








<b>TEST REPORT</b> <b>EN 60204-1 &amp; EN ISO 12100</b> <b>Safety of machinery - Electrical equipment of machines Part 1:</b> <b>General requirements</b> <b>Safety of machinery - General principles for design- Risk assessment and risk reduction</b>	
<b>Report Number.....:</b>	<b>ATS231101016LR</b>
<b>Date of issue.....:</b>	Nov. 07,2023
<b>Total number of pages.....:</b>	28 pages
<b>Name of Testing Laboratory preparing the Report.....:</b>	Shenzhen ATS Testing Technology Co., Ltd. Floor 3, Building C, 6373 Baoan Avenue, Fuhai Street, Baoan District, Shenzhen
<b>Applicant's name.....:</b>	SHENZHEN QINGMAI BICYCLE CO.,LTD
<b>Address.....:</b>	15B, Fusen Building, Shuanghu Street, Guangming District, Shenzhen
<b>Test specification:</b>	
<b>Standard.....:</b>	EN ISO 12100:2010; EN 60204-1:2018
<b>Test procedure.....:</b>	CE-LVD/MD
<b>Non-standard test method.....:</b>	N/A
<b>Test Report Form No.....:</b>	ATSMD
<b>Test Report Form(s) Originator.....:</b>	ATS
<b>Master TRF.....:</b>	Dated 2021-03-01
<b>Test Item description .....</b>	Electric bike
<b>Trade Mark .....</b>	N/A
<b>Manufacturer(s).....:</b>	SHENZHEN QINGMAI BICYCLE CO.,LTD 15B, Fusen Building, Shuanghu Street, Guangming District, Shenzhen
<b>Model/Type reference .....</b>	V20,V2Pro, V20MAX, V30, V40,V50.V60,V80,C20, H9, H11
<b>Ratings .....</b>	Adaptor: Input: 100-240V~ 50/60Hz 2.0A Output: dc 54.6V==2A Electric bike: Input: dc 54.6V 2A

<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>		
<b>Testing Laboratory:</b>	Shenzhen ATS Testing Technology Co., Ltd.	
Testing location/ address.....	Floor 3, Building C, 6373 Baoan Avenue, Fuhai Street, Baoan District, Shenzhen	
Tested by (name + signature).....:	Damon Lee	
Approved by (name + signature).....:	Max Wang	



<b>List of Attachments:</b>	
<ul style="list-style-type: none"> <li>- Appendix 1: EN 60204-1:2018</li> <li>- Appendix 2: EN ISO 12100:2010</li> <li>- Appendix 3: Product photo</li> </ul>	
<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b>	<b>Testing location:</b>
Refer to appended clause table for details	Shenzhen ATS Testing Technology Co., Ltd. Floor 3, Building C, 6373 Baoan Avenue, Fuhai Street, Baoan District, Shenzhen
<b>Summary of compliance with National Differences (List of countries addressed):</b>	
<input checked="" type="checkbox"/> The product fulfils the requirements of EN ISO 12100:2010; EN 60204-1:2018	

<b>Copy of marking plate:</b>
<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p>Electric bike Model: V20 Input: dc 54.6V === 2A</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>SHENZHEN QINGMAI BICYCLE CO.,LTD Made In China</p> </div>
Note:
<ul style="list-style-type: none"> <li>- The above markings are the minimum requirements required by the safety standard. For the final production samples, the additional markings which do not give rise to misunderstanding may be added.</li> <li>- Size of ce mark must be in correct ratio and ≥ 5mm in height, and size of WEEE mark must be in correct ratio and ≥ 7mm in height</li> </ul>

**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..... : Nov. 01,2023

Date (s) of performance of tests.....: Nov. 01,2023-Nov. 07,2023

**General remarks:**

"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a  comma /  point is used as the decimal separator.

**When differences exist; they shall be identified in the General product information section.**

Name and address of factory (ies).....: SHENZHEN QINGMAI BICYCLE CO.,LTD  
15B, Fusen Building, Shuanghu Street, Guangming  
District, Shenzhen

**General product information and other remarks:**

The product is Electric bike , powered by AC mains, for outdoor use only, all the models are the same except model name and appearance

All tests were conducted on the representative model V20

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict

## Appendix 1:

1	Scope	Industrial machine	P
2	Normative references	Considered	P
3	Definitions	Considered	P
4	General requirements	Considered	P
4.1	General considerations (BS EN 1050; hazards, safeguarding (BS EN 292-2 cl. 4), inquiry form etc.)	Covered by Machinery Directive.	P
4.2	Selection of equipment	See below	P
4.2.1	General (compliance with EN or IEC standards)	Evidence for compliance with the relevant European regulations is given by licenses or Declarations of Conformity.	P
4.2.2	Electrical equipment in compliance with the IEC 61439 series	Not applicable	NA
4.3	Electrical supply (+10%, +1Hz, harmonics, unbalance, impulses, interruption, dips etc.)	Information regarding electric supply tolerances is in user manual. (380V±10%, 50/60±1%Hz)	P
4.4	Physical environment and operating conditions	See below	P
4.4.1	General (see annex B)	See below	P
4.4.2	Electromagnetic Compatibility (see EMC directive)	Considered.	P
4.4.3	Ambient Air Temperature (5-40°C) (see annex B)	0-45°C as stated in user manual.	P
4.4.4	Humidity (30-95%)	20-95%, as stated in user manual.	P
4.4.5	Altitude (1000m)	Max. 2000m, as stated in user manual.	P
4.4.6	Contaminants (see 11.3 and annex B for details)	The electric equipment is installed in proper cabinets and boxes. See 12.3 Suitable for use.	P
4.4.7	Ionizing and non-ionizing Radiation (see annex B)	Not intended to be exposed to radiation	NA
4.4.8	Vibration, Shock and Bump (see annex B)	Not required.	NA
4.5	Transportation and storage (-25-55°C/70°C)	-25 to +55°C for transportation and storage, as stated in user manual.	P
4.6	Provision for handling (see 13.4.6)	Information provided in user manual.	P
4.7	Installation (BS's for ergonomic design)	Information provided in user manual.	P
5	Incoming Supply Conductor Terminations and Devices for Disconnecting and Switching off	See below	P
5.1	Incoming supply conductor terminations (BS EN 60445, 5.2, 5.3.1 and 5.3.2d)	Power by adaptor	NA
5.2	Terminal for connection to the external	phase terminal;	NA

