Elmo Compliance with MIL-STD-1275B

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Elmo
Motion Control

CHARACTERISTICS OF 28 VOLT DC ELECTRICAL SYSTEMS IN MILITARY VEHICLES

Operating in "battery-powered" applications (with or without an alternator or generator) exposes the electrical equipment to severe electrical interferences such as:

- surges
- spikes
- transients
- EMI
- over voltage
- under voltage
- voltage ripple
- reverse polarity

Harsh "battery-powered" environment interferences are unique in nature and have very high energy and long durations. As a result, the "battery-powered" interferences are unable to be managed, resolved or prevented by conventional remedies such as MOVs (metal oxide varistors), tranzorbers, zener and avalanche diodes, passive filters, capacitors, fuses, circuit breakers, etc. which are used to protect electronic equipment.

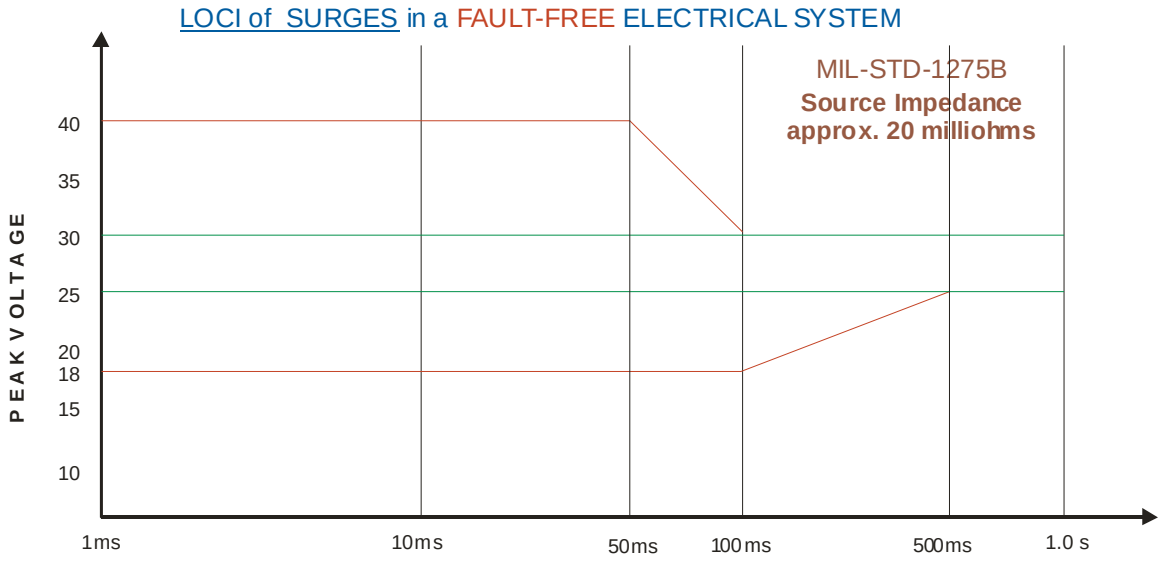
The MIL-STD-1275B sets the requirements that all 24VDC "battery-powered" equipment must be compliant in order to ensure reliable and fault free operation. Although complying with the MIL-STD-1275B is mandatory in military applications, it is highly recommended to be adopted in any type of "battery-powered" equipment.

The MIL-STD-1275B addresses 3 major interferences:

