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REPORT

on

COMPONENT - CONNECTORS FOR USE IN DATA, SIGNAL, CONTROL AND POWER APPLICATIONS

Tyco Electronics Corp.
Harrisburg, Pennsylvania

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DESCRIPTION

PRODUCT COVERED:

Component Connectors – USR, Series Universal MATE-N-LOK, Universal MATE-N-LOK Bulkhead.

USR: Universal Mate-N-LOK Connectors, Cat. Nos. 1-350736-9, 2029387-1, **1-350777-9, 350810-1, 926307-3, 926308-3, 926309-3, 926302-3, 350735-1, 350783-1, 350784-1.**

USR, CNR: Universal Mate-N-LOK Bulkhead Connector and Mating Connector Series 1604254 and 350720 and Socket Header Cat. Nos. 2029361-1 and 2029402-1; Printed Circuit Board Socket Header Cat. No. 1586892-1; Universal MATE-N-LOK II; Universal Mate-N-LOK Socket Header Cat. No. 1586869-1, 1586893-3. Universal Mate-N-LOK Pin Header Cat. No. 1586953-1. Universal Mate-N-LOK Plug Cat. No. 640581-1,-2. Universal MATE-N-LOK, Cat. Nos. 2106070-1, 350766-1, 2213725-1, 1969881-1, 1969882-1. UNIVERSAL LIGHT-N-LOK Cat. No. 2213727-1, 770262-1, -2, -3, -4.

USR, CNR: Universal Mate-N-LOK Connectors, Cat. No. 794741-1, 2029457-1.

USR, Universal MATE-N-LOK Bulkhead, Cat. Nos. 1877788, 2825081-1.

USR, Universal MATE-N-LOK Connectors, Headers, Cat. Nos. 2213752-X, 2213753-X, 2213755-X, 2213756-X.

USR, Universal MATE-N-LOK Headers, Cat. Nos. 1969795-1, 1969796-1, 1969797-1, 1969798-1, 1969799-1, 1969800-1, 1969801-1, 1969802-1, 1969803-1, 1969804-1, 1969805-1, 1969806-1, 1969807-1, 1969808-1, 1969809-1, 1969810-1, 1969811-1, 1969812-1, 1969813-1, 1969814-1, 1969815-1, 1969816-1, 1969817-1, 1969818-1, 1969830-1.
USR, CNR – FASTON Series 250, Cat. No. 521785-3

USR, CNR – Universal MATE-N-LOK Twist N-LOK, Cat. No. 2359624-X

USR, CNR – Universal MATE-N-LOK, Cat. No. 2387361-1

GENERAL:

The devices are mating multi-pole connectors for use within electrical appliance enclosures. These are factory assembled connectors on wire leads.

USR indicates investigation to United States Standards as referenced in the Test Record.

CNR indicates investigation to Canadian National Standards as referenced in the Test Record.

RATINGS:

Cat. No.	Wire AWG (str)	Current (A)	Voltage (V)
350779-4, Series 2312156	14, 12	15	600
350780-1, Series 2312157	14, 12	15	600
1604254	16	15 (position #2 and #4) 3.2 (position #7 and #8)	250
350720	16	15 (position #2 and #4) 3.2 (position #7 and #8)	250
1586869-1	-	16	600V ac/dc
1586953-1	-	17	600V ac/dc
2106070-1, 350766-1, 2213727-1, 770262-1, 770262-2, 770262-3, 770262-4, 2213725-1	--	12	600VAC
2213752-X, 2213753-X, 2213755-X, 2213756-X	-	12	600V ac/dc
1-350736-9	10	12	600V ac/dc
2029387-1	10	16.5	600V ac/dc
794741-1	16	15 (position #2 and #4) 3.2 (position #7 and #8)	600V ac/dc
1-350777-9	10	19	600V ac/dc
521785-3	14-18	--	--
2387361-1	**18**	**13 USR** **12 CNR**	**600**

The Universal MATE-N-LOK II Series has no electrical ratings.
Universal Mate-N-LOK Plug Cat. No. 640581-1,-2 and Universal Mate-N-LOK Socket Header Cat. Nos. 1586893-3, 2232696-1 have no electrical ratings.
FASTON Series 250, Cat. No. 521785-3 has no electrical ratings.
Universal MATE-N-LOK Twist N-LOK, Cat. No. 2359624-X has no electrical ratings.

ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

Use – For use only in complete equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Conditions of Acceptability - In order to be judged acceptable as a component of electrical equipment, the following conditions should be met.

1. These devices should be used only where they will not interrupt the current.

2. These devices have not been tested for current-carrying capability except for the following contacts:

	Cat. No.	Wire AWG	Current (A)	Max Temp Rise (°C)
	193796-1, 193797-1	10	22	30.3
	350922-3, 350923-3	12	20	36.1
	350537-1, 350538-1, 1954443-1	(2)18	10.5	29.7
	350537-1, 350700-1	(2)18	10.5	33.1
	1586064-1, 1586065-1	10	25	42.0
	1586064-1, 1586065-1	12	24	41.0
	1586067-1, 1586066-1	14	17	52.0
	1586067-1, 1586066-1	20	10	62.0
	881111-1, 881109-1	14	12	79.1
	881111-1, 881109-1	20	8	79.8
	1586096-1, 1586065-1	10	22	26.2
	1586096-1, 1586065-1	12	20	31.6
	1982101	10	30	51.4
	350779-4, 350780-1, Series 2312156, 2312157	14	15	64
	350873-3, 350874-3	16	15	26.9
	1586869-1	14	16	29.95
	1586953-1	14	17	29.45
	2387361-1 (USR)	**18**	**13**	**35.2**
	2387361-1 (CNR)	**18**	**12**	**28.9**

The following devices have been tested for current-carrying capability.

Housing Cat. No.	Contact Cat. No.	Wire AWG	Current (A)	Max Temp (°C)
1-480704-0, 1-480705-0	350536-1, 350218-1	18	11	80.8
1604254-1, 350720-1	350873-3, 350874-3	16	15 (position #2 and #4) 3.2 (position #7 and #8)	51.9

Cat Nos.	Current, A	Maximum Temperature °C	
		Rise	Recorded Temperature
2213725-1(represents 2106070-1)	12	28.9	53.9
2213727-1 (represents 350766-1)	12	20.6	45.6

Cat Nos.	Socket/Pin Cat. No.	Current, A	Maximum Temperature °C	
			Rise	Recorded Temperature
2213752-5	770528-1	12	36.2	61.2
2213753-5	350574-4	12	38.9	63.9
2231755-4	770528-1	12	49.2	74.2
2213756-4	350574-4	12	53.8	78.8
2387361-1	**350654-1**	**13 (USR)**	**35.2**	**60.2**
	350654-1	**12 (CNR)**	**28.9**	**53.9**

3. The placement of these devices within the equipment enclosure should be such that spacings between the live parts and the equipment are suitable for the particular application.

