

# Test Report

Product number type..... : CQI21042810 05001

Name of the product..... : uXcel Series Battery charger

Inspection category..... : IEC60146

Applicant..... : EverExceed Industrial Co.,Ltd.

## Sample Information

### 1. Sample information description

- (1) Product model: uXcel 220V50Amps
- (2) Capacity: 20KVA
- (3) Input and Output voltage: 380VAC/220VDC

### 2. Key material information for the sample:

See table 2.1 of the annex

### 3. Sample photos

- (1) Filming location: Company's production area
- (2) Filming date: June 28, 2021



Front door



Backdoor



Front door open-1



Front door open-2

uXcel Series Silicon Charger	
MODEL:	uXcel-220VDC50AMPS
INPUT VOLTAGE:	415VAC
FREQUENCY:	50Hz
NUMBER OF PHASES:	3-ph
RATED VOLTAGE:	220VDC
RATED CURRENT:	50A
RATED POWER:	15.4kW
SERIAL NUMBER:	EED20122132344

Product model

## A list of inspections

No.	Test items	Routine test	Optional test	Specification sub-clause
1	Visual inspection	★		
2	Insulation test	★		IEC60146-1-1:2009-7.2
3	Light load and functional test	★		IEC60146-1-1:2009-7.3.1
4	Rated current test	★		IEC60146-1-1:2009-7.3.2
5	Over-current capability test		★	IEC60146-1-1:2009-7.3.3
6	Measurement of the inherent voltage regulation	★		IEC60146-1-1:2009-7.3.4
7	Measurement of ripple voltage and current		★	IEC60146-1-1:2009-7.3.5
8	Measurement of harmonic current		★	IEC60146-1-1:2009-7.3.6
9	Efficiency test	★		IEC60146-1-1:2009-7.4.1
10	Temperature rise test	★		IEC60146-1-1:2009-7.4.2
11	Power factor measurement		★	IEC60146-1-1:2009-7.4.3
12	Checking of auxiliary devices	★		IEC60146-1-1:2009-7.5.1
13	Checking of properties of the control equipment	★		IEC60146-1-1:2009-7.5.2
14	Checking the protective devices	★		IEC60146-1-1:2009-7.5.3
15	Immunity test		★	IEC60146-1-1:2009-7.6.1
16	Radio frequency radiated and conducted disturbances		★	IEC60146-1-1:2009-7.6.2
17	Measurement of audible noise		★	IEC60146-1-1:2009-7.7
18	Additional tests		★	IEC60146-1-1:2009-7.7

## Results

No.	Inspected items	Standard requirements	Result of the test	Conclusion
1	Appearance and structure	The coating of the chassis is firm and the paint surface is symmetrical, without peeling, corrosion and cracks	Passed as met the requirements	Qualified by visual inspection
		The surface of the cabinet shall be flat, and all standard, marking and text shall be clear, correct and tidy	Passed as met the requirements	Qualified by visual inspection
		All kinds of switches are easy to operate, flexible and reliable	Passed as met the requirements	Qualified by inspection

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2	Insulation routine tests	Insulation resistance: the input and output to the housing, apply 500V dc voltage, insulation resistance should be greater than 1M	123MΩ	Qualified	
		Insulation strength: the input and output side to the ground to apply 50Hz, 2000V AC voltage 1min, should not break through, no arc, leakage current is less than 10mA.	No breakdown, no arc, leakage current 1.2mA	Qualified	
3	Light load and functional test	a) Light-duty test: When the current $\leq 5A$ , test the input voltage maximum and minimum values respectively to verify that all parts of the electrical wiring and cooling parts are operating properly	The input voltage range of 342-418V is working properly	Qualified	
		b) Functional test:	Charger overvoltage protection: Turn off the charger output when the voltage exceeds the set protection value	Passed as met the requirements	Qualified
		Charger over-current protection: Turn off the charger output when the current exceeds the set protection value	Passed as met the requirements	Qualified	
		Charger over temperature protection: analog temperature on and off close, when the temperature is exceeded, turn off the charging machine output	Passed as met the requirements	Qualified	
		Ground fault alarm: When the ground resistance is less than the set value, the charging machine sends an alarm signal	Passed as met the requirements	Qualified	
		Overvoltage alarm: When the charger voltage exceeds the set value, the charger sends an alarm signal	Passed as met the requirements	Qualified	
		Constant voltage setting charging: When the charging machine mode is set to constant voltage, the voltage	Passed as met the requirements	Qualified	