1. Surge-40V
2. Surge-100V
3. Spike-250V

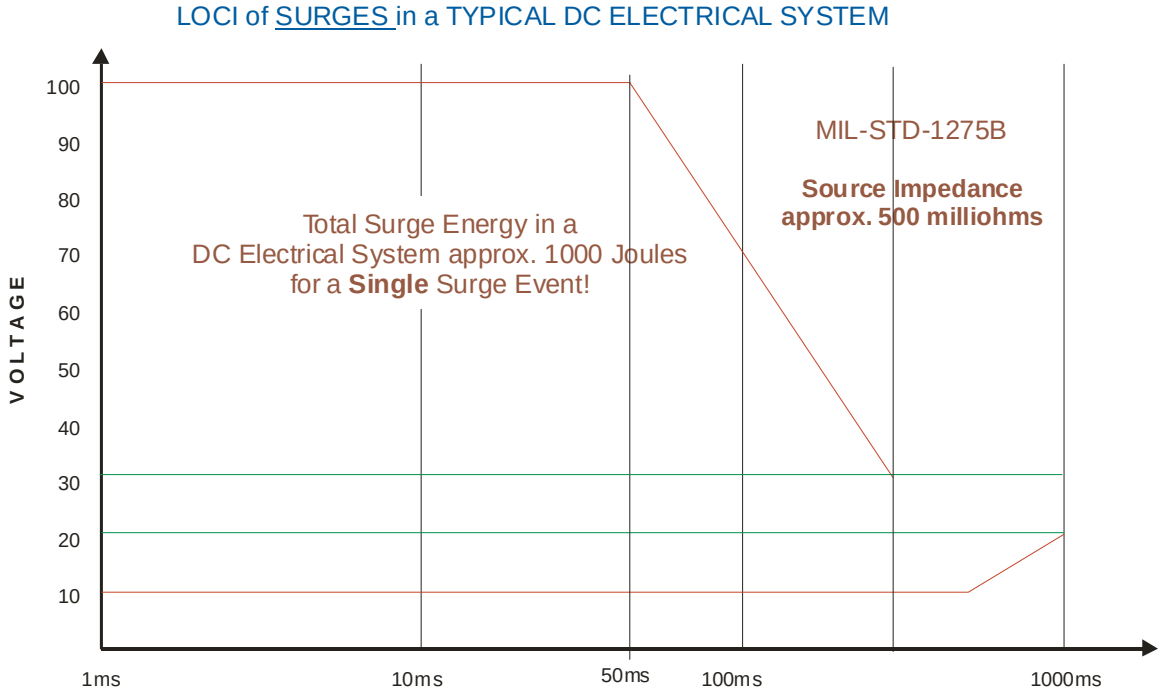
Surge-40V

		Electrical System Requirement
1	Surge 40V	Equipment shall continue to operate normally throughout these tests without damage to any components



