/A
Test Report Form No.	EN ISO 12100 A
Master TRF	Dated 2012-12

Test item description	Electric Scooter
Trade Mark	N/A
Model/Type reference	S10-S, S11-S
Ratings	Input:67.2Vdc, 2.0A Battery:60Vdc, 22.4Ah Max.

Summary of testing:

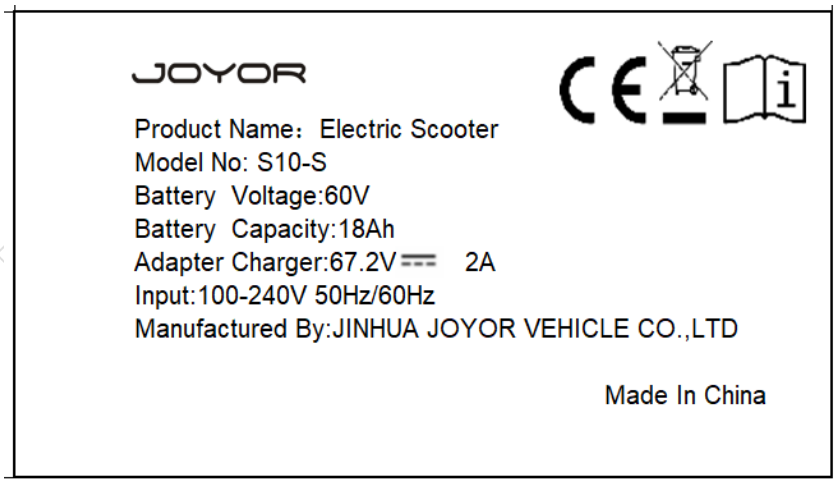
Model S10-S and S11-S are identical to each others, except for Battery capacity, All tests and assessments are performed on the prototype of the original sampled machine (S11-S) and the technical file which are submitted by the client.

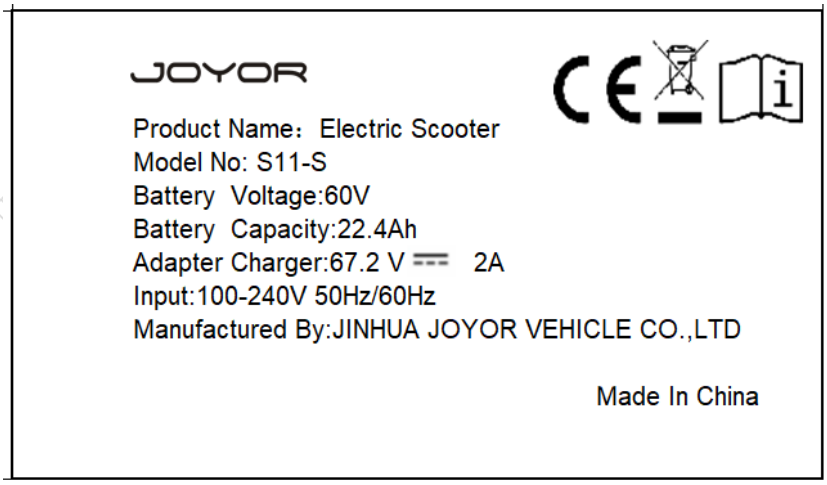
Risk assessment was carried according to EN ISO 12100:2010. Followed by risk assessment, protective measures have been implemented by the manufacturer for risk reduction. Iteration of this process have been carried out to eliminate hazards as far as practicable and to achieve appropriate risk reduction.

Tests performed (name of test and test clause):

Risk assessment was carried according to EN ISO 12100:2010.

Copy of marking plate





General product information:

Strategy for risk assessment and risk reduction:
To implement risk assessment and risk reduction the manufacturer take the following actions:

a) determine the limits of the machinery, include the intended use and any reasonably foreseeable misuse. The intended use of this scooter is for off-road use only.
Reasonably foreseeable misuse as below:

1. Riding on public road, it's dangerous to riding on public road, the scooter is not intended for riding on public road.
2. Riding on the scooter without wearing on personal protection equipment like a skateboard helmet, and knee and elbow pads and wrist guards.
3. Usage by disabled persons with single leg.
4. Riding on the scooter with single leg.
5. Riding on the scooter by handstand.
6. Riding on the U-shape stage, especially the vertical wall to perform the extreme sports.
7. Riding on the scooter to up or down the stairs.
8. Keep standing on the scooter when taking the escalator.
9. Play the scooter by children as a toy.
10. Usage of charger to supply or charge other appliance.
11. Disassemble the batteries inside the scooter for other usage.
12. Rushed to the ground with deep puddles.
13. Riding on ground with bumps and hollows.
14. Rush over the deceleration zone.
15. Keep reversing always like riding without eyes.