4. The suitability of the insulating materials used in the molded bodies shall be judged in the end-use equipment.

Cat. Nos	Insulating Material (#)	Measured Minimum Thickness	Flame Class	HWI	HAI	RTI Elec, °C	Max operating Temp, °C
2106067-1,-2 2106070-1,-2 2106127-1,-2 2106130-1,-2, 2213725-1	A	1.14 mm	V-0	0	0	140	120
1950041-x, 2387361-1	B	**0.73 mm**	V-0	0	0	140	120
794133-1, 794134-1, 794135-1	C	0.84 mm	V-0	2	3	115	100
2029314-x, 2029315-x	D	0.75 mm	V-2	4	0	150	150
1586892-1	E	0.86 mm	V-2	4	0	130	130
794707-1	D	0.51 mm	-	-	-	150	150
1586703-1	F	0.51 mm	V-2	-	-	130	130
Housing 2029367-1	F	0.75 mm	V2	4	0	130	130
Housing 2029368-1	F	0.75 mm	V2	4	0	130	130
Housing 2029369-1	F	0.75 mm	V2	4	0	130	130
Housing 2029370-1	F	0.75 mm	V2	4	0	130	130
1-1703062-2,1-1703061-2,2178474-2,2178473-2,2178773-1,1-1644055-2,1-1644055-3, 927231-7,1-1863003-2,1-1863006-2,1-1863005-2,926309-7,1-1863004-2,1586892-3	G	0.4mm	V0	4	0	140	140
Housing Cat. Nos. 926298-1, 926299-1, 926300-1, 926301-1, 926302-1, 926308-1, 926309-1, 926647-1, 969326-1	H	0.71	V2	4	0	140	140
1586869-1	E	1.15	V-2	4	0	130	130
1586953-1	E	1.15	V-2	4	0	130	130
350809-3	G	0.4 mm	V-0	4	0	140	140
350810-2	G	0.4 mm	V-0	4	0	140	140
926298-7	G	0.4 mm	V-0	4	0	140	140
926305-7	G	0.4 mm	V-0	4	0	140	140
1586893-3, 640581-1,-2	G	0.4 mm	V-0	4	0	140	140
2213727-1, 770262-1,-2,-3,-4	I	0.76 mm	V0	4	0	120	120
Universal Mate N Lok Headers, Cat. Nos. 1969795-1, 1969796-1, 1969797-1, 1969798-1, 1969799-1, 1969800-1, 1969801-1, 1969802-1, 1969803-1, 1969804-1, 1969805-1, 1969806-1, 1969807-1, 1969808-1, 1969809-1, 1969810-1, 1969811-1, 1969812-1, 1969813-1, 1969814-1, 1969815-1, 1969816-1, 1969817-1, 1969818-1, 1969830-1	J	0.4 mm	V0	4	0	120	120
Housing, 2294562-1, -2, 2359624-x	F	0.74 mm	V2	4	0	130	130
2213752-X, 2213753-X, 2213755-X, 2213756-X	K	0.8 mm	V-0	2	0	240	105
1969881-1, 1969882-1	L	0.4mm	V0	0	0	130	130
173924-1, 173925-1, 173926-1	M	0.6 mm	V-0	3	0	140	85

Cat. Nos	Insulating Material (#)	Measured Minimum Thickness	Flame Class	HWI	HAI	RTI Elec, °C	Max operating Temp, °C
1-350736-9	N	0.60 mm	V-0	4	0	130	120
2029387-1	N	0.60 mm	V-0	4	0	130	120
794741-1	N	0.60 mm	V-0	4	0	130	120
1-350777-9	N	0.60 mm	V-0	4	0	130	120
Universal MATE-N-LOK, Cat. No. 350810-1	**N**	**0.76 mm**	**V-0**	**4**	**0**	**130**	**120**
Universal MATE-N-LOK, Cat. No. 926307-3, 926308-3, 926309-3	**N**	**0.76 mm**	**V-0**	**4**	**0**	**130**	**120**
Universal MATE-N-LOK, Cat. No. 926302-3	**N**	**0.64 mm**	**V-0**	**4**	**0**	**130**	**120**
Universal MATE-N-LOK, Cat. No. 350735-1	**N**	**0.64 mm**	**V-0**	**4**	**0**	**130**	**120**
Universal MATE-N-LOK, Cat. No. 350783-1, 350784-1	**N**	**0.76 mm**	**V-0**	**4**	**0**	**130**	**120**
350433-5	L	0.70 mm	V-0	0	0	130	130
521785-3	O	0.4 mm	V0	4	0	130	130
350778-1, 350767-1, 350780-1, 350781-1, 350777-4, 350766-4, 350782-1	P	0.38	V0	4	0	130	130

(#) - Code for Insulating Body Material

A. Tyco 703570-3
   1. Dielectric strength (KV/mm): - 23
   2. CTI: 2

B. Tyco 704318
   1. Dielectric strength (KV/mm): 26
   2. CTI: 1

C. Tyco 1573672
   1. CTI: 0

D. Tyco 703609
   1. CTI: 2

E. Tyco 705304
   1. CTI: 2

F. Tyco 702925
   1. Dielectric strength (kV/mm): 26
   2. CTI: 0

G. Tyco ___1573697
Dielectric Strength - --
CTI - 2

H. Tyco 703561___
Dielectric Strength - --
CTI - 1

I. Tyco 705287___
Dielectric Strength - --
CTI - 0

J. Tyco 2136403
Dielectric Strength - --
CTI - 2

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K. Tyco 1573878
Dielectric Strength - 39
CTI - 4