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Clause	Requirement + Test	Result - Remark	Verdict
	protective earthing system (table 1, 8.2.2 and BS EN 60445)	No earth connector	
5.3	Supply disconnecting (isolating) device	See below	P
5.3.1	General (for each supply)	Single power supply	P
5.3.2	Type - switch-disconnector (BS EN 60947-3 AC- 23B or DC-23B) - disconnector with auxiliary contact (BS EN 60947-3) - circuit-breaker (BS EN 60947-2) - plugsocket combination (16A3kW) - plug and socket-outlet (IP2XXXB, see 3.39 and 14.4.5)	Switch-disconnector (EN 60947-3) provided  NA  NA  NA  NA	P
5.3.3	Requirements (IEC 60417-5007, IEC 60417-5008, red handle for E-stop, padlock, stalled motor, etc.)	Disconnecter fulfills the requirements.	P
5.3.4	Operating handle (0.6-1.71.9m)	The handle of main disconnector is located at a height of 0.6~1.8m above the servicing level.	P
5.3.5	Excepted circuits (lighting, undervoltage, UPS, etc.)	No such circuit.	NA
5.4	Devices for switching off for prevention of unexpected start-up (disconnect of 5.3.2, 3.17 and 5.6)	The main disconnector can be locked in the OFF position, which can fulfill the requirement of the clause.	P
5.5	Devices for disconnecting electrical equipment (see 5.3, 5.3.2 and 5.6)	The main disconnector can be locked in the OFF position, which can fulfill the requirement of the clause.	P
5.6	Protection against unauthorized, inadvertent and/or mistaken connection (see 5.4, 5.5 and 5.3.2 d)	The main disconnector can be locked in the OFF position, which can fulfill the requirement of the clause.	P
6	Protection against electric Shock	See below	P
6.1	General	See below	P
6.2	Protection against direct contact	See below	P
6.2.1	General (see 6.2, IEC 60364-4 and EN 60529 IP4XXXB)	See below	P
6.2.2	Protection by enclosures (general > IP4X; a) opened by tool and without disconnect > IP2X inside; b) disconnect with interlock > IP2X inside; c) without tool and without disconnect > IP2X and interlock for barrier)	- Live parts inside the electrical cabinet are provided protection against direct contact: IP5X - All openings (cable or wiring go through) are protected by cable glands or ducts properly. - top surface of cabinet > IP5X	P
6.2.3	Protection by insulation of live parts	All of the electrical components with	P

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Clause	Requirement + Test	Result - Remark	Verdict
	(completely covered)	high voltage are inside the enclosure. Live parts are insulated.	
6.2.4	Protection against residual voltage (60V5sec or 60 $\mu$ C1sec or IP2X)	Warnings of the electrical shock are attached on the enclosure of invertors.	P
6.2.5	Protection by barriers (see 412.2 of IEC 60364-4-41)	Not used.	NA
6.2.6	Protection by placing out of reach or protection by obstacles (see 412.4 and 412.3 of IEC 60364-4- 41)	Not used.	NA
6.3	Fault protection	See below	P
6.3.1	General (see 3.27, 6.3.2 to 6.3.3)	See below	P
6.3.2	Prevention of the occurrence of a touch voltage	See below	P
6.3.2.1	General	See below	P
6.3.2.2	Protection by use of class II equipment or by equivalent insulation	class II construction is used for accessible part.	P
6.3.2.3	Protection by electrical separation	No used.	NA
6.3.3	Protection by automatic disconnection of supply	The conductive parts connecting to the PE system and the over-current protection devices (approved circuit breaker and fuse) provided.	P
6.4	Protection by the use of PELV	See below	P
6.4.1	GENERAL REQUIREMENTS (25/60V AND 615 ETC.)	240V AC	P
6.4.2	SOURCES FOR PELV	Switching power supply.	P
7	Protection of Equipment	See below	P
7.1	General	See below	P
7.2	Overcurrent protection	See below	P
7.2.1	General	Circuit breaker and fuse are used as overcurrent protection devices.	P
7.2.2	Supply conductor (data for installation protection device)	Relevant information provided in the circuit diagram.	P
7.2.3	Power circuits (7.2.10, neutral conductor, etc.)	1. INFORMATION OF WIRE SIZES AND OVER CURRENT PROTECTION RATING IN CIRCUIT DIAGRAM ARE CHECKED.  2. OVERCURRENT PROTECTIVE DEVICES ARE APPLIED TO EACH LIVE CONDUCTOR.  3. Wire sizes are in compliance with tables 5,6	P
7.2.4	Control circuits (connection to safety ground)	Control circuits are fed by switching power supply and transformer; Control circuits are connected to the protective bonding circuit. Circuit breakers are used for overcurrent protection of AC control circuit.	P
7.2.5	Socket outlets and their associated conductors (for each socket outlet)	Overcurrent protection provided.	P