b) identify the hazards and associated hazardous situations, refer to page 8 to 11 of this risk assessment report.

c) estimate the risk for each identified hazard and hazardous situation; refer to page 8 to 11 of this risk assessment report.

d) evaluate the risk and take decisions about the need for risk reduction; protective measures are carried out to reduce the risk identified.

e) eliminate the hazard or reduce the risk associated with the hazard by means of protective measures; refer to page 8 to 11 of this risk assessment report.

Information for risk assessment

a) Related to machinery description:

1) anticipated machinery specifications,

i) Various phases of the whole life cycle of the machinery like produce, storage, transportation, handling, usage, cleaning, maintenance, service, disassemble are taken into consideration by the manufacturer.

ii) design drawing: like electric diagram, assemble diagram, production flow chart.

iii) required energy sources and supplied: the scooter is powered by rechargeable batteries.

2) documentation on previous designs of similar machinery, no such document since this is the 1st design of JINHUA JOYOR VEHICLE CO.,LTD.

3) information for use of the machinery: the original instruction.

b) Related to regulations, standards and other applicable documents:

1) applicable regulations: CE Machinery directive 2006/42/EC, EMC directive 2014/30/EU.

2) relevant standards:

Machinery directive 2006/42/EC	EMC directive 2014/30/EU
EN ISO 12100:2010 2006/42/EC Annex I	Refer to the EMC test report and Verification of compliance.

3）relevant technical specifications, refer to the marking label of scooter.

No.	Type or group	Hazard	Y/N	Notes
1	Mechanical hazards	Being run over	Y	
		Being thrown	Y	
		Crushing	N	
		Cutting or severing	N	
		Drawing-in or trapping	N	
		Entanglement	Y	
		Friction or abrasion	N	
		Impact	Y	
		Injection	N	
		Shearing	N	
		Slipping, tripping and falling	Y	
		Stabbing or puncture	N	
		Suffocation	N	
2	Electrical hazards	Burn	Y	
		Chemical effects	Y	
		Effects on medical implants	N	
		Electrocution	Y	
		Falling, being thrown	N	
		Fire	Y	
		Projection of molten particles	N	
		Shock	Y	
3	Thermal hazards	Burn	Y	
		Dehydration	N	
		Discomfort	N	
		Frostbite	N	
		Injuries by the radiation of heat sources	N	
		Scald	N	
4	Noise hazards	Discomfort	N	
		Loss of awareness	N	
		Loss of balance	N	
		Permanent hearing loss	N	
		Stress	N	
		Tinnitus	Y	
		Tiredness	N	
		Any other (e.g. mechanical, electrical) as a consequence of an interference with speech communication or with acoustic signals.	N	

No.	Type or group	Hazard	Y/N	Notes
5	Vibration hazards	Discomfort	N	
		Low-back morbidity	N	
		Neurological disorder	N	
		Osteo-articular disorder	N	
		Trauma of spine	N	
		vascular disorder	N	
6	Radiation hazards	Burn	N	
		Damage to eyes and skin	N	
		Effects on reproductive capability	N	
		Genetic mutation	N	
		Headache, insomnia, etc.	N	
7	Material/substance hazard	Breathing difficulties suffocation	N	
		Cancer	N	
		Corrosion	N	
		Effects on reproductive capability	N	
		Explosion	N	
		Fire	N	
		Infection	N	
		Mutation	N	
		Poisoning	N	
		Sensitization	Y	
8	Ergonomic hazards	Discomfort	N	
		Fatigue	N	
		Musculoskeletal disorder	N	
		stress	N	
		Any other(e.g. mechanical, electrical) as a consequence of human error	Y	
9	Hazards associated with environment in which the machine is used	Burn	N	
		Slight disease	N	
		Slipping, falling	Y	
		suffocation	N	
		Any other as a consequence of the effect caused by the sources of the hazards on the machine or parts of the machine	N	
10	Combination of hazards	e.g. dehydration, loss of awareness, heat stroke	N	

