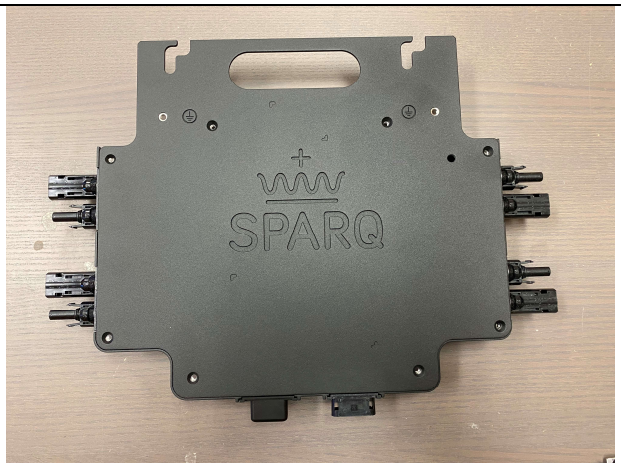
Test report no.: *Prüfbericht Nr.:*	US22J2M8.001	**Order No.:** *Auftrags-Nr.:*	234194715	Page 1 of 55 *Seite 1 von 55*
Client Reference No.: *Kunden-Referenz-Nr.:*	2228455	**Order date:** *Auftragsdatum:*	2022-10-11	
Client: *Auftraggeber:*	Sparq 945 Princess St, Box 212, Kingston ON K7L 0E9, Canada			
Test item: *Prüfgegenstand:*	Grid support Utility Interactive PV micro-inverter			
Identification/ Type No.: *Bezeichnung / Typ-Nr.*	Q2000-4301			
Order content: *Auftrags-Inhalt:*	T mark			
Test specification: *Prüfgrundlage:*	IEC 62109-1:2010 (First Edition) IEC 62109-2:2011			

Date of sample receipt: *Wareneingangsdatum:*	N/A
Test sample No: *Prüfmuster-Nr.:*	N/A
Testing period: *Prüfzeitraum:*	2022-11-07 – 2022-11-28
Place of testing: *Ort der Prüfung:*	295 Foster Street, Suite 100, Littleton, MA 01460
Testing laboratory: *Prüflaboratorium:*	TÜV Rheinland of North America, Inc.
Test result*: *Prüfergebnis*:*	Pass



tested by: *geprüft von:Zhiyong Hu*	**authorized by:** *genehmigt von:Howard Liu*
Date: 2022-11-28 *Datum:*	**Issue Date:** 2022-11-28 *Ausstellungsdatum:*
Position / *Stellung:* Expert	**Position** / *Stellung:* Manager

Other / *Sonstiges:* New certificate T72228212 issuance under report US22J2M8.001.

Condition of the test item at delivery: *Zustand des Prüfgegenstandes bei Anlieferung:* Test item complete and undamaged

* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
* *Legende:*	*P(ass) = entspricht o.g. Prüfgrundlage(n)*	*F(ail) = entspricht nicht o.g. Prüfgrundlage(n)*	*N/A = nicht anwendbar*	*N/T = nicht getestet*

TEST REPORT
IEC 62109-1
Safety of Power Converter for use in Photovoltaic Power Systems
Part 1: General requirements
IEC 62109-2
Safety of Power Converter for use in Photovoltaic Power Systems
Part 2: Particular requirements for inverters

Report Number. ..... :	US22J2M8.001
Date of issue ..... :	11-28-2022
Total number of pages ..... :	55
Name of Testing Laboratory ..... :	TÜV Rheinland of North America, Inc.
Address ..... :	295 Foster Street, Suite 100, Littleton, MA 01460
Applicant's name ..... :	Sparq
Address ..... :	945 Princess St, Box 212, Kingston ON K7L 0E9, Canada
Test specification:	
Standard ..... :	IEC 62109-1:2010 (First Edition), IEC 62109-2:2011
Test procedure ..... :	T mark
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62109_1B
Test Report Form(s) Originator .... :	VDE Testing and Certification Institute, LCIE
Master TRF ..... :	Dated 2016-04

General disclaimer:

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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Grid support Utility Interactive PV micro-inverter	
Trade Mark ..... :	SPARQ	
Manufacturer ..... :	Sparq, 945 Princess Street, Kingston ON K7L 0E9, Canada	
Model/Type reference ..... :	Q2000-4301	
Ratings ..... :	See copy of marking plate	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☐ **CB Testing Laboratory:**		
Testing location/ address .....:		
☐ **Associated CB Testing Laboratory:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)...:		
☐ **Testing procedure: CTF Stage 1:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)...:		
☒ **Testing procedure: CTF Stage 2:**		
Testing location/ address .....:	Sparq 945 Princess Street, Box 212,Kingston ON K7L 0E9	
Tested by (name + signature).....:	Ryan Fernandes	
Witnessed by (name, function, signature) .:	Zhiyong Hu	See cover page
Approved by (name, function, signature)...:	Howard Liu	See cover page
☐ **Testing procedure: CTF Stage 3:**		
☐ **Testing procedure: CTF Stage 4:**		
Testing location/ address .....:		
Tested by (name, function, signature).....:		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature)...:		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment):

1. CDF
2. Photograph
3. Test package

Summary of testing:

Tests performed (name of test and test clause):

