







Test Report issued under the responsibility of:



<b>TEST REPORT</b> <b>IEC 61010-1</b> <b>Safety requirements for electrical equipment for measurement, control, and laboratory use</b> <b>Part 1: General requirements</b>	
<b>Report Number</b> .....	31183682.032
<b>Date of issue</b> .....	April 07, 2022
<b>Total number of pages</b> .....	189+ Attachments
<b>Name of Testing Laboratory preparing the Report</b> .....	TÜV Rheinland of North America, Inc. 1279 Quarry Lane, Ste. A, Pleasanton, CA 94566
<b>Applicant's name</b> .....	TDK-Lambda Ltd
<b>Address</b> .....	56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
<b>Test specification:</b>	
<b>Standard</b> .....	IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016
<b>Test procedure</b> .....	CB Scheme
<b>Non-standard test method</b> .....	N/A
<b>TRF template used</b> .....	IECEE OD-2020-F1:2020, Ed.1.3
<b>Test Report Form No.</b> .....	IEC61010_1P
<b>Test Report Form(s) Originator</b> .....	VDE Prüf- und Zertifizierungsinstitut GmbH
<b>Master TRF</b> .....	2021-04-12
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<b>General disclaimer:</b>	
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 NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

<b>Test item description</b> ..... : <b>Trade Mark</b> ..... : <b>Manufacturer</b> ..... : <b>Model/Type reference</b> ..... :  <b>Ratings</b> ..... :	Programmable power supply TDK-Lambda  for Z series; National Instruments  or  for RMX series TDK-Lambda Ltd., 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel 1. Z200 or RMX-4101 series; 2. Z400 or RMX-4102 series; 3. Z600 or RMX-4103 series; 4. Z800 or RMX-4104 series; configuration code: 1. Zxxx-yyy-o-p/w/mmmmm 2. RMX-410z-xxxyyy-o-p/w/mmmmm <b>where:</b> z=1, 2, 3 or 4 (RMX series only) xxx=any number between 010 to 650 yyy=any number between 0.32 to 72 o=blank or (in any combination) L, L2, IEEE, IS420, IS510, LAN p=blank or E, I, J or U w=blank or CO or CC or NC m=blank or A-Z, 0-9, not safety relevant) Input: 1: ~100-240V, 3A, 50/60Hz; 2: ~100-240V, 6A, 50/60Hz; 3: ~100-240V, 9A, 50/60Hz; 4: ~100-240V, 12A, 50/60Hz. Output: 1. Z200 or RMX-4101: from 0-10VDC/0-20A to 0-650VDC/0-0.32A, <b>216W</b> max. 2. Z400 or RMX-4102: from 0-10VDC/0-40A to 0-650VDC/0-0.64A, 432W max. 3. Z600 or RMX-4103: from 0-10VDC/0-60A to 0-650VDC/0-1A, <b>650W</b> max. 4. Z800 or RMX-4104: from 0-10VDC/0-72A to 0-650VDC/0-1.25A, 864W max.
<b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b>	
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	TUV Rheinland of North America
<b>Testing location/ address</b> ..... :	1279 Quarry Lane, Suite A, Pleasanton, CA 94566, USA
<b>Tested by (name, function, signature)</b> ..... :	Tedla Mengistu Test Engineer Tedla Mengistu <small>Digitally signed by Tedla Mengistu Date: 2022.04.08 16:43:38 -04'00'</small>
<b>Approved by (name, function, signature)</b> .. :	Ryan Braman Reviewer 
<input type="checkbox"/> <b>Testing procedure: CTF Stage 1:</b>	

<b>Testing location/ address .....</b> :		
<b>Tested by (name, function, signature).....</b> :		
<b>Approved by (name, function, signature) ..</b> :		
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 2:</b>	
<b>Testing location/ address .....</b> :		
<b>Tested by (name + signature).....</b> :		
<b>Witnessed by (name, function, signature) .</b> :		
<b>Approved by (name, function, signature) ..</b> :		
<input checked="" type="checkbox"/>	<b>Testing procedure: CTF Stage 3:</b>	TDK-Lambda Ltd.
<input type="checkbox"/>	<b>Testing procedure: CTF Stage 4:</b>	
<b>Testing location/ address .....</b> :		56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
<b>Tested by (name, function, signature).....</b> :		
<b>Witnessed by (name, function, signature) .</b> :		
<b>Approved by (name, function, signature) ..</b> :		
<b>Supervised by (name, function, signature) :</b>		

<b>List of Attachments (including a total number of pages in each attachment)</b>		
Document No.	Documents included / attached to this report (description)	Page No.
	ATTACHMENT 1 National Differences (26 Pages)	
	ATTACHMENT 2 Photo-documentation (35 Pages)	
	ATTACHMENT 3 Transformer Specifications (20 Pages)	
	ATTACHMENT 4 PCB Layouts (70 Pages)	

Documents referenced by this report (available on request):		
Document Name or No.	Documents description	Page No.