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.6	Lighting circuits (unearthed conductor)	Checked and ok.	P
7.2.7	Transformers (see 7.2.10)		P
7.2.8	Location of overcurrent protective devices (conductor, reduction for less 3m and own duct)	Over-current protection devices are provided at the points where the conductors to be protected are connected to its supply.	P
7.2.9	Overcurrent protective devices (must readily available in country of use)	Considered	P
7.2.10	Rating and setting of overcurrent protective devices (as low as possible)	The rating and setting of the overcurrent protective devices are checked and ok.	P
7.3	Protection of motors against overheating	See below	P
7.3.1	General (more than 0.5kW, restart not possible)		P
7.3.2	Overload protection	Protection circuit used.	P
7.3.3	Over-temperature protection (IEC 60034-11)	Protection circuit used.	P
7.3.4	Current limiting protection	Protection circuit used.	P
7.4	Abnormal temperature protection (heater protection)	Protection circuit and overcurrent protection used.	P
7.5	Protection against supply interruption or voltage reduction and subsequent restoration (undervoltage device, restart not possible)	Considered.	P
7.6	Motor overspeed protection (see 9.3.2)	Not safety relevant.	NA
7.7	Earth fault residual current protection (see 6.3)	No such protection used.	NA
7.8	Phase sequence protection	Not safety relevant.	NA
7.9	Protection against overvoltage due to lightning and to switching surge	No such device is used on the machine.	NA
7.10	Short-circuit current rating		P
8	Equipotential Bonding	See below	P
8.1	General	See below	P
8.2	Protective conductors	See below	P
8.2.1	General (Figure 2, all stress, etc.)	PE circuit with sufficient strength provided.	P
8.2.2	Protective conductors (13.2.2, size in accordance with Table 1)	THE PROTECTIVE COPPER CONDUCTOR IN POWER SUPPLY CABLE IS CONNECTED TO THE TERMINAL. EVERY CONDUCTIVE PART OF THE EQUIPMENT IS CONNECTED TO THE RELEVANT EARTHING TERMINAL. THE GREEN-AND-YELLOW PE	P

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Clause	Requirement + Test	Result - Remark	Verdict
		CIRCUIT WITH SUFFICIENT STRENGTH PROVIDED.	
8.2.3	Continuity of the protective bonding circuit (Doors, hinges etc. need conductor, except for PELV etc.)	1. All conductive parts protected by enclosure	P
8.2.4	Exclusion of switching devices from the protective bonding circuit	No switching devices are used in PE circuit.	NA
8.2.5	Parts that need not be connected to the protective bonding circuit (insulation failure unlikely, 50x50mm <sup>2</sup> )		P
8.2.6	Protective conductor connecting points (IEC 60417- 5019 or green-and-yellow, PE only for supply terminal)	<ul style="list-style-type: none"> <li>The protective conductor connecting points used only for connection functions;</li> <li>The symbol acc. 60417- 5019 is used in other earthing terminals;</li> <li>One connecting point for only one conductor.</li> </ul>	P
8.2.7	Mobile machines	Stationary machine.	NA
8.2.8	Additional protective bonding requirements for electrical equipment having earth leakage current higher than 10mA a.c. or d.c.	No this kind of leakage current.	NA
8.3	Measures to restrict the effects of high leakage current	See 8.2.8.	NA
8.4	Functional bonding (insulation failure and EMI, see 4.4.2 and 9.4.3.1)	Considered	P
9	Control Circuits and Control Functions	See below.	P
9.1	Control circuits	See below	P
9.1.1	Control circuit supply (Transformer, except for less than two controls etc.)	Evidence about compliance with applicable regulations are provided; Transformer used.	P
9.1.2	Control circuit voltages (< = 277V)	60V DC <	P
9.1.3	Protection (7.2.4 and 7.2.10)	Protected by fuse according to 7.2.4,7.2.10	P
9.2	Control functions	See below	P
9.2.1	Start functions (9.2.5.2)	Start by energizing the corresponding circuit.	P
9.2.2	Stop functions (category 0, 1, and 2 etc.)	Stop function of category off used.	P
9.2.3	Operating modes (separate action for mode selector functions etc.)	Switch provided for mode selection with same safety level.	NA
9.2.4	Suspension of safeguards (hold-to-run, speed limiting, range of motion )	Not applicable	NA
9.2.5	Operation	See below	P
9.2.5.1	General (interlock see 9.3)	Safety protection provided.	P
9.2.5.2	Start	The start can be operated only when all	P



EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
	(safeguard in place, interlocks with sequential starting ...)	safeguards are in places and functional.	
9.2.5.3	Stop (category depends on risk assessment based on BS EN 1050 ...)	See 9.2.2.	P
9.2.5.4	Emergency operations (emergency stop, emergency switching off)	See below	P
9.2.5.4.1	General	See below	P
9.2.5.4.2	Emergency stop (see ISO 13850, category 01 stop, see 9.2.5.3, 9.2.2)	E-stop is correctly placed in the workstation and Category 0 provided.	P
9.2.5.4.3	Emergency switching off (see IEC 60364-4-53, 536.4)	No emergency switching off is provided.	NA
9.2.5.5	Monitoring of command actions (for hazardous movement)	From working position, the operator can monitor the command actions.	P
9.2.6	Other control functions	See below	P
9.2.6.1	Hold-to-run controls (continuous actuation)		P
9.2.6.2	Two-hand control (type I, II, and III...)	No two-hand control is used.	NA
9.2.6.3	Enabling device (see also 10.9)	No enabling devices provided.	NA
9.2.6.4	Combined start and stop controls (for secondary function only)	No such control device	NA
9.2.7	Cableless control	No cableless control used.	NA
9.2.7.1	General	Not applicable	NA
9.2.7.2	Control limitation	Not applicable	NA
9.2.7.3	Stop (see annex B)	Not applicable	NA
9.2.7.4	Use of more than one operator control station	Not applicable	NA
9.2.7.5	Battery-powered operator control stations	Not applicable	NA
9.3	Protective interlocks	See below.	P
9.3.1	Reclosing or resetting of interlocked safeguards (no automatic start...)	Compliant	P
9.3.2	Exceeding operating limits	Compliant	P
9.3.3	Operation of auxiliary functions (Sensors...)	Checked by control system .	P
9.3.4	Interlocks between different operations and for contrary motions (interlock against contrary motion)	Appropriate interlock has been provided for related parts.	P
9.3.5	Reverse current braking (time function is not possible...)	Not applicable	NA
9.4	Control functions in case of failure	See below	P
9.4.1	General requirements (protective device, proven techniques, redundancy, functional tests...)	Measures to reduce those risks include but are not limit to : -use of proven circuit techniques and components	P
9.4.2	Measures to minimize risk in the event of failure	See below	P
9.4.2.1	Use of proven circuit techniques and components	Compliant	P

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Clause	Requirement + Test	Result - Remark	Verdict
	(one terminal, de-energizing for stop, positive open operation, design...)		
9.4.2.2	Provisions of partial or complete redundancy (on-line, off-line...)	Compliant	P
9.4.2.3	Provision of diversity (combination of open and closed contacts, different components, electrical and non-electrical systems...)	Compliant	P
9.4.2.4	Provision for functional tests (automatic or manually (17.2 and 18.6)...) )	Functional tests were carried out during inspection.	P
9.4.3	Protection against maloperation due to earth faults, voltage interruptions and loss of circuit continuity	See below.	P
9.4.3.1	Earth faults (method a, b, c)	Control circuit is protected according to method a.1).	P
9.4.3.2	Voltage interruptions (7.5...)	See clause 7.5.	NA
9.4.3.3	Loss of circuit continuity	No sliding contacts are used for safety function circuit.	NA
10	Operator Interface and Machine mounted Control Devices	See below	P
10.1	General	See below	P
10.1.1	General device requirements (IEC 61310 and IEC 60447)	Meaning of the switches is marked, 'I' and 'O' are also marked near the switches.	P
10.1.2	Location and mounting (>= 0.6m...)	0.6 - 1.8m	P
10.1.3	Protection (IPXXD, EN 60529...)	At least IP42, sealing provided for control panel.	P
10.1.4	Position sensors (no damage...)	None.	NA
10.1.5	Portable and pendant control stations	None.	NA
10.2	Actuators	See below.	P
10.2.1	Colors (table 2, red and yellow!...)	<i>Run - green</i> Stop – red	P
10.2.2	Markings (IEC 60417, EN 50099...)	Meaning of the switches is marked	P
10.3	Indicator lights and displays	See below.	P
10.3.1	Modes of use (Red, yellow, green...)	Complied.	P
10.3.2	Colors (BS EN 50099...)	Complied.	P
10.3.3	Flashing lights and displays (Immediate action...)	Red for emergency conditions.	P
10.4	Illuminated push-buttons (table 2 and 4...)	None.	NA

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
10.5	Rotary control devices (Rotation...)	Emergency stop switch and switches are mounted in such way as to prevent rotation of the stationary member.	P
10.6	Start devices (Inadvertent operation...)	Inadvertent operation is not expected due to its construction.	P
10.7	Emergency stop devices	See below	P
10.7.1	Location of emergency stop devices (see 9.2.7.3)	One emergency stop device is provided in the working position.	P
10.7.2	Types of emergency stop device (push-button, pull-cord, and pedal-operated)	Push-button type emergency stop device are used, self-latching type and positive opening operation used.	P
10.7.3	Color of actuators (red and yellow)	Red actuators.	P
10.7.4	Local operation of the supply disconnecting device to effect emergency stop (disconnecting device based on 5.3.2 a), b) or c); color see 10.7.3)	No such function.	NA
10.8	Emergency switching off devices	Not applicable	NA
10.8.1	LOCATION OF EMERGENCY SWITCHING OFF DEVICES	Not applicable	NA
10.8.2	TYPES OF EMERGENCY SWITCHING OFF DEVICE (push-button operated, pull-cord operated, see EN 60947-5-1)	Not applicable	NA
10.8.3	Color of actuators (Red and Yellow background)	Not applicable	NA
10.8.4	Local operation of the supply disconnecting device to effect emergency switching off (see 10.8.3)	Not applicable	NA
10.9	Enabling control device (position 123)	Not applicable	NA
11	Controlgear: location, mounting and enclosures	See below	P
11.1	General requirements	See below	P
11.2	Location and mounting	See below	P
11.2.1	Accessibility and maintenance (0.4-2.0m, see 13.4.5)	Terminals are above 0.2m from the servicing level. All of controlgears are about 0.4m from the servicing level. No devices mounted on door.	P
11.2.2	Physical separation or grouping (power circuits, associated control circuits, other)	Controls in power circuit and control circuit, terminals are arranged in groups separately.	P

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Clause	Requirement + Test	Result - Remark	Verdict
11.2.3	Heating effects (limits...)	Sufficient space inside the electric cabinet.	P
11.3	Degrees of protection (at least IP22 for enclosures of controlgear, see EN 60529...)	The enclosure of the control device is at least IP44	P
11.4	Enclosures, doors and openings (doors <= 0.9m, no openings between liquids and electrical devices, fasteners of captive type...)	The screws are standard size; The width of the door is less than 0.9m; Opening angle: > 95° Enclosure material is steel and the gasket material are used.	P
11.5	Access to controlgear (see 481.2.4 of IEC 60364-4-81, 0.7m x 2.0m...)	No gangway	NA
12	Conductors and Cables	See below	P
12.1	General requirements (EN 60439-1...)	See below	P
12.2	Conductors (table 5 )	Cross section of wiring at least 0.5 mm <sup>2</sup> Copper conductors meet the requirement of table 5, 6.	P
12.3	Insulation (PVC, 2000V test voltage, 500V for PELV, see IEC 60364-4-41, class III equipment...)	PVC insulated copper conductors are used. Insulation test conducted: 2000V, 5min;	P
12.4	Current-carrying capacity in normal service (table 5, table 6, and D2...)	The conductor sizes are checked according to Table 6.	P
12.5	Conductor and cable voltage drop (<= 5%...)	Voltage drop is less than 5%.	P
12.6	Flexible cables	See below	P
12.6.1	General (table D.4...)	Class 5 conductors are inside the flexible cables.	P
12.6.2	MECHANICAL RATING (15 Nmm <sup>2</sup> ...)	The cables are properly fixed and protected.	P
12.6.3	FLEXIBLE CABLES (table 7, see clause 44 of IEC 60621-3)	No cables wound on drums.	NA
12.7	CONDUCTOR WIRES, CONDUCTOR BARS AND SLIP-RING ASSEMBLIES	No collector wires, collector bars or slip-ring assemblies used.	NA
12.7.1	PROTECTION AGAINST DIRECT CONTACT (SEE 412.2.2 OF IEC 60364-4-41)	Not used.	NA
12.7.2	PROTECTIVE CONDUCTOR CIRCUIT	Not used.	NA

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Clause	Requirement + Test	Result - Remark	Verdict
12.7.3	PROTECTIVE CONDUCTOR CURRENT COLLECTORS	Not used.	NA
12.7.4	REMOVABLE CURRENT COLLECTORS WITH A DISCONNECTOR FUNCTION  (SEE 8.2.4)	Not used.	NA
12.7.5	CLEARANCES IN AIR	Not used.	NA
12.7.6	CREEPAGE DISTANCES	Not used.	NA
12.7.7	CONDUCTOR SYSTEM SECTIONING	Not used.	NA
12.7.8	CONSTRUCTION AND INSTALLATION OF COLLECTOR WIRE , COLLECTOR BAR SYSTEMS AND SLIP-RING ASSEMBLIES	Not used.	NA
13	WIRING PRACTICES	See below	P
13.1	CONNECTIONS AND ROUTING	See below	P
13.1.1	GENERAL REQUIREMENTS  (LOOSENING, ONE TERMINAL, CORRESPOND WITH SCHEMATICS, NO SOLDER, EN 60947-7-1, NO CROSS OVERS...)	The connections are protected against loosening. One PE conductor is connected to one terminal. No solder connections. All terminals and conductors are marked according to 13.2.1.	P
13.1.2	Conductor and cable runs (from terminal to terminal, no strain to termination, ...)	Direct run of wiring from terminal to terminal, no cross over, no extended strain and no splices or joints.	P
13.1.3	Conductors of different circuits (insulation for highest voltage, separation of live conductors before disconnect or marked with different color...)	All conductors are insulated for the highest voltage.	P
13.1.4	Connection between pick-up converter of an inductive power supply system (as short as possible...)	Not applicable.	NA
13.2	Identification of conductors	See below	P
13.2.1	General requirements	Color and Alphanumeric, or color and number identification used.	P
13.2.2	Identification of the protective conductor (60417-IEC-5019 symbol or green- and-yellow...)	Earth conductor marking is found; The GREEN-AND-YELLOW conductor is used only for protective conductor; 60417-IEC-5019 symbols used except terminal for main earthing conductor.	P

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
13.2.3	Identification of the neutral conductor (Light blue (3.2.2 of IEC 60446)...) )	No neutral conductor used	NA
13.2.4	Identification of other conductors (black > power, red > control, orange > interlock...)	In compliance with color code	P
13.3	Wiring inside enclosures (IEC 60332, 11.2.1, 8.2.3...)	Easy maintenance.	P
13.4	Wiring outside enclosures	See below	P
13.4.1	General requirements (individual glands, bushings, ...)		P
13.4.2	External ducts (13.5, ...)	Flexible conduit is used.	P
13.4.3	Connection to moving elements of the machine (12.2, 12.6, flexible conduit, 25mm, no metallic conduits, ...)	None.	NA
13.4.4	Interconnection of devices on the machine (no in series connection of devices...)	Through terminals.	P
13.4.5	Plugsocket combinations (safety ground first, > 16A must be locked, identification, see 6.2.4 and IEC 60309-1...)	None.	NA
13.4.6	Dismantling for shipment (protected, ...)	None.	NA
13.4.7	Additional conductors (spare conductors)	Not applicable	NA
13.5	Ducts, connection boxes and other boxes	See below	P
13.5.1	General requirements (No edges, separation from liquids...)	Fulfilled.	P
13.5.2	Rigid metal conduit and fittings (Corrosion...)	Not used.	NA
13.5.3	Flexible metal conduit and fittings	Not used.	NA
13.5.4	Flexible non-metallic conduit and fittings	Considered	P
13.5.5	Cable trunking systems	Not used.	NA
13.5.6	Machine compartments and cable trunking systems	Considered	P
13.5.7	Connection boxes and other boxes (see 11.3)	Considered.	P
13.5.8	Motor connection boxes	No other components inside.	P
14	Electric Motors and associated Equipment	See below	P
14.1	General requirements (EN 60034-1, 7.3, 7.6, 7.2, 5.3, 5.4,	Complied with EN 60034-1.	P