IEC 62109-1	
Clause	Test Item
4.3	Thermal test
4.4.4.1	Component fault tests
4.4.4.4	Transformer short circuit tests
4.4.4.5	Output short circuit
4.4.4.7	Output overload
4.4.4.13	Mis-wiring with incorrect phase sequence or polarity
4.7.1	Input ratings test
4.7.2	Output ratings test
5.1.2	Durability of markings
7.3.6.3.3	Rating of protective bonding
7.5.2	Voltage test
IEC 62109-2	
Clause	Test Item
4.8.2.1	Array insulation resistance detection for inverters for ungrounded arrays
4.8.3.2	30mA touch current type test for isolated inverters
4.8.3.3	Fire hazard residual current type test for isolated inverters

Testing location:

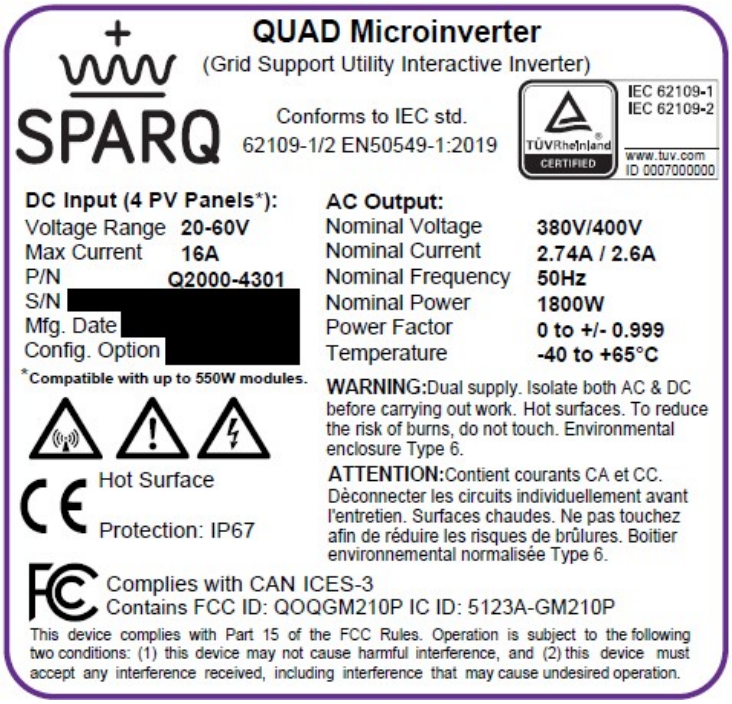
Sparq

945 Princess Street, Kingston ON K7L 0E9, Canada

Summary of compliance with National Differences (List of countries addressed): N/A

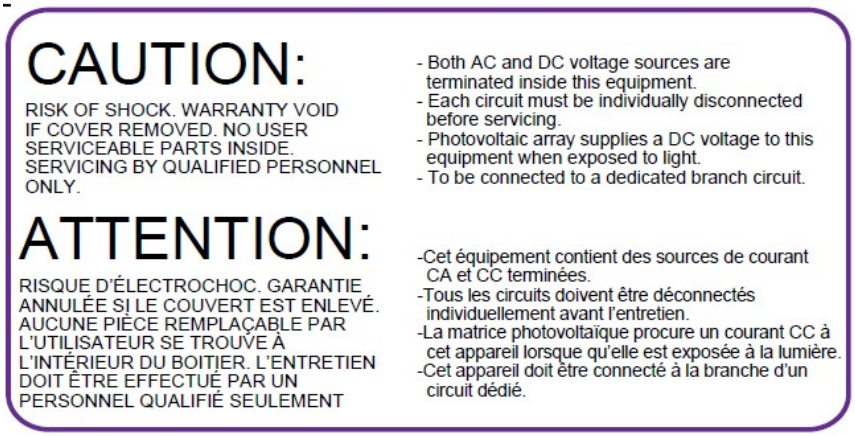
☒ **The product fulfils the requirements of IEC 62109-1:2010 (First Edition) and IEC 62109-2:2011, Ed. 1.0.**

Copy of marking plate:



Cautionay Marking:

-



Test item particulars.....:	
Equipment mobility .....:	☐ movable ☐ hand-held ☐ stationary ☒ fixed ☐ transportable ☐ for building-in
Connection to the mains .....:	☐ pluggable equipment ☐ direct plug-in ☒ permanent connection ☐ for building-in
Environmental category .....:	☒ outdoor ☐ indoor unconditional ☐ indoor conditional
Over voltage category Mains .....:	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV
Over voltage category PV.....:	☐ OVC I ☒ OVC II ☐ OVC III ☐ OVC IV
Mains supply tolerance (%).....:	N/A
Tested for power systems .....:	TN
IT testing, phase-phase voltage (V).....:	N/A
Class of equipment.....:	☒ Class I ☐ Class II ☐ Class III ☐ Not classified
Mass of equipment (kg) .....:	3.8
Pollution degree.....:	3
IP protection class.....:	IP 67
.....:	
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 was not evaluated for the requirement .....:	N/E
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	N/A
Date (s) of performance of tests.....:	2022-11-07 – 2022-11-28

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.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) ..... :	**OCM Manufacturing** 2183 Thurston Drive, Ottawa ON, Canada K1G 6C9
General product information: The product covered by this report is grid support utility interactive, transformer-isolated, PV micro-inverter for outdoors. It integrated with 4 independent input channels with transformer each and is fully potted with Epoxy and rated IP67, 3 phase, 380V, 400V, intended for ungrounded PV arrays. The product is provided with Zigbee for communication.	