**Summary of testing:**

The measurements recorded in this Report only relate to the tested items detailed on the first page of this Report and demonstrate conformity with the stated specifications. The items tested were selected by the manufacturer as the worst case representative samples of the product group detailed in the first page of this Report, with which it has design and constructional similarity and a commonality of materials and components.

The following power supplies were supplied as a representative sample of the Z200 or RMX-4101 (1),

1. Z10-20, Z100-2;
2. Z10-40, Z100-4, Z160-2.6, Z650-0.64
3. Z10-60, Z100-6;
4. Z10-80, Z100-8, Z160-5, Z650-1.25

Units which represent Z200 or RMX-4101 and Z600 or RMX-4103 series subjected to partial testing due to similarity with base series Z400 or RMX-4102 and Z800 or RMX-4104 correspondingly.

Although the Standard requires testing for a 40° C ambient temperature, the represent items have been rated and therefore tested for operation in a 50° C ambient temperature.

Clause	Comment

<b>Test Report History:</b>	
This report may consist of more than one report and is only valid with additional or previous issued reports:	
Report Ref. No.	Item
31183682.001	Original report issued for model number Z400 and Z200 series, IEC61010-1 2nd Edition.
31183682.003	This report for an upgrade of standard to IEC61010-1:2010 [3rd Edition], additional model Z600 and Z800 series; also change of applicant's name and address to 56 Haharoshet St.,P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel.
31183682.005	Amendment 1 to original CB-report with number 31183682.003 for the listing of an alternate PCB-material in the list of Critical Components. The PCB is manufactured by an alternate manufacturer but according to identical specification and drawings from the applicant which haven't changed.
31183682.007	Amendment 2 to original CB-report with number 31183682.003 for the change of configuration code from L to Lx (with x = blank or 0-9), change of input current rating for Z600 series from 12 to 9A, change of output ratings for Z200 and Z400 series from 100Vdc to 650Vdc at same overall power, update of list of critical components due to change of output ratings.
31183682.009	Amendment 1 to CB-report with number 31183682.007 for the change of configuration to xxx=any number between 010 to 650; yyy=any number between 0.32 to 72
31183682.011	This report replaces the original CB report 31183682.009 for the change of configuration code L2 and change of output current rating from 6A to 1A for series Z600 and from 8A to 1.25A for series Z800. Also the change of output ratings for Z600 and Z800 series from 100Vdc to 650Vdc at same overall power, update of list of critical components due to change of output ratings.
31183682.013	Amendment 1 to the original CB report 31183682.011 to add "J" to suffix "p" for Japan power cord set and an additional suffix "w" = CO for models in with optional coating (for environmental protection only) used. This report also covers the modification to the CCL to remove some alternate components which were not fully specified and previously listed as "interchangeable".
31183682.015	Amendment 2 to the original CB report 31183682.011 to add alternate PCBs from APCB Inc. to the list of critical components. See Table 1 for more information.
31183682.018	New CB report covers addition of alternate models numbers RMX-41xx, associated trademark "National Instruments", addition of variable "m" in models nomenclature, correction of List of Critical Components, and replacement of Attachment 3 "Transformer Specifications" to meet an actual construction.
31183682.020	Amendment 1 to the original CB report 31183682.018 to add alternate T102

transformer to the list of critical components.

