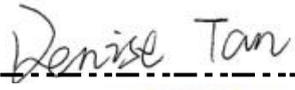




<b>TEST REPORT</b> <b>EN 61800-5-1</b> <b>Adjustable speed electrical power drive systems</b>	
<b>Report Reference No</b> .....	BKC200255MS
Tested by (printed name and signature).....	Denise Tan 
Approved by (printed name and signature).....	Cobin Wang  
Date of issue .....	<b>Mar. 24, 2020</b>
<b>Testing Laboratory name</b> .....	<b>Shenzhen BKC Testing Co., Ltd.</b>
Address .....	6/F, Building 3, Zhouteng Industrial Park, Nanwan Street, Longgang District, Shenzhen, Guangdong, China
<b>Applicant's name</b>	
Name.....	<b>Suzhou Veichi Electric Co.,LTD</b>
Address.....	No.1000 Songjia Road,Guoxiang Street, Wuzhong Economic and Technological Development Zone, Suzhou,China
<b>Test specification:</b>	
Standard.....	EN 61800-5-1:2007+A1:2017
Test procedure .....	LVD
Non-standard test method .....	N/A
<b>Test Report Form No</b> .....	EN61800_5_1A
Master TRF.....	dated 2016-10
<b>Test item description</b> .....	
Product name.....	<b>SI23 Solar Pump Inverter</b>
Model.....	<b>SI23-D5-5R5G</b>
Trademark.....	<b>VEICHI</b>
Rating.....	<b>See the following page</b>
Manufacturer.....	<b>Suzhou Veichi Electric Co.,LTD.</b>
Address.....	No.1000 Songjia Road,Guoxiang Street, Wuzhong Economic and Technological Development Zone, Suzhou,China

Brief description of the test sample:

The equipment is a **SI23 Solar Pump Inverter** for general use.

The test data is based on the model: **SI23-D5-5R5G**.

Except the model number is different. The additional models are same in the constructions, shape of enclosures and electronics circuits as the basic model: **SI23-D5-5R5G**.

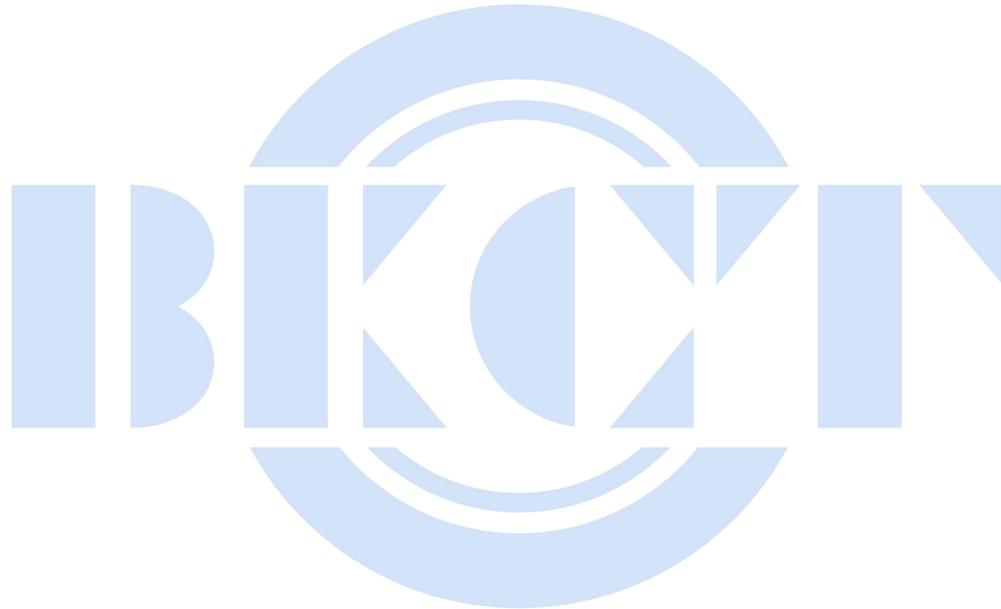
Artwork of marking plate and summary of test results (information/comments):**SI23 Solar Pump Inverter****Model No.: SI23-D5-5R5G****Input: 380VAC 50-60Hz / 250-780VDC****Output : 380VAC 5.5KW 13A 0-600.00Hz****Suzhou Veichi Electric Co.,LTD.**

No.1000 Songjia Road,Guoxiang Street, Wuzhong Economic and Technological Development Zone, Suzhou,China

