



Fraunhofer

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DEVICE

KUKA Deutschland GmbH  
KMR iiwa omniMove CR UL  
Report No. KU 2206-1325

DUPLICATE

Statement of  
Qualification

Single product  
Electrical  
Resistance

Customer	KUKA Deutschland GmbH Zugspitzstrasse 140 86165 Augsburg Germany
Component tested	
Category:	Automation Components
Subcategory:	Robotics
Product name:	KMR iiwa omniMove CR UL (manufacturing date: 7/2019; article number: 338483; serial number: 1040513; weight: 434 kg; E-Doc.: 336518; Mounted Manipulator : LBR iiwa 14 R820 CR; manufacturing date: 5/2017; article number: 291253; serial number: 982697; weight: 33 kg)

Electrical resistance measurements at representative points (resistance to groundable point and point-to-Point resistance)

Standards/Guidelines:	ANSI STM4.1:2017; ANSI S20.20-2014 The norms stated generally refer to the version valid at the time of the tests.
Test devices:	<ul style="list-style-type: none"><li>Data capture:<ul style="list-style-type: none"><li>Type: ..... Tera-Ohm-Meter TO-3 ..... H.-P. Fischer Elektronik GmbH &amp; Co. KG (Mittenwalde)</li></ul></li><li>Measuring probes:<ul style="list-style-type: none"><li>Type: ..... Model 860, ME 2.5 kg, Ø 63.5 mm, DIN IEC 61340-2-3, -4-1 ..... KEINATH Electronic GmbH</li><li>Type: ..... Model 844 Resistance 2-Point Probe (Micro probe) ..... Electro-Tech Systems Inc. (Glenside, USA)</li></ul></li><li>Counter electrode:<ul style="list-style-type: none"><li>Material: ..... 2 stainless steel plates</li><li>Dimensions: ..... 500 mm x 500 mm (± 2 mm)</li><li>Thickness: ..... 1.2 mm (± 0.1 mm)</li></ul></li><li>Insulating base:<ul style="list-style-type: none"><li>Material: ..... planar PTFE-sheet with <math>R &gt; 10^{14} \Omega</math></li><li>Dimensions: ..... 1,210 mm x 1,200 mm (± 5 mm)</li><li>Thickness: ..... 5 mm (± 1 mm)</li></ul></li></ul>
Test environment parameters:	<ul style="list-style-type: none"><li>Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1</li><li>Airflow velocity:.....0.45 m/s</li><li>Airflow pattern:..... vertical laminar flow</li><li>Temperature: .....22 °C ± 0.5 °C</li><li>Relative humidity: ..... 45 % ± 5 %</li></ul>
Test procedure parameters:	<ul style="list-style-type: none"><li>Device status: ..... switched on</li></ul>

Test result / Classification

The autonomous robot KMR iiwa omniMove CR UL was examined for its electrical resistance at representative points in accordance with ANSI STM4.1:2017. The resistance to groundable point values obtained from the test piece lies not within the limits of the limiting value of  $1 \times 10^9 \Omega$  required by ANSI S20.20-2014 for ESD control elements.

The point-to-point resistance values obtained from the test piece lies not within the limits of the limiting value of  $1 \times 10^9 \Omega$  required by ANSI S20.20-2014 for ESD control elements.

Test procedure	Operating voltage [V]	Max. value [ $\Omega$ ]	Compliance with limit value as per ANSI S20.20-2014
Resistance to groundable point	10 / 100	$> 1.0 \times 10^9$	not fulfilled
Point-to-Point resistance	10 / 100	$> 1.0 \times 10^9$	not fulfilled

The measuring devices used for the qualification tests are calibrated at regular intervals; their results can be traced back to national and international standards. In cases where no national standards exist, the test procedure implemented complies with the technical regulations and norms applicable at the time of the test. The relevant documentation can be viewed on request at any time.

Detailed information and parameters of the test environment can be found in the Fraunhofer IPA test report.

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Department of Ultraclean Technology and Micromanufacturing	-- Report No. current document	-- Place, current date
Nobelstrasse 12 70569 Stuttgart Germany	on behalf of Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA	