C.   The soft starter shall be provided with one isolation contactor to provide positive isolation from the mains and one bypass contactor to bypass the soft starter power section when motor reaches to its full speed.

D.   The starter shall be equipped with metal oxide arrestor type surge suppressors across the SCR to protect against voltage transients and resistor/capacitor Snubber network to protect against false firing of SCR.

E.   A temperature sensor shall be embedded to the heat sink of each SCR to protect the soft starter from over-temperature condition.

F.   Any failure in the soft starter shall be indicated on the cubicle door through LCD display or LED indicator without requiring to open the door.

G.   The soft starter shall be supplied factory configured ready to commission, without requiring any Para metering or reconfiguration at site.

H.   The soft starter shall have the following protective feature as minimum:

   a.   Over temperature / Overload / Jam / Stall / Phase Loss / Phase reversal / Shorted SCR

I.   The soft starter shall have the following control feature as minimum:-

   a.   Kick start 0-85% locked rotor torque – 0 to 2 seconds

   b.   Ramp start 0-85% locked rotor torque – 1 to 60 seconds

   c.   Current limit start 0-85% locked rotor current – 1 to 60 S

   d.   Soft stop 0 to 60 seconds

J.   The soft starter shall be provided with high speed fuses as recommended.

K.   Starting current for motor should not be more than 2xFull load currents or 1.5 full current as per size of motor as specified above.

1.3.15.3   *Variable Frequency Drives (VFD)*

A.   Variable Frequency Drives (VFD) shall be of solid-state, static voltage source type, using minimum 32-bit microprocessor or the latest available, digital sine wave approximation Pulse Width Modulation (PWM) type suitable for the applications, controlling mainly pumps with variable torque characteristics.

B.   The VFD shall confirm to CE compliance and UL approved to Standard 508C.

C.   The VFD and associated control equipment shall be housed within a cubicle forming part of the relevant Factory Built Assembly (FBA) such as a MCC. A