**MADE IN CHINA**

**Model appendix**

SI23-SS2-R75G, SI23-SS2-1R5G, SI23-SS2-2R2G, SI23-D1-R75G, SI23-D1-1R5G, SI23-D3-R75G, SI23-D3-1R5G, SI23-D3-2R2G, SI23-D3-004G, SI23-D5-R75G, SI23-D5-1R5G, SI23-D5-2R2G, SI23-D5-004G, SI23-D5-7R5G, SI23-D5-011G, SI23-D5-015G, SI23-D5-018G, SI23-D5-022G, SI23-D5-030G, SI23-T3-037G, SI23-T3-045G, SI23-T3-055G, SI23-T3-075G, SI23-T3-090G, SI23-T3-110G, SI23-T3-132G, SI23-T3-160G, SI23-T3-185G, SI23-T3-200G, SI23-SS2-R75G-I, SI23-SS2-1R5G-I, SI23-SS2-2R2G-I, SI23-D1-R75G-I, SI23-D1-1R5G-I, SI23-D3-R75G-I, SI23-D3-1R5G-I, SI23-D3-2R2G-I, SI23-D3-004G-I, SI23-D5-R75G-I, SI23-D5-1R5G-I, SI23-D5-2R2G-I, SI23-D5-004G-I, SI23-D5-5R5G-I, SI23-D5-7R5G-I, SI23-D5-011G-I, SI23-D5-015G-I, SI23-D5-018G-I, SI23-D5-022G-I, SI23-D5-030G-I, SI23-T3-037G-I, SI23-T3-045G-I, SI23-T3-055G-I, SI23-T3-075G-I, SI23-T3-090G-I, SI23-T3-110G-I, SI23-T3-132G-I, SI23-T3-160G-I, SI23-T3-185G-I, SI23-T3-200G-I.





**Possible test case verdicts:**

-test case does not apply to the test object .....: N (Not Applicable)

-test object does meet the requirement.....: P (Pass)

-test object does not meet the requirement .....: F (Fail)

**Testing**

Date of receipt of test item .....: Mar. 16, 2020

Date(s) of performance of tests .....: Mar. 16, 2020 - Mar. 24, 2020

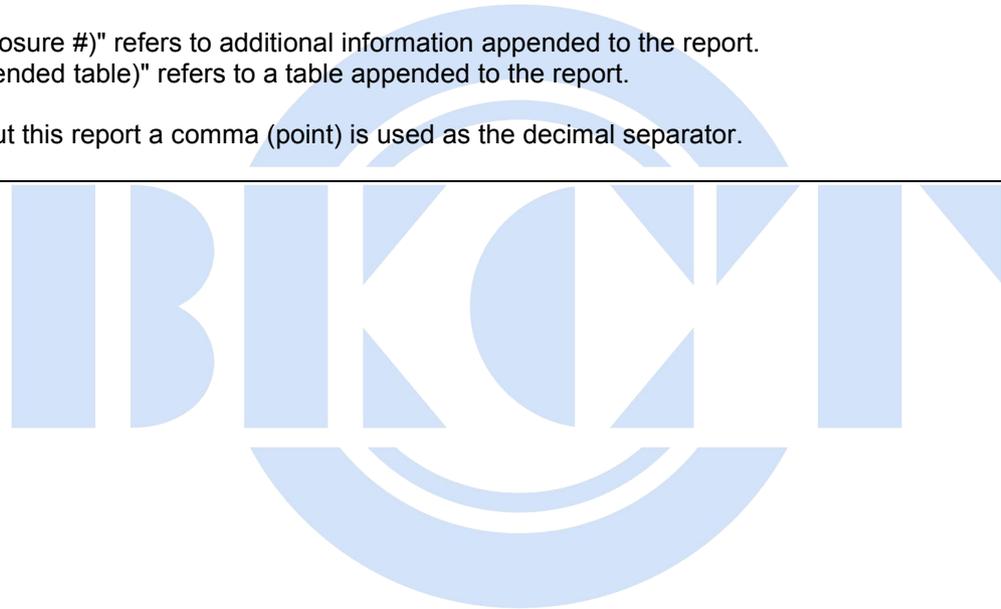
**General remarks:**

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.