31183682.022	Amendment 2 to the original CB report 31183682.018 to 1) correct the test report history: "31183682.020 Amendment 3 to the original CB report 31183682.015" should be "31183682.020 Amendment 1 to the original CB report 31183682.018" 2) Clarified Testing dates and Testing location.
31183682.023	New CB report covers addition of the National Instruments trademark and models which were inadvertently removed from the previous report.
31183682.024	New CB report to 1) add alternate inrush resistors and to make minor corrections to the list of critical components 2) update existing attachment 2 and attachment 3 to improve the quality of the Photos and Drawings 3) include attachment 4 for PCB Layouts 4) update of the labels artwork due to change of model designation nomenclature.
<b>31183682.032</b>	<b>During this update the following modification completed: The report updated to Update to IEC 61010-1:2010/AMD1:2016, EN 61010-1:2010/A1, UL 61010-1 (3rd Ed.); Am. 1, CAN/CSA-C22.2 No 61010-1 + Amd 1 Correction of typos. To determine compliances no further tests required.</b>

<b>Tests performed (name of test and test clause):</b>		<b>Testing location:</b>	
31183682.001		P.O. Box 500 Industrial Zone, Karmiel, Israel	
4.4.2.2	Single fault – protective conductor		
4.4.2.6	Single fault – transformers (short / overload)		
4.4.2.7	Single fault – outputs short		
4.4.2.9	Single fault – cooling -ventilation openings blocked -fan(s) stopped		
4.4.2.11	Single fault – bridging of basic insulation		
5.1.3.c	Mains supply		
5.3	Durability of markings		
6	Values in normal condition (6.1.1 / 6.3.1)		
6.3	Discharge tests (6.6.2 / 6.10.3c)		
6.3.1.2	Accessible Current		
6.5.1.3/4	Bonding impedance of equipment		
6.8	Dielectric strength tests + humidity		
7.3	Stability tests		
8.1.1	Static test		
8.1.2	Dynamic test		
8.2	Drop test		
10	Temperature measurements		
10.5.2	Ball pressure test		
Annex D	Working voltages & Creepage and Clearances		
31183682.003			TÜV Rheinland of North America 12 Commerce Road, Newtown, CT 06470, USA
4.4.2.2	Single fault – protective conductor		
4.4.2.7	Single fault – transformers (short / overload)		
4.4.2.8	Single fault – outputs short		
4.4.2.10	Single fault – cooling		

	-ventilation openings blocked -fan(s) stopped	
4.4.2.12	Single fault – bridging of basic insulation	
5.1.3	Mains supply	
5.3	Durability of markings	
6	Values in normal condition (6.1.1 / 6.3.1)	
6.3	Discharge tests (6.6.2 / 6.10.3c)	
6.3.2 b)	Accessible Current	
6.5.2.4	Bonding impedance of equipment	
6.8	Dielectric strength tests + humidity	
7.4	Stability tests	
8.2.1	Static test	
8.2.2	Dynamic test	
8.3	Drop test	
10.1, 10.2, 10.3	Temperature measurements	
10.5.2	Resistance to heat of non-metallic enclosures	
Annex D	Working voltages & Creepage and Clearances	
31183682.005	No testing performed	TÜV Rheinland of North America 12 Commerce Road, Newtown, CT 06470, USA
31183682.007		TDK-Lambda Ltd. 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
4.4.2.2	Single fault – protective conductor	
4.4.2.7	Single fault – transformers (short / overload)	
4.4.2.8	Single fault – outputs short	
4.4.2.10	Single fault – cooling -ventilation openings blocked -fan(s) stopped	
4.4.2.12	Single fault – bridging of basic insulation	
5.1.3	Mains supply	
Annex D	Working voltages & Creepage and Clearances	
31183682.011		TDK-Lambda Ltd. 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
4.4.2.2	Single fault – protective conductor	
4.4.2.7	Single fault – transformers (short / overload)	
4.4.2.8	Single fault – outputs short	
4.4.2.10	Single fault – cooling -ventilation openings blocked -fan(s) stopped	
4.4.2.12	Single fault – bridging of basic insulation	
5.1.3	Mains supply	
5.3	Durability of markings	
6	Values in normal condition (6.1.1 / 6.3.1)	
6.3	Discharge tests (6.6.2 / 6.10.3c)	
6.3.2 b)	Accessible Current	
6.5.2.4	Bonding impedance of equipment	
6.8	Dielectric strength tests + humidity	
7.4	Stability tests	
8.2.1	Static test	
8.2.2	Dynamic test	
8.3	Drop test	
10.1, 10.2, 10.3	Temperature measurements	
10.5.2	Resistance to heat of non-metallic enclosures	
Annex D	Working voltages & Creepage and Clearances	



