Current Capacity

TE Connectivity Rail Power Cable Products

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Current Rating of Rail Power Cables

Table 1

Nominal conductor cross sectional area (mm^2)	Current Carrying Capacity I_{Cable} (A)
1	24.8
1.5	30.9
2.5	40.8
4	56.9
6	74.3
10	105.2
16	136.1
25	185.6
35	235.1
50	297.0
70	371.3
95	445.5
120	526.0
150	606.4
185	693.0
240	835.3
300	959.1
400	1175.7

Current Carrying Capacity as calculated by TE Connectivity using EN 50343:2014

45°C Ambient temperature (TCRefAmb)

120°C maximum conductor operating temperature (TCRefMax)

In free air.

For condtions other than the above, the following equation should be used;

$I_{Corr} = I_{Cable} \times K^* \times K_1 \times K_2 \times K_3 \times K_4 \times K_5$

Where:

K^* is a correction factor for the expected maximum temperature

K_1 is a correction factor for the expected ambient temperature.

K_2 is a correction factor for installation type

K_3 is a correction factor to allow for a decrease in the expected cable lifetime

K_4 is a correction factor to take into account the short time currect when operation is not continuous.

K_5 is a correction factor for multi-core cables

Correction factors K_3 and K_4 are assumed to 1.0 unless stated otherwise.

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Modification Factor K*

Calculating current ratings for temperature classes other than 120°C

Table 2

TC$_{Max}$ (°C)	Factor K*
90	0.808
105	0.913
120	1.000
140	1.096
150	1.138

For temperature classes other than 120°C, the values in Table 1 shall be multiplied by the values in Table 2.

For other maximum temperatures not listed in Table 2, use the following equation;

$$K_* = \sqrt{\frac{(TC_{Max} - TCRef_{Amb}) * (1 + (0.004 * TCRefMax))}{(TC_{Ref}Max - TCRefAmb) * (1 + (0.004 * TCMax))}}$$

$$K_* = \sqrt{\frac{(TC_{Max} - 45) * (1 + (0.004 * 120))}{(120 - 45) * (1 + (0.004 * TCMax))}}$$

Where:

TC$_{Ref}$Amb   The ambient temperature in °C for which I$_{Cable}$ is correct.

TC$_{Max}$ The Maximum cable/conductor temperature in °C for which we want the current capacity.

TC$_{Ref}$Max   The maximum cable/conductor temperature in °C for which I$_{Cable}$ is correct.

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Modification Factor K_1

Derating factor for ambient temperatures other than 45°C

Table 3

Expected Ambient Temperature - TC_{Amb} (°C)	Factor (Maximum conductor Temperature of 90°C)	Factor (Maximum conductor Temperature of 120°C)
35	1.11	1.07
45	1.00	1.00
55	0.88	0.93
65	0.75	0.85
75	0.58	0.76
85	0.33	0.68

For other maximum temperatures not listed in Table 3, use the following equation;

$$K_1 = \sqrt{\frac{(TCMax - TCAmb)}{(TCMax - TCRefAmb)}}$$

Where:

TC_{Amb} The ambient temperature in °C which we want the current capacity for.

$TC_{Ref}Amb$ The ambient temperature in °C for which I_{Cable} is correct.

TC_{Max} The Maximum cable/conductor temperature in °C for which we want the current capacity.

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Modification Factor K$_2$

Derating factor K$_2$ for installation type (grouping and installation conditions)

Table 4

Number of cables being simultaneously loaded	Installation Type			
	Cable in free air	Cables on trays, in one layer	Cables on trays, in two layers	Cables on trays, in several layers
	Type (a)	Type (b)		Type (c)
1 single cable	1.00	1.00	1.00	1.00
2 cables together	-	0.87	0.87	0.87
3 cables together	-	0.83	0.83	0.78
4 cables together	-	0.78	0.71	0.71
up to 8 cables together	-	0.74	0.59	0.52
up to 12 cables together	-	0.73	0.54	0.45
up to 16 cables together	-	0.72	0.51	0.41
17 cables and above together	-	0.71	0.47	0.38

Number of cables being simultaneously loaded	Installation Type			
	Cables on the floor or on a wall	Cables on a ceiling or under floor	Cables in a closed tube, conduit or tray	Cables in a closed tube or conduit, thermally insulated
	Type (d)	Type (e)	Type (f)	Type (g)
1 single cable	1.00	0.95	0.95	0.76
2 cables together	0.85	0.81	0.80	0.61
3 cables together	0.79	0.72	0.70	0.53
4 cables together	0.75	0.68	0.65	0.49
up to 8 cables together	0.75	0.62	0.52	0.40
up to 12 cables together	0.75	0.61	0.45	0.34
up to 16 cables together	0.75	0.61	0.41	0.31
17 cables and above together	0.75	0.61	0.38	0.29

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Modification Factor K_5

Derating factor K_5 for installation type (grouping and installation conditions)

Table 5

Number of Loaded Cores	2	3	4	5	7	9	12	19
Correction Factor K_5	0.91	0.78	0.63	0.59	0.51	0.46	0.41	0.38

The information contained in this document is for reference only and may be subject to change.

Current carrying capacity of TE Connectivity products should be calculated in conjuction with TE Connectivity.

Using thermal ageing data, TE Connectivity can help to ensure that the current capacity values used are not only safe and suitable for the required application, but also that the life expectancy of the cable is acceptable.

The information contained in this document relates to TE Connectivity's *RAIL-PC*, *CH-RAIL-PC*, *EN50264-RAIL* and *ZHPCG* product lines.

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