Each hazards situation is allocated a risk index according to the following matrix:

		Risk index calculation					
		O1		O2		O3	
		A1	A2	A1	A2	A1	A2
S1	F1	1				2	
	F2						
S2	F1	2			3		4
	F2	3	4		5		6

- a risk index of 1 or 2 corresponds to the lowest priority of action (priority 3)
- a risk index of 3 or 4 corresponds to a medium priority of action (priority 2)
- a risk index of 5 or 6 corresponds to the highest priority of action (priority 1)

Severity of harm: S

1）S1 slight injury (usually reversible)

2）S2 serious injury （usually irreversible, including fatality）

Frequency and/or duration of exposure to hazard: F

1）F1 twice or less per work shift or less than 15 min cumulated exposure per work shift

2）F2 more than twice per work shift or more than 15 min cumulated exposure per work shift

Probability of occurrence of the hazardous event: O

1) O1 mature technology, proven and recognized in safety application; robustness

2) O2 technical failure observed in the two last years:

- inappropriate human action by a well-trained person aware of the risks and having more than six months experience on the work station

3) O3 technical failure regularly observed (every six months or less):

- inappropriate human action by an untrained person having less than six months experiences on the work station;
- similar accident observed in the plant in the preceding ten years

Possibility of avoidance or reduction of harm: A

1）A1 possible under some conditions:

- if parts move at a speed less than 0,25 m/s

And the exposed worker is familiar with the risks and with the indications of a hazardous situation or impending hazardous event;

- depending on particular conditions (temperature, noise, ergonomics, etc.)

2) A2 impossible

Risk assessment (hazard identification)									
Ref. no.	**Task**	**Hazard**	**Hazardous situation**	**Hazardous events**	**S**	**F**	**O**	**A**	**Risk index**
1.	Riding	Being run over Impact	Approaching the moving machine	Being run over by the machine. Being impacted by the machine.	1	2	2	2	1
2.	Riding	Being thrown	Abrupt stop during moving.	Being thrown is possible with abrupt stop.	2	1	2	1	2
3.	Riding	Entanglement	Approaching the rotating wheels	Entanglement by the rotating wheels	1	2	2	2	1
4.	Riding	Slipping, tripping and falling	Lose of balance	Slipping from the foot pedal. Falling from the machine.	2	2	2	2	5
5.	Riding Charging	Burn Electrocution Fire Shock	Operation, commissioning or maintain	Contact live parts. Failure of basic insulation. Burn or fire due to short circuit.	2	2	2	2	5
6.	Charging	Chemical effects	Exposure of chemical substances and material.	Chemical effects are possible by batteries overvoltage.	2	2	2	2	5
7.	Charging	Burn	Explosion during charging.	Burn is possible by batteries overvoltage.	2	2	2	2	5
8.	Riding	Tinnitus	Riding on scooter.	Tinnitus is possible in persons with appropriate hearing.	1	2	2	2	1
9.	Charging Riding	Sensitization	Explosion during riding or charging.	Sensitization is possible when using chemical-physical-unsafe materials	2	1	2	2	3
10.	Riding	Any other(e.g.	Riding on scooter.	Any other (e.g. mechanical,	2	1	2	2	3

		mechanical, electrical) as a consequence of human error		electrical) as a con-sequence of human error is possible by cramped posture while learning					
11.	Riding	Slipping, falling	Standing on smooth pedal surface. Crash the projection of ground. Riding on ground with bumps and hollows. Rush over the deceleration zone with high speed.	Slipping, falling is possible by improper use or incorrect ground	2	2	2	2	5

Risk reduction and risk assessment after risk reduction						
Ref. no.	**Risk reduction Protective measures**	**Risk estimation after risk reduction**				
		S	**F**	**O**	**A**	**Risk index**
1.	1. Good visibility from the riding position, speed and braking control easily.	1	2	2	1	1
2.	1. Warning of residual risk. User shall keep low speed and play in the safe open area while learning how to control the scooter. All persons shall keep sufficient braking distance to avoid crash. Personal protection equipment like a skateboard helmet, and knee and elbow pads and wrist guards shall be wear on to reduce risk of injury.	2	1	2	1	2
3.	1. Wheels guard are provided to avoid entanglement.	1	2	2	1	1
4.	1. Foot pedal are made of slip-resistant material. 2. Warning of residual risk.	2	2	2	1	4
5.	1. Use of proven components. 2. Suitable design of IP protection degree. 3. Adequate and appropriate insulation is used. 4. Protection of indirect contact is provided by protective bonding and automatic disconnecting the power supply by overcurrent protection devices. 5. Overcurrent and overload protection are provided. 6. Warning labels against electric shock are affixed on the machine(s) and the instruction manual.	2	1	1	2	2