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
	5.5, 7.5, 7.6, 9.4, 11...)		
14.2	Motor enclosure (EN 60034-5, IP23...)	Complied with EN 60034-5.	P
14.3	Motor dimensions (IEC 60072-1, IEC 60072-2...)	Not safety related.	NA
14.4	Motor mounting and compartments (EN 60034-1, guarding...)	Adequately protected and easily accessed.	P
14.5	Criteria for motor selection (EN 60034-1, IEC 60146, ...)	Suitable for operation	P
14.6	Protective devices for mechanical brakes	Not applicable	NA
15	Socket-outlets and lighting	See below	NA
15.1	Socket-outlets for accessories (socket-outlets based on EN 60309-1, see 6.4, 7.2, 7.3, 5.3.5...)	No such kinds of socket-outlets are used.	NA
15.2	Local lighting of the machine and equipment	No local lighting used. Ambient lighting sufficient for operation.	NA
15.2.1	General (see 8.2.2, 4.4.2...)	Not used.	NA
15.2.2	Supply (≤ 50V, 250V, one source like transformer, separate overcurrent protection, factory lighting, 7.2.6...)	Not used.	NA
15.2.3	Protection (7.2.6...)	Not used.	NA
15.2.4	Fittings (lampholders based on IEC, ...)	Not used.	NA
15.2.3	Protection		NA
15.2.4	Fittings		NA
16	Marking, warning signs and reference designations	See below	P
16.1	General	See below	P
16.2	Warning signs (IEC 60417-5036, no disconnect, ...)	Flash Warning label is marked.	P
16.3	Functional identification (IEC 60417, ISO 7000...)	Appropriate identifications provided.	P
16.4	Marking of equipment (name, mark, ratings, IEC 62023...)	Required information provided in the nameplate.	P
16.5	Reference designation	Suitable designation provided.	P
17	Technical Documentation	See below	P

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
17.1	General (see annex B)	The information provided is considered adequate and in English	P
17.2	Information to be provided (description, supply requirements, environment, block diagram, schematics, sequence of operation, inspection, functional tests, maintenance, part lists...)	The documentation provided is considered complete, see also below	P
17.3	Requirements applicable to all documentation (IEC 61082, IEC 61346 IEC 62079, IEC 62027, cross-reference, ...)	Relevant information provided in the user manual.	P
17.4	Installation documents (supplies, drawing, location, Annex B, interconnection drawing...)	Sufficient information is given in the user manual.	P
17.5	Overview diagrams and function diagrams (IEC 61082series ...)	Not required	NA
17.6	Circuit diagram (IEC 60617, cross-reference...)	Circuit diagram provided in the user manual.	P
17.7	Operating manual (see also product specific standard, 1.7.4 in Annex I of Machinery Directive...)	Checked by inspection.	P
17.8	Maintenance manual	Checked by inspection.	P
17.9	Parts list	Parts list of electric components are provided	P
18	Verification	See below	P
18.1	General	See below	P
18.2	Verification of conditions for protection by automatic disconnection of supply	See below	P
18.2.1	General	TN system	P
18.2.2	Test 1 – Verification of the continuity of the protective bonding circuit		P
18.2.3	Test 2 – Fault loop impedance verification and suitability of the associated overcurrent protective device		P
18.2.4	Test methods in TN-systems	Test 1 performed, measured voltage drop between the PE terminal and test point is Max:0.02V Test 2 shall be verified under final installation.	P
18.2.4	Application of the test methods for TN-systems	See 18.2.2	P



EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict
18.3	Insulation resistance tests (500Vdc, > 1 MΩ...)	Resistance is more than 50MΩ	P
18.4	Voltage tests (1000Vac, 1 sec, 500VA...)	No breakdowns were recorded	P
18.5	Protection against residual voltages (6.2.4...)	Not applicable.	NA
18.6	Functional tests (all safety related functions and components...)	Tested and OK.	P
18.7	Retesting (after modifications...)	Not applicable.	NA
Annex A	Fault protection by automatic disconnection of supply	Not applicable	NA
Annex B	Enquiry form for the electrical equipment of machines		P
Annex C	Examples of machines covered by this part of IEC 60204		P
Annex D	Current-carrying capacity and overcurrent protection of conductors and cables in the electrical equipment of machines		P
Annex E	Explanation of emergency operation functions		NA
Annex F	Guide for the use of this part of IEC 60204		P
Annex G	Comparison of typical conductor cross-sectional areas		P
Annex H	Measures to reduce the effects of electromagnetic influences		P

EN 60204-1:2018			
Clause	Requirement + Test	Result - Remark	Verdict

Test Equipment      CE multi tester 1.103  
 Test conditions      2A  
 Date:                    Nov. 18,2022

### 1. Continuity of the protective bonding circuit

Test Points	Test Result(mΩ)	Test Current(A)	Voltage Drop(V)
Motor	74	10	0.76

### 2. Insulation Resistance

Test Points	Test Result(MΩ)
Motor	766

### 3. Withstanding Voltage

Test Points	Breakdown
L, N - Enclosure	No
L, N - output	No

## Appendix 2:

### I. Introduction.

In general this risk assessment report for the MCA Unit Loader, model ASS'Y-2020-WD and its variants made by Beijing Sunshine Technology Co., Ltd. was carried out in accordance with the requirements of Machinery Directive and the standards of EN ISO 12100-2010.