L. TE 2136700
Dielectric Strength - 17
CTI - 2

(#) - Code for Insulating Body Material

M. TE 2136507
Dielectric Strength - 19
CTI - -

N. TE 2136597
Dielectric Strength - 13
CTI – 0

O. TE 2136682
Dielectric Strength – 20
CTI - 0

P. TE 2136597-2
Dielectric Strength – 13
CTI - 0

5. The operating temperature of these devices should not exceed the temperature ratings of the insulating materials. All devices except for Cat Nos. 794133-1, 794134-1, 794135-1, x-829182-3, x-829183-3, x-829184-3, x-829185-3, 1586377, 1586378, 1586379, 1586380, 1586436, 1586437, 480700 and 480701 may be used interchangeably at a maximum temperature of 105°C; Cat Nos. 1586377, 1586378, 1586379, 1586380, 1586436, 1586437, 480700 and 480701 may be used interchangeably at a maximum operating temperature of 130°C; Cat Nos. x-829182-1, x-829183-1, x-829184-1, x-829185-1, 350779-4,350780-1, Series 2312156, 2312157 may be used at a maximum operating temperature of 95 °C; Cat. Nos. 794133-1, 794134-1, 794135-1 may be used at a maximum operating temperature of 100°C. Cat. Nos. 1604254 and 350720 may be used at a maximum operating temperature of 120 °C.

6. The adjacent poles may carry currents between any two circuits at potentials not exceeding 250 V provided there is a min of 3/64 in spacing between live parts of opposite polarity or up to 600 V provided there is a min 1/8 in spacing between live parts of opposite polarity.

7. Voltage higher than 600 V may be accepted where the spacing requirements and Dielectric Strength Test requirements of the equipment in which they are used are met.

8. The suitability of the crimp termination of the contacts have not been evaluated except for the following:

*

Contact	Wire Size (AWG)	Pull Force (lbs)
350537-1	(2)18	20
350538-1	(2)18	20
350700-1	(2)18	20
1586066-1	14 - 18	20
1586067-1		
1586066-1,	20	8
1586067-1		
881111-1, 63435-1 and 63306-1	14 - 18	20
881109-1		
881111-1,	20	8
881109-1		
1586096-1	10, 12	20
194210-1	10	20
194211-1	10	20
194212-1	12-14	20
1954443-1	(2)18	20
926900-1, 926868-1	14	20
926901-1, 926869-1	14	20
640309-3, 350922-3	12	20
640310-3, 350923-3	12	20
2029452-1, 2029453-1	14-20	25 (14AWG)
		10 (20AWG)
350654-1	**18**	**20**

Note: Number in prentices indicates number of conductors.

9. The strain relief clamps, Cat. Nos. 1-350589-0 and 1-350590-0, were not subjected to Strain Relief Tests.

10. The molding material, Vydyne M-340FR, by Monsanto, was subjected to the Hot Wire Ignition Test, as specified in the Recognized Component Index (plastics), with a rating of 10 s.

11. The suitability of the mounting means shall be determined in the end-use application.

12. Cat. Nos. 350779-4, 350780-1, 350433-5, Series 2312156, **2312157**, **2387361-1** may be used at potentials not exceeding 600 V based on Dielectric Voltage-Withstand testing conducted at 2200 V ac.

13. The following devices may be used at potentials not exceeding 600 V based on Dielectric Voltage-Withstand testing conducted at 2200 V ac.

Housing Cat. No.	Contact Cat. No.
1-480704-0, 1-480705-0	350536-1, 350218-1

14. Testing per The Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, UL 2043, 3rd edition dated 2008-08-20 has been performed on a sample set of 50 each of Cat. Nos. 350777 and 350778 and 100 of Cat. No. 640713 manufactured of Tyco raw material 703939-1.

15. Testing per The Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, UL 2043, 3rd edition dated 2008-08-20 has been performed on a sample set of 16 each of Cat. Nos. 350777 and 350778 and 32 of Cat. No. 640713 manufactured of Tyco raw material 705287.

16. Universal Mate-N-Lok pin or socket headers, Cat. Nos. 1586867-1, 1586965-2, 1586873-1, 1586986-1, 1586866-1, 1586958-1, 1586963-1, 1586872-1, 1586968-1 molded of Tyco Raw Material 705304 (Natural color), were subjected to Glow Wire Testing at 850C in accordance with the IEC 60695-2-11 First Edition -‘2000 specification.