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





EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
<b>4</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK, THERMAL, AND ENERGY HAZARDS</b>		P
4.1	General		P
4.2	Fault conditions		P
4.3	Protection against electric shock		P
4.3.1	Decisive voltage classification		P
4.3.1.1	Use of decisive voltage class	Class C	P
4.3.1.2	Limits of DVC		P
4.3.1.3	Requirements for protection		P
4.3.1.4	Circuit evaluation		P
4.3.1.4.1	General		P
4.3.1.4.2	AC working voltage		P
4.3.1.4.3	DC working voltage		N
4.3.1.4.4	Pulsating working voltage		P
4.3.2	Protective Separation	By reinforced insulation	P
4.3.3	Protection against direct contact		P
4.3.3.1	General		P
4.3.3.2	Protection by means of insulation of live parts		P
4.3.3.3	Protection by means of enclosures and barriers		N
4.3.4	Protection in case of direct contact		P
4.3.4.1	General		P
4.3.4.2	Protection using DVC A		N
4.3.4.3	Protection by means of protective impedance		P
4.3.4.4	Protection by means of using limited voltage		N
4.3.5	Protection against indirect contact		P
4.3.5.1	General		P
4.3.5.2	Insulation between live parts and exposed conductive parts		N
4.3.5.3	Protective bonding circuit		P
4.3.5.3.1	General		P
4.3.5.3.2	Rating of protective bonding		P



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.5.3.3	Protective bonding impedance		N
4.3.5.4	Protective earthing conductor		P
4.3.5.5	Means of connection for the protective earthing conductor		P
4.3.5.5.1	General		P
4.3.5.5.2	Touch current in case of failure of protective earthing conductor		P
4.3.5.6	Special features in equipment for protection class II		N
4.3.6	Insulation		P
4.3.6.1	General		P
4.3.6.1.1	Influencing factors		P
4.3.6.1.2	Pollution degree	Pollution degree 2	P
4.3.6.1.3	Overvoltage Category	Category II	P
4.3.6.1.4	Supply earthing systems		P
4.3.6.1.5	Insulation voltages		P
4.3.6.2	Insulation to the surroundings		P
4.3.6.2.1	General		P
4.3.6.2.2	Circuits connected directly to the supply mains		P
4.3.6.2.3	Circuits not connected directly to the supply mains		N
4.3.6.2.4	Insulation between circuits		P
4.3.6.3	Functional insulation		P
4.3.6.4	Clearance distances		P
4.3.6.4.1	Determination		P
4.3.6.4.2	Electric field homogeneity		P
4.3.6.4.3	Clearance to conductive enclosures		P
4.3.6.5	Creepage distance		P
4.3.6.5.1	General		P
4.3.6.5.2	Materials		P
4.3.6.6	Coating		P
4.3.6.7	PWB spacings for functional insulation		P
4.3.6.8	Solid insulation		P



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.6.8.1	General		P
4.3.6.8.2	Requirements for electrical withstand capability		P
4.3.6.8.2.1	Basic- and Supplementary Insulation		P
4.3.6.8.2.2	Double- and Reinforced Insulation		P
4.3.6.8.2.3	Functional insulation		P
4.3.6.8.3	Thin sheet or tape material		P
4.3.6.8.3.1	General		P
4.3.6.8.3.2	Material thickness not less than 0,2 mm		P
4.3.6.8.3.3	Material thickness less than 0,2 mm		N
4.3.6.8.3.4	Compliance		P
4.3.6.8.4	Printed wiring boards (PWBs)		P
4.3.6.8.4.1	General		P
4.3.6.8.4.2	Use of coating materials		P
4.3.6.8.5	Wound components		P
4.3.6.8.6	Potting materials		N
4.3.6.9	Insulation requirements above 30 kHz		N
4.3.7	Enclosures		P
4.3.7.1	General		P
4.3.7.2	Cast metal		N
4.3.7.3	Sheet metal		N
4.3.8	Wiring and Connections		P
4.3.8.1	General		P
4.3.8.2	Routing		N
4.3.8.3	Color coding		P
4.3.8.4	Splices and connections		P
4.3.8.5	Accessible connections		N
4.3.8.6	Interconnections between parts of the PDS		P
4.3.8.7	Supply connections		P
4.3.8.8	Terminals		P
4.3.8.8.1	Construction requirements		P
4.3.8.8.2	Connecting capacity		P



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.3.8.8.3	Connection		P
4.3.8.8.4	Wire bending space for wires 10 mm <sup>2</sup> and greater		P
4.3.9	Short Circuit Requirements		P
4.3.10	Residual current-operated protective (RCD) or monitoring (RCM) device compatibility		P
4.3.11	Capacitor Discharge		P
4.3.12	Access conditions for high-voltage PDS		P

4.4	Protection against thermal hazards		P
4.4.1	Minimizing the risk of ignition		P
4.4.2	Insulation Materials	Complied	P
4.4.2.1	General		P
4.4.2.2	Material requirements		P
4.4.3	Flammability of enclosure materials		P
4.4.4	Temperature limits		P
4.4.4.1	Internal parts		P
4.4.4.2	External parts of CDM		P
4.4.5	Specific requirements for liquid cooled PDS		N
4.4.5.1	Coolant	No coolant	N
4.4.5.2	Design requirements		N
4.4.5.2.1	Corrosion resistance		N
4.4.5.2.2	Tubing, joints and seals		N
4.4.5.2.3	Provision for condensation		N
4.4.5.2.4	Leakage of coolant		N
4.4.5.2.5	Loss of coolant		N
4.4.5.2.6	Conductivity of coolant		N
4.4.5.2.7	Insulation requirements for coolant hoses		N

4.5	Protection against energy hazards		P
4.5.1	Electrical energy hazards	Complied	P
4.5.2	Mechanical energy hazards	Complied	P



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
4.5.2.1	General		P
4.5.2.2	Critical torsional speed		N
4.5.2.3	Transient torque analysis		N
4.5.3	Acoustic noise emission	Under consideration	N
4.5.6	Protection against environmental stresses	Complied	P

<b>5</b>	<b>TEST REQUIREMENTS</b>		P
5.1	General		P
5.1.1	Test objectives and classification	Type test	P
5.1.2	Selection of test samples		P
5.1.3	Sequence of tests	No required	N
5.1.4	Earthing Conditions		P
5.1.5	Compliance		P
5.1.6	Test Overview		P

5.2	Test specifications		P
5.2.1	Visual Inspections (type test, sample test and routine test)	Type test	P
5.2.2	Mechanical tests		P
5.2.2.1	Clearance and creepage distance (type test)		P
5.2.2.2	PWB short-circuit test (type test)		P
5.2.2.3	Non -accessibility test (type test)		N
5.2.2.4	Enclosure integrity test (type test)		N
5.2.2.5	Deformation tests		P
5.2.2.5.1	General		P
5.2.2.5.2	Deflection test (type test)		P
5.2.2.5.3	Impact test (type test)	250N applied for 5s	P
5.2.3	Electrical tests		P
5.2.3.1	Impulse voltage test (type test and sample test)		P
5.2.3.2	AC or DC voltage test (type and routine test)		P
5.2.3.2.1	Purpose of test		P



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
5.2.3.2.2	Value and type of test voltage		P
5.2.3.2.3	Performing the voltage test		P
5.2.3.2.4	Duration of the AC or DC voltage test		P
5.2.3.2.5	Verification of the AC or DC voltage test		P
5.2.3.3	Partial Discharge Test (type test, sample test)		P
5.2.3.4	Protective impedance (type test and routine test)		P
5.2.3.5	Touch current measurement (type test)		P
5.2.3.6	Short-circuit test and Breakdown of components test (type tests)		P
5.2.3.6.1	General		P
5.2.3.6.2	Test configuration		P
5.2.3.6.2.1	Supply voltage and current		P
5.2.3.6.3	Short-circuit test		P
5.2.3.6.3.1	Load conditions		P
5.2.3.6.3.2	Location of short-circuit		P
5.2.3.6.4	Breakdown of components test		P
5.2.3.6.4.1	Load conditions		P
5.2.3.6.4.2	Application of short-circuit or open-circuit		P
5.2.3.6.5	Test sequence		N
5.2.3.6.6	Pass criteria		P
5.2.3.7	Capacitor discharge (type test)		P
5.2.3.8	Temperature rise test (type test)		P
5.2.3.9	Protective bounding (type test and routine test)		P
5.2.4	Abnormal operation tests		P
5.2.4.1	General		P
5.2.4.2	Test duration		P
5.2.4.3	Pass criteria		P
5.2.4.4	Loss of phase (type test)		N
5.2.4.5	Cooling failure tests (type tests)		N
5.2.4.5.1	General		N
5.2.4.5.2	Inoperative blower motor		N