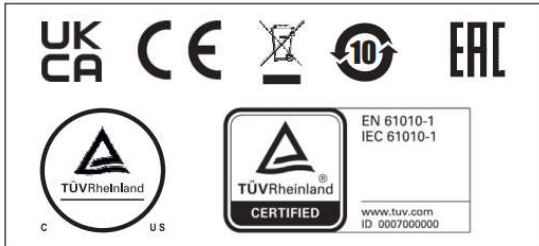
31183682.013 /31183682.015	No testing performed	TÜV Rheinland of North America 12 Commerce Road, Newtown, CT 06470, USA
31183682.018	No testing performed	TDK-Lambda Ltd. 56 Haharoshet St., P.O.B. 500 Karmiel Industrial Zone Karmiel 2161401, Israel
31183682.020	No testing performed	TÜV Rheinland of North America 1279 Quarry Lane, Suite A, Pleasanton, CA, 94566, USA
31183682.022	No testing performed	TÜV Rheinland of North America 1279 Quarry Lane, Suite A, Pleasanton, CA, 94566, USA
31183682.023	No testing performed	TÜV Rheinland of North America 1279 Quarry Lane, Suite A, Pleasanton, CA, 94566, USA
31183682.024	No testing performed	TÜV Rheinland of North America 1279 Quarry Lane, Suite A, Pleasanton, CA, 94566, USA
31183682.032	No testing performed	<b>TÜV Rheinland of North America 1279 Quarry Lane, Suite A, Pleasanton, CA, 94566, USA</b>
<p><b>Summary of compliance with National Differences (List of countries addressed):</b>  <b>EU Group Differences, EU Special Conditions, CA, US</b>  <b>CA = Canada, US = United States of America</b></p> <p><input checked="" type="checkbox"/> <b>The product fulfils the requirements of IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016</b></p>		
<p><b>Statement concerning the uncertainty of the measurement systems used for the tests</b>  (may be required by the product standard or client)</p> <p><input type="checkbox"/> <b>Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:</b>  <b>Procedure number, issue date and title:</b></p> <p>Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.</p> <p><input type="checkbox"/> <b>Statement not required by the standard used for type testing</b>  (Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)</p>		

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Main marking plate

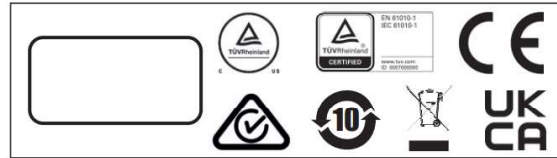
Z+ series



FCC: This equipment complies with part 15 of the FCC rules. Operation is subject to the following two conditions:  
 (1) This device may not cause harmful interference.  
 (2) This device must accept any interference received, including interference that may cause undesired operation.

EU representative: TDK-Lambda Germany GmbH,  
 Karl-Bold-Str. 40, D-77855 Achem  
 UK representative: TDK-Lambda UK Limited,  
 Kingsley Avenue, Ilfracombe, Devon EX34 8ES

RMX series



FCC: This equipment complies with part 15 of the FCC rules. Operation is subject to the following two conditions:  
 (1) This device may not cause harmful interference.  
 (2) This device must accept any interference received, including interference that may cause undesired operation.

National Instruments Corporation  
 EU representative: 4031 Debrecen, Hatar ut 1/A, Hungary  
 UK representative: Measurement House, London Rd,  
 Newbury Rg14 2PZ

Input rating label (located on rear side near to appliance inlet)

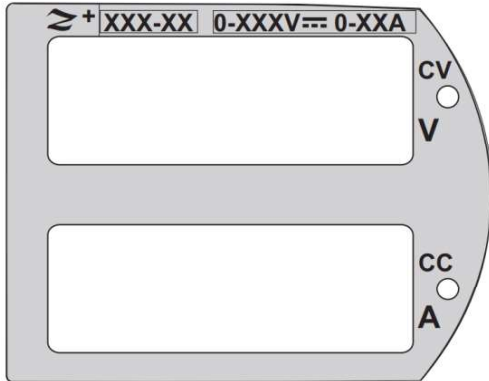


NOTE

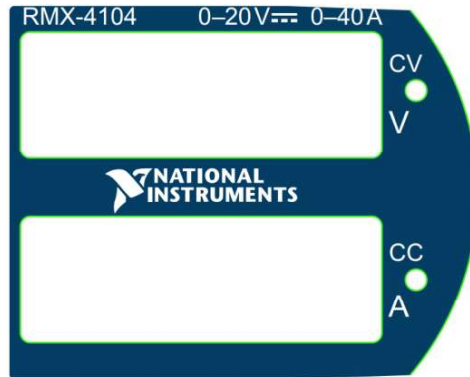
1. Z200 or RMX-4101 series – 3A
2. Z400 or RMX-4102 series – 6A
3. Z600 or RMX-4103 series – 9A
4. Z800 or RMX-4104 series – 12A