			needs to remain stable		
			Constant current setting charging: When the charging machine mode is set to constant current, the current needs to remain stable	Passed as met the requirements	Qualified
4	Rated current test	In the input voltage range, when the output is rated voltage <b>165VDC</b> , the charger operates normally at the rated current of <b>50A</b>		Passed as met the requirements	Qualified
5	Over-current capability test	In the input voltage range, when the output is rated voltage <b>165VDC</b> , the charger can operate normally at <b>110%</b> rated current <b>55A</b> for 10min		20min	Qualified
6	Measurement of the inherent voltage regulation	In the case of constant AC voltage, change the load current, measure the DC voltage value at different values, the voltage accuracy is less than 1%		0.35%	Qualified
7	Measurement of ripple voltage	At the output rated voltage of <b>165VDC</b> , the AC ripple voltage superimposed by DC measurement is not greater than <b>3%</b>		0.8%	Qualified
8	Measurement of harmonic current	The input voltage and frequency are rated and the output is rated load, and the total harmonic composition of 3-39 times is not greater than <b>35%</b>		31%	Qualified
9	Efficiency test	When the output voltage current is rated and the output is 100% rated, the system efficiency should be greater than 88%		92.1%	Qualified
		When the output voltage current is rated and the output is 50% rated, the system efficiency should be greater than 85%		91.5%	Qualified
10	Temperature rise test	In the case of rated loads, measure the temperature rise of key components: transformers, resistors, and SCR modules within 8 hours, as detailed in <b>Table 3.2</b>		Check schedule	Qualified
11	Power factor measurement	The input voltage and frequency are rated and the input power factor is not less than <b>0.6</b> when the output is rated for load		0.81	Qualified
12	Checking of auxiliary devices	Check whether auxiliary equipment such as contactors, fan and relays can function properly		Passed as met the requirements	Qualified
13	Checking of properties of the control	Detects that the main board pulse control signal is correct		Passed as met the requirements	Qualified

	equipment			
14	Inspection of the protective devices	Rating of the over current protection device	Met the requirements	Qualified
		Check the correct action of fast fuse and fast switch	Met the requirements	Qualified
		Check the performance of overvoltage protection device	Met the requirements	Qualified
		Check for safe grounding	Met the requirements	Qualified
15	Immunity test		Unconditional testing	
16	Radio frequency radiated and conducted disturbances		Unconditional testing	
17	Audible noise measurements	The input voltage is rated and the audio noise measured when the output is rated for a resistive load is no greater than <b>65dB</b>	51dB	Qualified
18	The communication interface	Chargers should have RS485 or RS232, RS422, Ethernet, USB standard communication interface (at least one of them) and provide communication cables or various warning signal output terminals to use with the communication interface	RS485, RS232, Ethernet	Qualified
19	Remote communication	The content of the charger remote measurement is: the output voltage and output current of the charger; the content of the remote control signal is: the charger alarm signal	Met the requirements	Qualified
20	Output voltage regulation accuracy	The output is no-load and rated resistive load. When the input voltage is adjusted to the upper and lower limits of the charger, its voltage regulation accuracy should be less than <b>1%</b> .	0.52	Qualified
21	Output steady current accuracy	When the output is a resistive load, and the input voltage is adjusted to the upper and lower limits of the charger, its steady current accuracy should be less than <b>1%</b> .	0.42	Qualified
22	Transport test	After the test, the charger should not be mechanically damaged, the fasteners should not be loose, and it should be able to work normally after being energized.	Met the requirements	Qualified

Table 3.2 Temperature rise test

<b>On-load running Time</b>	<b>10min</b>	<b>30min</b>	<b>1hour</b>	<b>3hour</b>	<b>5hour</b>	<b>8hour</b>
The measured voltage	299.9VDC	300.01VDC	300.06VDC	300.06DC	300.09VDC	300.13VDC
Current display	50.05A	50.02A	50.05A	50.07A	50.06A	50.05A
The measured current	50.01A	50.01A	49.97A	49.99A	50.02A	50.02A
Transformer Temperature	36.2°C	41.8°C	53.1°C	58.1°C	59.6°C	59.4°C
L Temperature	37°C	46.7°C	51.7°C	55.2°C	60.9°C	60.3°C
SCR module Temperature	37.3°C	40.9°C	41.8°C	42.2°C	42.6°C	42°C
<b>Environment Temperature:</b>	30°C		<b>Input AC:</b>		AC380V	



## Use of test equipment

NO.	Equipment	Model	Calibration date	Valid period
1	Power quality analyzer	FLUKE-430-II series	2021.6.10	2022.6.9
2	Digital oscilloscope	DSO-X3014A	2021.6.10	2022.6.9
3	Digital multi-meter	FLUKE 15B+	2021.6.10	2022.6.9
4	Digital Clamp Meter	FLUKE 317	2021.6.10	2022.6.9
5	Insulation withstand voltage tester	RS2672AM	2021.6.10	2022.6.9
6	Ground Resistance Tester	AR907A+	2021.6.10	2022.6.9
7	AC voltage regulator	TSGC2J	2021.6.10	2022.6.9
8	DC load box	VILVA-AC380V/ DC300V-100KW-R	2021.6.10	2022.6.9
9	Multi-channel temperature tester	SH-X	2021.6.10	2022.6.9

## Inspection instructions:

1. Subcontract inspection agency involved in this inspection: none.
2. Other matters that need to be explained: none.

Testing venue	Manufacturer premises		
Testing time	2021.6.28-2021.7.3		
Test environment	Temperature: (20-25)°C	Relative humidity: (30-60)%	
Inspector	Zhuwang Zhuo	Verifier	Joe Zou