After the first assessment, some measures to eliminate the risks are given for the modification of machine or of relative documents with taking into account the explicit C-type EN standard or related B-type standard. While taking appropriate provisions for the existing risks, the procedures and principles to eliminate the risk according to the most general B-type standard for any kind of machine, EN ISO 12100-2010, are followed, i.e.:

- First step: consider the possibility of eliminating risk at design stage.
- Second step: if impossible, protect the dangerous zone with appropriate design of safety guard or safety device.
- Third step: If above impossible, give warning signs to draw attention of operators about the residual risks.

In addition, some check list drawn from the explicit C-type EN standards, which are found suitable for or near the characteristic of this machine, are used to help developing the provisions for the elimination of the risks. Finally the risk assessment was carried out again to ensure this machine and its relative documents are totally compliance with the Machinery Directive.

### II. Risk assessment Methodology

This risk assessment report is based on the methods mentioned in the EN ISO 14121 and DINV 19250 standards, and the 4 factors S-A-G-W have been used for evaluating the level of risks.

S: Severity of possible harm

- S1: Slight (normally reversible)
- S2: Serious (normally irreversible)
- S3: Cause a few men die
- S4: Calamity or cause many men die

A: Frequency and duration of exposure

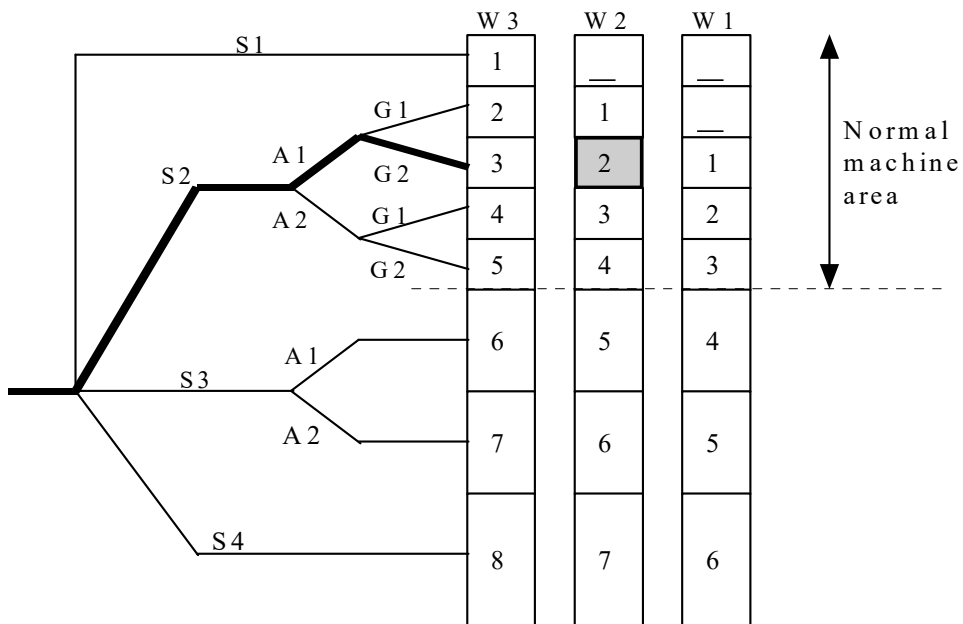
- A1: Seldom to very often
- A2: Frequent to continuous

G: Possibilities of avoidance

- G1: Possible
- G2: Impossible

W: Probability of occurrence of harm

- W1: Low
- W2: Medium
- W3: High



#### Solutions for the level of hazards

- 1: Protected by warning sign
- 2: Protected by guard and warning sign
- 3: Consider the other design, choose the best one, add both guard and warning sign
- 4: Consider another two designs, choose the best one, add both guard and warning sign
- 5: Consider another three designs, choose the best one, add both guard and warning sign

**2. Risk assessment and risk reduction**

<b>Risk assessment and risk reduction</b>					
<b>Machine</b>		MCA Unit Loader		<b>Analyst</b>	Damon Lee
<b>Sources</b>		Specifications, preliminary design		<b>Extent</b>	Use phase: setting and operation
<b>Method</b>		Checklists: BS EN ISO 12100: 2010 Annex B		<b>Date</b>	Nov. 18,2022
<b>No.</b>	<b>Type of group</b>	<b>Hazards</b>		<b>Risk reduction Protective measures</b>	
		<b>origin</b>	<b>Potential consequences</b>		
<b>1</b>	Mechanical hazards	moving elements rotating elements sharp edges	crushing drawing-in or trapping entanglement stabbing or puncture	Fixed guards, emergency stop, and warning signs are used to eliminate these hazards. Round the sharp edges.	
<b>2</b>	Electrical hazards	live parts overload short-circuit parts which have become live under fault conditions	fire shock	Attach the flash warning out of the electrical cabinet, And the door must be opened by the key which kept by skilled operator. Protecting bonding circuits are used for protection. BS EN 60204-1 applied.	
<b>3</b>	Thermal hazards	objects or materials with a high or low temperature	scald	Cooling system, fixed guards and interlocking moveable guards are used to eliminate this hazard.	
<b>4</b>	Noise hazards	manufacturing process	discomfort	Eliminate the noise source.	
<b>5</b>	Vibration hazards	none	none	none	
<b>6</b>	Radiation hazards	none	none	none	
<b>7</b>	Material substance hazards	none	none	none	
<b>8</b>	Ergonomic hazards	posture	discomfort fatigue	Operation actuators were designed in a height of 0.6m to 1.8m.	
<b>9</b>	Hazards associated with the environment in which the machine is used	none	none	none	