Front screening

Z+ series

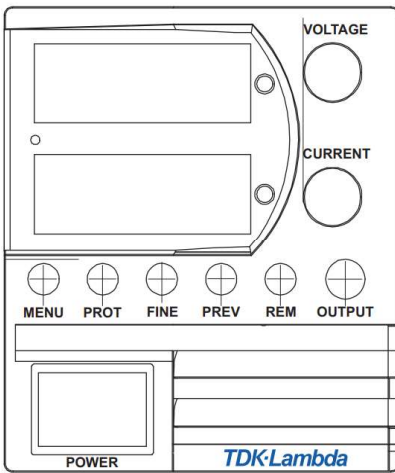


RMX series

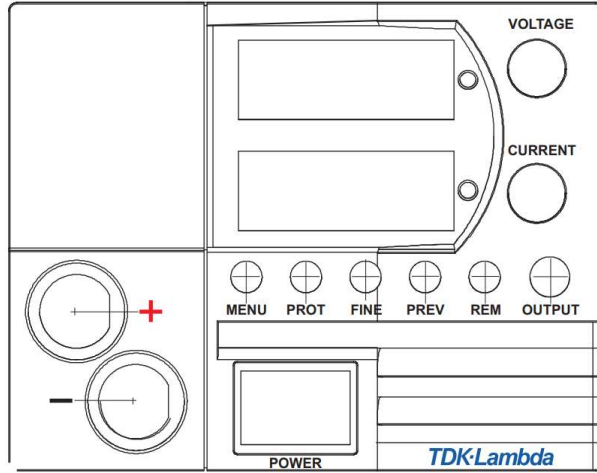


F side screening

Standard body

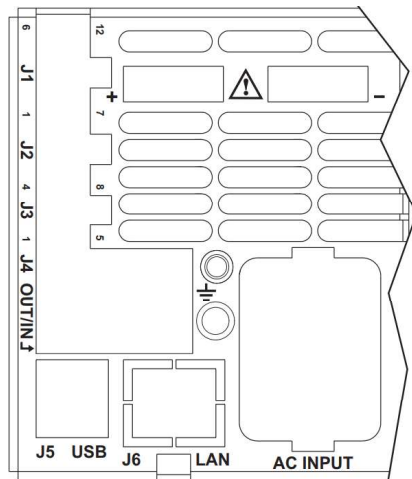


Wide body

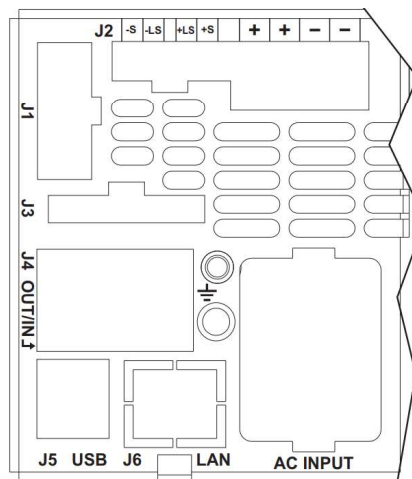


Rear side screening

Low voltage output



High voltage output



**Test item particulars:**

**Type of item** ..... : Laboratory  
**Description of equipment function**..... : Programmable power supply  
**Connection to MAINS supply** ..... : Detachable cord set  
**Overvoltage category** ..... : II  
**POLLUTION DEGREE**..... : 2  
**Means of protection**..... : Class I (PE connected)  
**Environmental conditions** ..... : Extended: max. ambient: 50°C, altitude: 3000m  
**For use in wet locations** ..... : No  
**Equipment mobility**..... : Portable  
**Operating conditions**..... : Continuous  
**Overall size of equipment (W x D x H)**..... : Standard enclosure: 70X350X83  
Wide body enclosure: 105/350/83  
**Mass of equipment (kg)**..... : Standard enclosure: 1.9 kg max.  
Wide body enclosure: 2.4 kg max.  
**Marked degree of protection to IEC 60529** ..... : Not marked, IPX0

