

Protection against overheating

Nearly all fans delivered by thermofin[®] can be changed in their speed. This can be realised partly by tension regulators and also by converters with pole changing or tension changing. With this process, the power input can be considerably modified. A motor protection against overheating with motor protection switches or bimetallic relay is only possible to a limited extent. The connection and the evaluation of the thermo protection element integrated in the motors are mandatory. The fuses, motor protection switches and bimetal relays connected upstream serve in controlled drives only the line and short circuit protection.

Below, the procedures for the protection of motors against overheating.

Integration of the thermo contacts and/or PTC elements into the safety chain of the motors

The thermo contacts (PTO) and/or the PTC elements serve the protection of the motor windings against unpermitted overheating.

Especially for the regulated operation of the motors, this is unexceptionally prescribed. Motor protection switches MCB's or bimetallic relays cannot sufficiently ensure a regulated drive.

Thermo contacts can be evaluated directly. PTC elements additionally require an evaluation unit.

The thermo contacts and/or PTC elements deactivate the motors in case of an overheating. A locking device can prevent a too early restart.

The restart interlock must be executed in such a manner that the motors cannot be switched on before a manual release and/or a time delay of minimum 30 min. The motors must not be switched on before they are sufficiently cooled down. This does apply especially to the core sections of the windings which cool down much slower than the winding parts outside of the stator package.

Please contact thermofin[®] for circuit examples.

Compliance with the minimum and maximum motor speeds for AC and norm motors

The compliance with the maximum speed serves the protection of the motor against an overheating and a resulting destruction due to an overheating of the motor windings.

See the data sheet of the motor manufacturer for the maximum speeds. In individual cases, it is possible to increase the speed in case that the used motor has enough power reserves and the maximum power loss is not exceeded with it.

For this case, the speed limits of the driven fan must be observed. The designed speed must not be exceeded without the consent of the fan manufacturer.

The exceedance of the minimum speed can also result in overheating. The pulse modulation procedure of many converters is not suitable to supply very low frequencies in sufficient quality.

Incorrect pulse modulations result in harmonics on the motor lines which contributes to an unpermitted high warming of the motor windings. An increased load of the motor bearings due to bearing currents may also be expected.

Also in case that the speed falls below the minimum due to suitable drive solutions, the motor manufacturer must be asked for approval.

In case of low speeds, the motor current can fall below the nominal value. However, the absorbed current is too high for the lower speed. The cause for such errors is the speed of the motor self-ventilation which is not adapted to the present current consumption. The self-ventilation is not sufficient for the adjusting current consumption, however the motor current can considerably fall below the nominal value.

In such cases the actual compression of the fan is not the designed pressure. Depending on the used fans, for such adaptations, the compression on site or the relation between motor speed and fan speed must be modified.