6.	1. Batteries are complied with IEC 62133. 2. Overcharge and overvoltage charging test are carried out according to EN 60335-1 to verify safety during overvoltage of batteries. 3. The batteries are totally covered by the scooter enclosure to avoid exposure of chemical substances and material once leakage occurs.	2	1	2	2	3
7.	1. Batteries are complied with IEC 62133. 2. Overcharge and overvoltage charging test are carried out according to EN 60335-1 to verify safety during overvoltage of batteries.	2	1	2	2	3
8.	1. Warning of residual risk. Personal protection equipment like ear plug or ear protection cover shall be wear on if tinnitus occurs during usage.	1	2	2	2	1
9.	1. The batteries are totally covered by the scooter enclosure to avoid exposure of chemical substances and material once leakage occurs.	2	1	1	2	2
10.	1. Warning of residual risk. Personal have no experience on riding such type of scooter shall be learn carefully and under the supervision of professional trainer.	2	1	2	2	3
11.	1. Foot pedal are made of slip-resistant material. 2. Warning of residual risk. Person shall not play the scooter on ground with bumps and hollows and shall not rush over the deceleration zone with high speed.	2	2	2	2	5

Photos

Figure 1. Over view 01 for Electric scooter

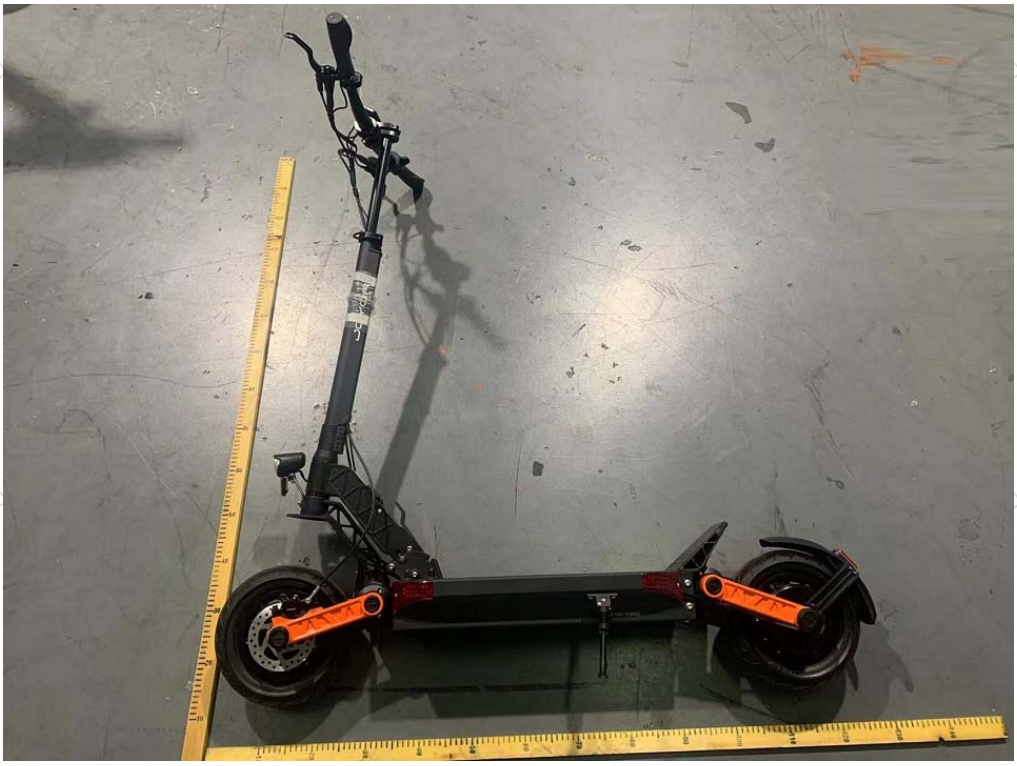


Figure 2. Over view 02 for Electric scooter

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