**Possible test case verdicts:**

- **Test case does not apply to the test object** ..... : N/A (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**..... : 11/11/2011 - 31183682.001  
12/03/2012 - 31183682.003  
N/A - 31183682.005  
12/19/13 - 31183682.007  
04/02/14 - 31183682.011  
N/A-31183682.013  
N/A-31183682.015  
N/A-31183682.018  
N/A-31183682.020  
N/A-31183682.022  
N/A-31183682.023  
N/A-31183682.024  
**N/A-31183682.032**

**Date (s) of performance of tests** ..... : 11/11/2011 – 11/29/2011 - 31183682.001  
01/21 – 01/25/2013 - 31183682.003  
N/A - 31183682.005  
12/19/13-12/23/13 - 31183682.007  
04/02/14 – 05/18/14 - 31183682.011  
N/A-31183682.013  
N/A-31183682.015  
N/A-31183682.018  
N/A-31183682.020  
N/A-31183682.022  
N/A-31183682.023  
N/A-31183682.024  
**N/A-31183682.032**

**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 Form A.xx)" refers to a Table appended to the report.  
Bottom lines for measurement Tables Forms A.xx are optional if used as record.

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

**Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:**

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) .....**: TDK-Lambda Ltd., 56 Haharoshet St., P.O.B. 500  
Karmiel Industrial Zone Karmiel 2161401, Israel

**General product information and other remarks:**

Description of unit:

Z200 or RMX-4101 series, Z400 or RMX-4102 series, Z600 or RMX-4103 series and Z800 or RMX-4104 series are family of switching mode programmable power supplies with output rating as listed below:

1. Z200 or RMX-4101 series - from 0-10VDC/0-20A to 0-650VDC/0-0.32A, **216W max.**
2. Z400 or RMX-4102 series - from 0-10VDC/0-40A to 0-650VDC/0-0.64A, 432W max.
3. Z600 or RMX-4103 series - from 0-10VDC/0-60A to 0-650VDC/0-1A, **650W max.**
4. Z800 or RMX-4104 series - from 0-10VDC/0-72A to 0-650VDC/0-1.25A, 864W max.

Z200/RMX-4101 and Z400/RMX-4102 series, Z600/RMX-4103 and Z800/RMX-4104 series in pairs are fully identical (el. schematic, construction, PCB, components) except for some components influence of that covered by Temperature Test done for both series.

All series are constructed in two variants of enclosure.

-Standard: standard output located on the rear, no possibility to install an optional module except for LAN;

-Wide body: two variants of wide body enclosure:

- standard output located on the rear, additional section for optional IEEE card and Isolated Analog card;
- output on front side (binding post), additional section for optional IEEE card and Isolated Analog card.

**Description of model differences:**

Z200 or RMX-4101 series

Z400 or RMX-4102 series

Z600 or RMX-4103 series

Z800 or RMX-4104 series

Configuration Code: Zxxx-yyy-o-p/w/mmmmm or RMX-410z-xxx- yyy-o-p/w/mmmmm

where:

z=1, 2, 3 or 4 (for RMX series only)

xxx = max. output voltage, may be any between 10 and 650;

yyy = max. output current, may be any between 72 and 0.32;

o=options, may be one or combination of some from listed below:

blank- standard model (without an additional modules installed, standard enclosure);

L - lab. option: output on front side-binding post (wide body enclosure, standard connectors, models with output up to 60VDC);

L2 - lab. option: output on front side-binding post (wide body enclosure, isolated CATIII type connectors, all models);

IEEE- fitted with optional IEEE communication module (wide body enclosure);

IS420-fitted with optional current mode Isolated Analog module (wide body enclosure);

IS510-fitted with optional voltage mode Isolated Analog module (wide body enclosure);

LAN- fitted with optional LAN communication module (standard and wide body enclosure)

p=optional power cord set provided with unit, may be as following:

blank- power cord set not provided with unit;

E- power cord set for Europe;

I- power cord set for Israel;

J- power cord set for Japan;

U- power cord set for US/Canada.

w=CO-optional coating used for environmental protection only,

=CC-Conformal Coating

=NC-Nakamura Choukou

=blank-coating not used.

m= blank or any combination of letters and numbers (not related safety)

**Description of special features:**  
(HV circuits, high pressure systems etc.)