Challenge

Energy efficiency has become a very important topic over the last few years.

Therefore the switch to more efficient motors (IE2 and IE3 efficiency classes) was a consequential step. Due to this switch, the motor characteristics have changed.

Monitoring the motor load limit based on nominal current is not an optimal method. Monitoring the load limit based on a temperature sensor in the windings could offer 2 significant benefits:

- Allow to use the installed motor power to its true limits
- Protect the motor via the best available criteria: The thermal load in the core of the windings

We are looking for a motor protection scheme based on true motor temperature criteria. It should be cost effective solution compared to existing sensing technologies.

Requirements

- Analyze the differences in the protection according to key features
  - Estimate the saving potential in installed motor power (size reduction) due to better utilization
  - Show the cost consequences for handling the higher peak currents in the installation
  - Show the benefits of direct temperature sensing compared to current sensing
  - Analyze residual risk points due to temperature sensing
- Check this mode of protection against worldwide electrical and safety standards
- Provide a cost effective solution to implement this method
  - Solution for simple motor switches (direct-on-line, star-delta, simple soft starters)
  - Solution for electronic drives (frequency converters, soft starters with monitoring functions)
  - Cost consequences in hardware components and assembly
  - Consequences for dimensioning rules and engineering process