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
5.2.4.5.3	Clogged filter		N
5.2.4.5.4	Loss of coolant		N
5.2.5	Material tests		P
5.2.5.1	High current arcing ignition test (type test)		P
5.2.5.2	Glow-wire test (type test)		P
5.2.5.3	Hot wire ignition test (type test - alternative to glow-wire test)		N
5.2.5.4	Flammability test (type test)		P
5.2.6	Environmental tests (type tests)		N
5.2.6.1	General		N
5.2.6.2	Acceptance criteria		N
5.2.6.3	Climatic tests		N
5.2.6.3.1	Dry heat test (steady state)		N
5.2.6.3.2	Damp heat test (steady state)		N
5.2.6.4	Vibration test (type test)		N
5.2.7	Hydrostatic pressure (type test and routine test)		N
<b>6</b>	<b>Information and marking requirements</b>		<b>P</b>
6.1	General		P
6.2	Information for selection		P
	Name of manufacturer, supplier or importer	See the marking plate	P
	Catalogue number or equivalent	See the marking plate	P
	input and output voltage range, current, and power rating information	See the marking plate	P
	protective class		P
	the type of electrical supply system to which the PDS/CDM/BDM		P
	prospective short-circuit current rating(s) and protective device characteristics		P
	field supply requirements		N



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
	coolant type and design pressure for liquid cooled product		N
	IP rating		N
	Operating and storage environment		P
	Reverence to relevant standards		P
	date code, or serial number from which the date of manufacture can be determined		P
	Reverence to instructions for installation, use and maintenance		P

6.3	Information for installing and commissioning		P
6.3.1	General		P
6.3.2	Mechanical considerations		P
6.3.3	Environment		P
6.3.4	Handling and mounting		P
6.3.5	Motor and driven equipment		N
6.3.5.1	Motor selection		N
6.3.5.2	Motor integrated sensors		N
6.3.5.3	Critical torsional speeds		N
6.3.5.4	Transient torque analysis		N
6.3.6	Connections		P
6.3.6.1	General		P
6.3.6.2	Interconnection and wiring diagrams		P
6.3.6.3	Conductor (cable) selection		P
6.3.6.4	Terminal capacity and identification		P
6.3.6.5	Protection requirements		P
6.3.6.6	Earthing		P
6.3.6.7	Protective earthing conductor current		P
6.3.6.8	Special requirements		P
6.3.7	Overcurrent or short-circuit protection		P
6.3.8	Motor overload protection		N



EN 61800-5-1			
Clause	Requirement – Test	Result – Remark	Verdict
6.3.9	Commissioning		N
6.4	Information for use		P
6.4.1	General		P
6.4.2	Adjustment		P
6.4.3	Labels, signs and signals		P
6.4.3.1	General		P
6.4.3.2	Isolators		P
6.4.3.3	Visual and audible signals		P
6.4.3.4	Hot surface		N
6.4.3.5	Equipment marking		P
6.5	Information for maintenance		N
6.5.1	General		N
6.5.2	Capacitor discharge		N
6.5.3	Auto restart/bypass connection		N
6.5.4	PT/CT connections		N
6.5.5	Other hazards		N
Annex A	Examples of protection in case of direct contact	Considered	P
Annex B	Examples of overvoltage category reduction	Considered	P
Annex C	Measurement of clearance and creepage distances	Considered	P
Annex D	Altitude correction for clearances	Considered	P
Annex E	Clearance and creepage distance determination for frequencies greater than 30 kHz	Considered	P
Annex F	Cross sections of round conductors	Considered	P
Annex G	Guidelines for RCD compatibility	Considered	P
Annex H	Symbols referred to in this part of IEC 61800	Considered	P



5.2.2.1	TABLE: clearance and creepage distance measurements						P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
Different polarity	622	440	3.0	>4.4	4.4	>4.4	
Live part to enclosure	622	440	5.5	>8.8	8.8	>8.8	

5.2.3.8	Temperature rise test (type test)					P
	test voltage (V) .....	380V			—	
	t1 (°C).....	25.3			—	
	t2 (°C) .....	25.5			—	
temperature rise dT of part/at:			dT (°C)		permitted dT (°C)	
C1 body			58.6		105	
PCB near T1			78.5		130	
C3 body			55.3		105	
PCB near Q1			63.4		130	
U1 body			42.6		100	
Varistor RV2			29.4		85	
Internal wire			38.9		80	
T1 coil			74.9		110	
T1 core			72.3		110	
Enclosure			31.8		95	
temperature rise dT of winding:		R <sub>1</sub> (Ω)	R <sub>2</sub> (Ω)	dT (K)	permitted dT (K)	insulation class



