

Protection: RC-snubber network protection circuits shall be provided for softstarter sizes designed for rated current of 200A and more, to avoid possible component damage.

(18) *Ambient Conditions*

The soft starter shall be capable of withstanding the following environmental conditions during operation and may not cause any electrical/ mechanical damage or degradation of performance.

Temperature: As a standard of soft starter design quality, the starter shall be documented to show that the open chassis design has been tested for -25 – 60°C operation with de-rating above 40 °C.

Altitude: 4000m maximum with de-rating above 1000m.

Thermal: The soft starter shall be equipped with a heat sink temperature switch designed to protect the thyristors (SCRs) from over temperature.

(19) *Mechanical Construction*

The soft starter shall be housed in a plastic material and termination points provided to accommodate the required incoming cables for the line and load connections.

The soft starter shall be ventilated with fan cooling when necessary. The fans shall be temperature regulated and automatically switch on during soft start and soft stop (if used) and in between only when cooling is necessary. This in order to reduce energy consumption and noise level of the Soft starter as well as increasing the life length of the fans.

All Soft starters shall be equipped with integrated by-pass contacts or contactor(s) as standard. This design shall reduce the power losses during continues run to allow enclosing the soft starter without using any forces cooling.

The sensitive parts on the electronics, the printed circuit board assembly, shall be protected from harsh environments using protective coating.

(20) *Quality Requirements*

The vendor shall be certified to ISO 9001 (quality certification) and ISO 14001 (environmental certification).

The produced soft starter shall be functionally tested operating a motor, prior shipment to assure proper operation per specification.

Subassemblies shall be inspected and/or tested for conformance to vendors engineering and quality assurance specifications.

Each soft starters shall be marked with an unique serial number to secure tractability. The marking shall be possible to read after installation.

Bypass relay and contactor.

(21) *Documentation and Marking*

Units shall be shipped with a complete set of documentation to include the following items:

- It shall provide Complete schematics and wiring diagrams and dimensional drawings
- Main product catalogues

The soft starter unit shall be clearly marked with information regarding current and voltage ratings at the front of the soft starter. Vital information at the side of the soft starter is not accepted, as the surrounding components and/or enclosure easily can cover this information.

8.7.16 Frequency converter motor controllers