TECHNICAL STATEMENT

VOLTAGE DEFINITIONS

In the Fairfild website and Fairfild technical documentation the reader may find different references to the voltage:

- Limit voltage (max voltage)
- Operating voltage
- Rated insulation voltage
- Working voltage

This difference is mainly due to the different historical period the documents have been written and to the different field of application of the product and different certification.

The aim of this document is to publish a clear definition of the two voltages to be considered for Fairfild resistors: (1) the voltage between the two terminals, and (2) the voltage from the active material (live part) and the ground (earth).

The above four definitions are for us equal to the following:

"r.m.s. withstand voltage value assigned by the manufacturer to the equipment or a part of it characterising the specified PERMANENT (over 5 min) withstand capability of its insulation."

The minimum value of the rated insulation voltage of a section shall be higher or equal to the highest working voltage appearing within the section. Stressed shorter than 5 min may be taken into account case by case considering in particular the interval between such stresses.

In our resistors the rated voltage between the terminals and from live part to ground have the same value.

To impose to the resistor a higher value of non-permanent voltage, we can use the standard *EN 50163 Railway application – Supply voltage of traction system* that puts in correlation the values of rated insulation voltage and the values of Umax1, Umax2, Umax3. See below the relative graph.

The value of Umax2 is in the table norm.

FAIRFILD SRL – Via Eching, 12 20090 Trezzano sul Naviglio (MI) Italy – C.F. 03539970156 – P.ta Iva IT02736630167 – REA MI 1630934 - Capitale Sociale i.v. 50.000 € - www.fairfild.com – Tel. +39 02 48407171 Fax +39 02 48407157 – email: info@fairfild.com

4 Voltages and frequencies of traction systems

4.1 Voltages

The characteristics of the main voltage systems (overvoltages excluded) are specified in Table 1 below.

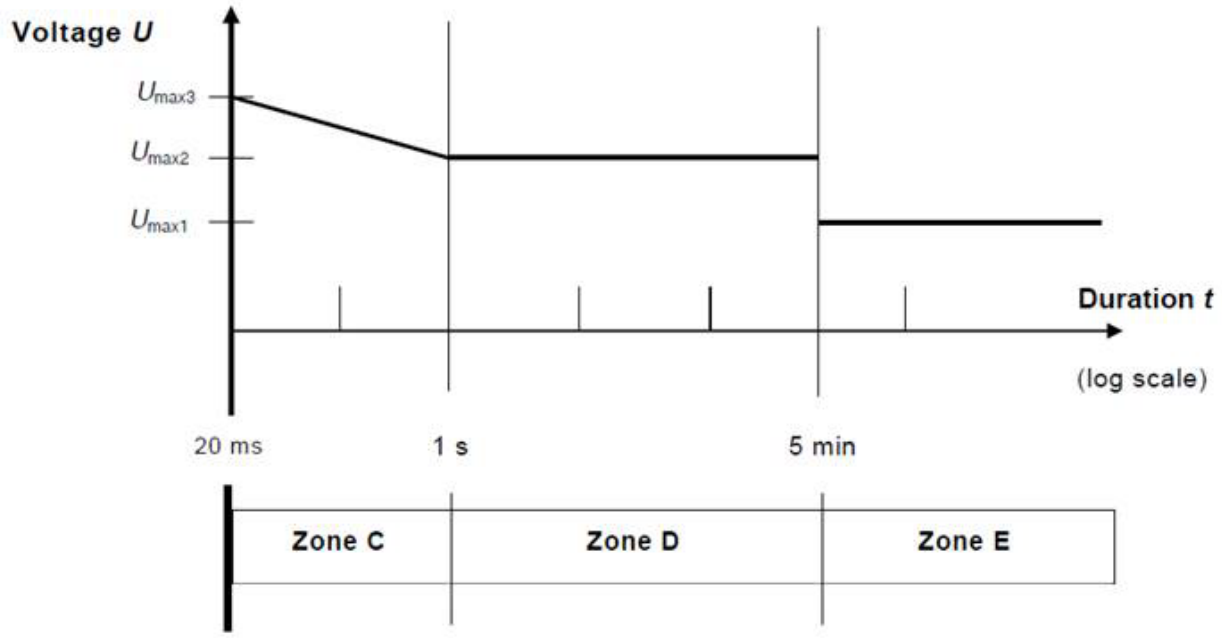
Table 1 – Nominal voltages and their permissible limits in values and duration

Electrification system	Lowest non-permanent voltage U_{min2} V	Lowest permanent voltage U_{min1} V	Nominal voltage U_n V	Highest permanent voltage U_{max1} V	Highest non-permanent voltage U_{max2} V
d.c. (mean values)	400	400	600 [a]	720	800
	500 [c]	500	750	900 [c]	1 000
	1 000	1 000	1 500	1 800 [c]	1 950
	2 000	2 000	3 000	3 600	3 900 [b]
a.c. (r.m.s. values)	11 000	12 000	15 000	17 250	18 000
	17 500 [c]	19 000 [c]	25 000	27 500 [c]	29 000

In this norm there is a formula to calculate Umax3 in function of the time and the Umax2.

Annex A
(normative)

Maximum value of the voltage *U* according to the duration



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