Annex 1	TABLE: List of critical components					P
Object/part no.	Manufacturer/ trademark	Type/model	Value/rating	Standard	Mark(s) of conformity <sup>1)</sup>	
PCB	Interchangeable	Interchangeable	V-0, 130 °C	UL 796	UL	
Internal wire	DONGGUAN CHENG XING ELECTRONIC CO LTD	1672	18AWG,105 °C, 300Vac	UL 758	UL	
Insulation tube	GREAT HOLDING INDUSTRIAL CO LTD	TFL	200 °C	UL 224	UL	
Photocoupler	LITE-ON TECHNOLOGY CORPORATION	LTV-725V	dti=0.7mm, Int. dcr=5mm, Ext.dcr=8mm , 100°C	UL 1557	UL	
Varistor	Chengdu Tieda Electronic Co.. Ltd.	MYN15-561K	560V	IEC 61051	VDE	
Enclosure	COVESTRO DEUTSCHLAND AG [PC RESINS]	6485+(f1)	V-0, 115°C, minimum thickness 1.5mm	UL94, UL746C	UL	
Transformer (T1)	Shenzhen Haixinxing Electro nics Co., Ltd	PQ262040W-A,B	Class B	-	Tested in appliance	
T1-Bobbin	Chang Chun Plastics Co., Ltd	T373J	94V-0, 150°C	UL94	UL	
T1-Winding	Shantou Shengang Electrical Industrial Co., Ltd	UEW	130 °C	UL1446	UL	
T1-Tape	Jingjiang jingyang Insulatng Product Co Ltd	JY-133	130 °C	UL510	UL	
T1-Varnish	Hang Cheung Petrochemical Co Ltd	8562(a)	155 °C	UL1446	UL	
T1-Margin tape	CHYUN YIH Tape Co Ltd	P2068F(d)	130 °C	UL510	UL	
DC fan	HUAXIA HENG TAL	F08025N45D024	24VDC, 0.23A, 38.6CFM	EN 60950, UL 507	VDE, UL	



**ANNEX A:**

**Photo-documentation**

Photo 1



Photo 2

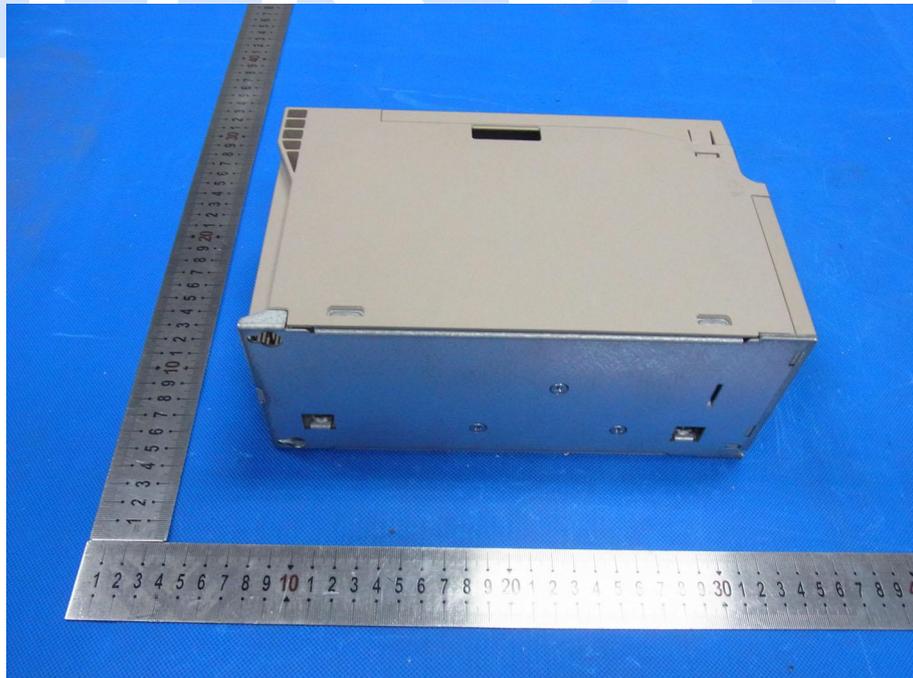


Photo 3



Photo 4



**Photo 5**



**Photo 6**



\*\*\*\*\*END OF REPORT\*\*\*\*\*