EN ISO 12100:2010

<b>10</b>	Combination of hazards	none	none	none
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No.	Hazards source	S	A	G	W	Level
1.1	Crushing	S2	A2	G2	W2	4
<b>Where</b>	<i>Working area.</i>					
<b>When</b>	<i>Machine is running and maintenance.</i>					
Improvement result						
Method		S	A	G	W	Level
<i>Fixed guards, emergency stop, and warning signs are used to eliminate this hazard.</i>		S2	A1	G1	W1	-

No.	Hazards source	S	A	G	W	Level
1.2	Drawing-in or trapping	S2	A2	G2	W2	4
<b>Where</b>	<i>Rotating elements</i>					
<b>When</b>	<i>Machine is running and maintenance.</i>					
Improvement result						
Method		S	A	G	W	Level
<i>Fixed guards, emergency stop, and warning signs are used to eliminate this hazard.</i>		S2	A1	G1	W1	-

No.	Hazards source	S	A	G	W	Level
1.3	Entanglement	S2	A2	G2	W2	3
<b>Where</b>	<i>Rotating elements</i>					
<b>When</b>	<i>Machine is running and maintenance.</i>					
Improvement result						
Method		S	A	G	W	Level
<i>Fixed guards, emergency stop, and warning signs are used to eliminate this hazard.</i>		S2	A1	G1	W1	-

No.	Hazards source	S	A	G	W	Level
1.4	Stabbing or puncture	S2	A2	G1	W2	3
<b>Where</b>	<i>Machine body.</i>					
<b>When</b>	<i>All the time.</i>					
Improvement result						
Method		S	A	G	W	Level
<i>Round the sharp edges.</i>		S2	A1	G1	W1	-

No.	Hazards source	S	A	G	W	Level
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<b>2.1</b>	Contact with live parts	<b>S2</b>	<b>A1</b>	<b>G2</b>	<b>W2</b>	<b>2</b>
<b>Where</b>	<i>Working area and electrical cabinet.</i>					
<b>When</b>	<i>Machine is running and maintenance.</i>					
<b>Improvement result</b>						
<b>Method</b>		<b>S</b>	<b>A</b>	<b>G</b>	<b>W</b>	<b>Level</b>
<i>Attach the flash warning out of the electrical cabinet. And the door must be opened by the key which kept by skilled operator. All live parts are suitable protected. EN 60204-1 applied.</i>		<b>S2</b>	<b>A1</b>	<b>G1</b>	<b>W1</b>	<b>-</b>

<b>No.</b>	<b>Hazards source</b>	<b>S</b>	<b>A</b>	<b>G</b>	<b>W</b>	<b>Level</b>
<b>2.2</b>	Contact with parts which have become live under faulty conditions	<b>S2</b>	<b>A1</b>	<b>G2</b>	<b>W2</b>	<b>2</b>
<b>Where</b>	<i>Working area and electrical cabinet.</i>					
<b>When</b>	<i>Machine is running and maintenance.</i>					
<b>Improvement result</b>						
<b>Method</b>		<b>S</b>	<b>A</b>	<b>G</b>	<b>W</b>	<b>Level</b>
<i>Attach the flash warning out of the electrical cabinet. And the door must be opened by the key which kept by skilled operator. All live parts are suitable protected. EN 60204-1 applied.</i>		<b>S2</b>	<b>A1</b>	<b>G1</b>	<b>W1</b>	<b>-</b>

<b>No.</b>	<b>Hazards source</b>	<b>S</b>	<b>A</b>	<b>G</b>	<b>W</b>	<b>Level</b>
<b>3</b>	Scald	<b>S2</b>	<b>A2</b>	<b>G2</b>	<b>W2</b>	<b>4</b>
<b>Where</b>	<i>Hot surface, hot elements.</i>					
<b>When</b>	<i>Machine is running and maintenance</i>					
<b>Improvement result</b>						
<b>Method</b>		<b>S</b>	<b>A</b>	<b>G</b>	<b>W</b>	<b>Level</b>
<i>Cooling system, fixed guards and interlocking moveable guards are used to eliminate this hazard.</i>		<b>S2</b>	<b>A1</b>	<b>G1</b>	<b>W1</b>	<b>-</b>



No.	Hazards source	S	A	G	W	Level
4	Noise	S1	A2	G2	W2	1
<b>Where</b>	<i>Around the machine.</i>					
<b>When</b>	<i>Machine is running.</i>					
<b>Improvement result</b>						
<b>Method</b>		S	A	G	W	Level
<i>Eliminate the noise source.</i>		S1	A1	G1	W1	-

No.	Hazards source	S	A	G	W	Level
8	Ergonomic	S1	A2	G1	W2	1
<b>Where</b>	<i>Operation position and maintenance position.</i>					
<b>When</b>	<i>Operating and maintenance.</i>					
<b>Improvement result</b>						
<b>Method</b>		S	A	G	W	Level
<i>Operation actuators were designed in a height of 0.6m to 1.8m.</i>		S1	A1	G1	W1	-

Appendix 3



Product view\_1



Product view\_2



Product view\_3



Product view\_4



Product view\_5

End of the Report