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ENGINEERING TOMORROW

Fact Sheet

VLT® PTC Thermistor Card MCB 112



VLT® PTC Thermistor Card MCB 112 improves the motor condition surveillance in the Danfoss VLT® AutomationDrive, VLT® HVAC Drive and VLT® AQUA Drive frequency converters, compared to the standard built-in ETR function with thermistor terminal.

The MCB 112 option enables VLT® drives to be used in systems that require control of motors located in potentially explosive environments. When MCB 112 is used with a VLT® drive with integrated Safe Torque Off, the drive is certified to coast the motor when motor temperature becomes too high. This helps to eliminate the risk of explosion due to an over-temperature condition in the ATEX-certified motor (Ex d, Ex e, Ex n, Ex tb and Ex tc).

ATEX Directive 94/9/EC is an EU directive that describes equipment permitted in an environment with a potentially explosive atmosphere.

The option is ATEX certified for protection of certified Ex proof motors, regardless of supplier, in zones 1 and 2 (gas) and zones 21 and 22 (dust), in accordance with the dedicated additional measures of the Ex protection system of the motor.

The frequency converter itself is not ATEX rated and must be situated outside the hazardous area.

The MCB 112 is a standard plug-in option for VLT® AutomationDrive, VLT® HVAC Drive and VLT® AQUA Drive with integrated Safe Torque Off.

Alarm handling

The MCB 112 surveillance function detects motor overheating, possible short circuits, or open circuit due to breaks in the sensor circuit. It also provides alarm logging, diagnosis and intelligent evaluation, thus facilitating troubleshooting.

Integrated Safe Torque Off

The MCB 112 uses the Safe Torque Off function of the drive which is approved in accordance with SIL2 EN 61508. A mains disconnect contactor is not necessary.

The Safe Torque Off function can be used with external safety devices (with integrated "&" function) and is compatible with simultaneous use of the MCB 112.

Collaboration and approval

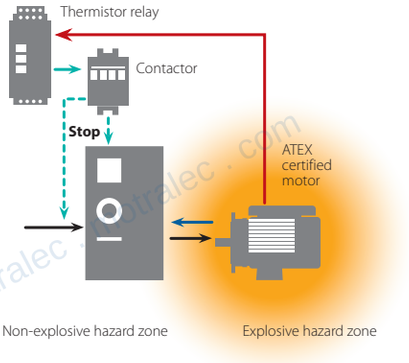
The MCB 112 has been developed in collaboration with the company ZIEHL industrie-elektronik, an experienced specialist in thermal motor protection in potentially explosive atmospheres, approved by the PTB (Physikalisch-Technische Bundesanstalt).

Ex

Suitable for operation of Ex d, Ex e & Ex n and Ex tb & Ex tc certified motors

Feature	Benefit
Independent of motor supplier	Flexible choice of motor type
No binding between the different components	Easy service
Temperature surveillance is performed directly in the frequency converter	– No external components needed – Less space required – Reduced system cost
Can assume sole protection of an Ex d, Ex e, Ex n, Ex tb and Ex tc certified motor within the installation/facility	External components saved
Current limiting feature (only VLT® AutomationDrive)	Less costly Ex-e motors can be applied
Integrated safety technology	Reduced cabling and commissioning cost
Plug-and-play	– Swift and cost-efficient upgrade on-site – The drive automatically identifies the option
Isolated solution (PELV)	Digital outputs are galvanically isolated from supply and high-voltage

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The integrated MCB 112 replaces external components like thermistor relay, contactor and wiring, since the drive communicates directly with the motor.

Current limiting feature

VLT® AutomationDrive has a feature that makes it possible to apply "Ex-e" certified motors instead of the more expensive "Ex-d" certified motors for ignition protection. The combination of the parameter setup and the MCB 112 ensures that the VLT® AutomationDrive will never provide sufficient current to cause the motor to overheat.

The feature is easy to use

Enter relevant data from the motor name plate via variable speed current limit parameters in the frequency converter. From this data, the drive creates an upper limit that limits the current provided dependent upon the motor speed.

Uncomplicated

Flexible use of speed control with motors certified with increased safety "e" ignition protection.

Compact

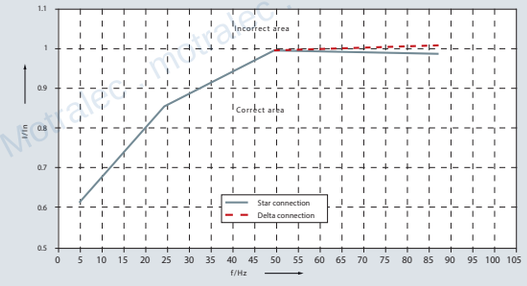
With increased safety "e" certification, distinctly smaller frame size, lower weight and lower costs compared to speed control of motors with flameproof enclosure "d" certification.

Flexible

Easy mix and match, resulting in smaller stocks of motors and frequency converters.

Specifications

PTC-thermistor connection	
Monitoring function	Temperature monitoring by means of PTC sensors
PTC compliant with DIN 44081, DIN 44082	
Number of sensors in series	Set with 3 -...6 resistors
Cut-out-point	3.3 kΩ .... 3.65 kΩ ... 3.85 kΩ
Reclosing point	1.7 kΩ .... 1.8 kΩ ... 1.95 kΩ
Collective resistance cold sensors	< 1.65 kΩ
Terminal voltage (sensors)	≤ 2.5 V for R ≤ 3.65 kΩ, ≤ 9 V for R = ∞
Terminal current (sensors)	≤ 1 mA
Short circuit	20 Ω ≤ R ≤ 40 Ω
Max. sensor cable length for short-circuit detection 2 × 250 m with 0.5 mm^2, 2 × 800 m with 1.5 mm^2	
Testing conditions	
EN 60 947-8	
Rated impulse voltage	6000 V
Over voltage category	III
Contamination level	2
EMC – Immunity industry standard	EN61000-6-2
EMC – Emission industry standard	EN61000-6-4
Safety-related parameters	
EN 61508 for T_a = 40°C ongoing	
SIL	2
HFT	Type A
PFD (test interval one year)	3,37E-04
SFF	78%
λ_{SD}	2,35E-07
λ_{SU}	3,73E-08
λ_{DU}	7,69E-08
MTBF	179 years
Operating mode	Low demand mode
Hardware architecture	1oo1
Ordering number: 130B1137	



Variable speed current limitation, from the EC type-examination certificate of the Ex e motor. Enter the relevant information from the motor nameplate into the control panel of the drive. Then the drive will calculate max. current in relation to the motor speed. The curve represents the limit under which the current must be kept to prevent overheating of the motor. The nodes for the curves are determined by measurement from the Ex notified body. With a second protective device like the MCB 112, direct temperature monitoring is possible via a triple PTC thermistor circuit. Direct temperature monitoring also detects malfunctions such as blocked ventilation or inadmissibly high ambient temperatures.

Economical

Lower investment costs enable faster payback when speed control is used to achieve energy savings.

Universal

Universal solution for the entire power range of 0.25 to 630 kW.

No need for matched pairs

Suitable for operation of Ex d, Ex e, Ex n, Ex tb and Ex tc certified motors without the need for matched pair motor-drive.

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