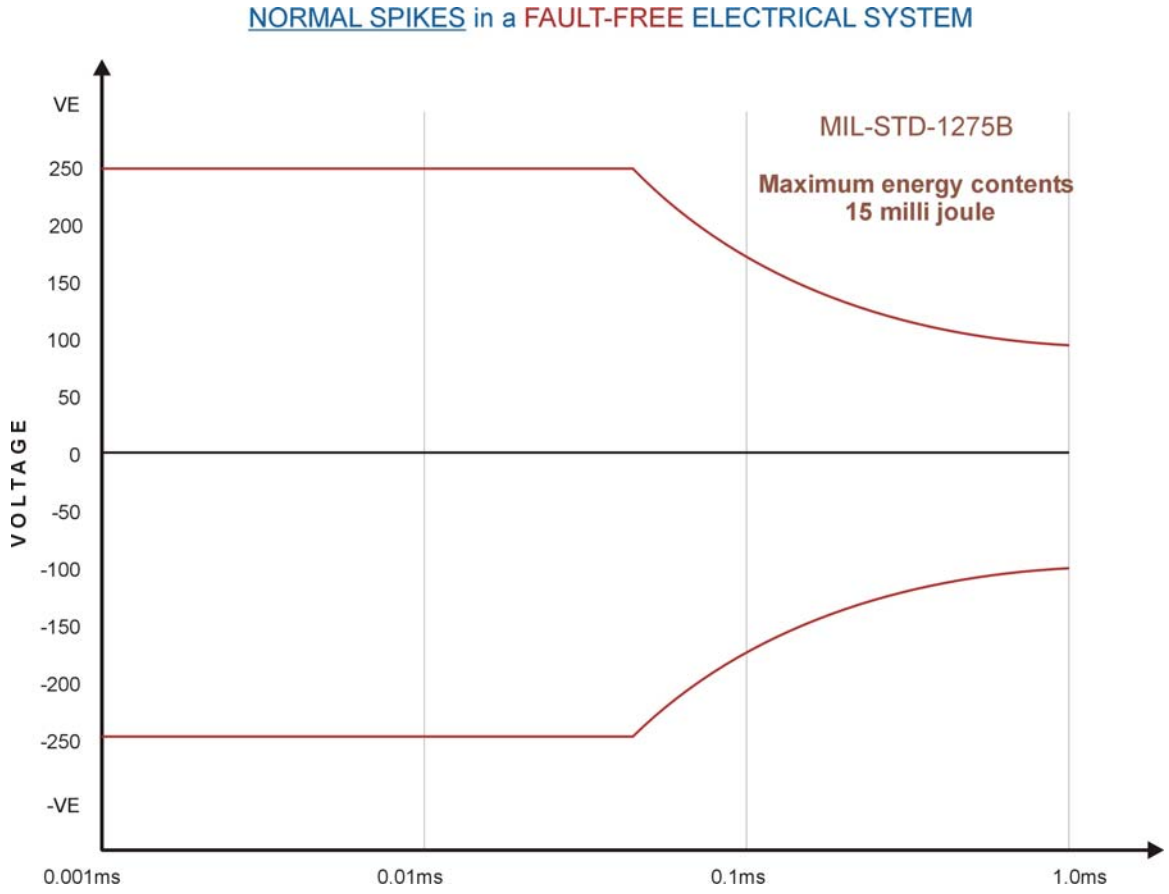
Surge-100V

		Electrical System Requirement
2	Surge 100V	Equipment shall function as specified



Spike-250V

		Electrical System Requirement	
3	Spike ±250V	The voltage spikes so imposed shall not cause any damage nor effect the normal operation of the equipment	



Elmo ***ExtrIQ*** products are designated by:

- XXX-YY/48
- XXX-YY/60
- XXX-YY/100
- XXX-YY/200

They comply with the requirements to withstand the 3 types of interferences as defined by the MIL-STD-1275B described above.

Surge-100V

Special attention must be paid to the **Surge 100V** interference.

The MIL-STD-1275B requires that the electrical equipment "…shall function as specified" by suppliers. Under the conditions of Surge 100V, Elmo's products will be disabled by over voltage protection (except for the XXX-YY/200 models which will operate normally at 100VDC). This condition suits most (if not all) applications. There is no point in trying to keep the servo driver enabled when a 500 milliohm resistor (interference condition) "exists" in series to the 24V battery power supply (for example: the drop on this resistance when peaking 100A is 50V). The servo system will hardly operate as the voltage drop on the 0.5 ohm resistor will be too high.

It is a rare condition when "the equipment shall continue to operate normally throughout…" the "Surge 100V" is required. Elmo proposes some "remedies" which are listed below for such cases:

- The simplest way is to use a drive that can operate "normally" at 100V. Usually those drives are designated as XXX-YY/200. In many cases it will be impractical because higher voltage rating servo drives are usually rated for lower currents and are significantly less efficient than the lower voltages drives.
    - In extreme cases, Elmo will be able to modify the XXX-YY/100 to operate "normally" at Surge-100V.
- The only way to keep the servo system enabled and "operating normally" during the Surge 100V with high current low voltage drives is by adding an enormous stack of capacitors to serve as the energy/voltage reservoir during the interference. In most cases, it is impractical and not required by the application.
- In low current applications (<20A), it could be practical to add a simple electrical circuit that will limit the maximum voltage applied to the servo drive during the Surge 100V to the "normal operating conditions".

Surge 100V Summary

Elmo was and is involved in many projects that meet the MIL-STD-1275 (A or B).
In only one case, there was a request to "continue normal operation" during Surge 100V.