FUNKEN
Kunststoffanlagen

MOTORS

General information

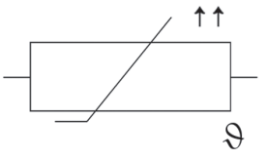
Made
in
Germany

PTC-THERMISTOR

Thermistors have a positive temperature coefficient (TC) and therefore are also called PTC resistors (PTC = Positive Temperature Coefficient).
Thermistors are temperature-sensitive semiconductor resistors. They conduct electricity better at low temperatures than at high temperatures.
If the temperature in the coil exceeds the trigger temperature, a triggering device converts the change in resistance into a control signal, which interrupts the power supply to the motor.
In the event of an overload, this ensures the motor is shut off before major damage can occur, thus increasing the overall service life of the motor.

The PTC is either built right into the coil during production of the motor, or it can be retrofitted as a modification. In this case, the three thermistors of the PTC are installed in series, one for each phase.

Circuit symbol for a thermistor



MOTOR PROTECTION SWITCH

Motor protection switches are produced primarily for three-phase AC motors.
This type of motor protection uses OR-linked triggering by means of monitoring the currents in the three lines (current-sensitive protection device).
The monitoring can be thermo-mechanical (bimetal), thermo-electronic (PTC) or electronic (current measurement).

To prevent damage due to overload or failure of an external conductor, AC motors should only be connected to the power grid using suitable motor protection switches or motor protection relays.

As a rule, this type of motor protection is always set according to the rated motor current Ie. The restart after a trigger event can either occur automatically or be initiated manually by pressing a release button.

Some motor protection switches also have integrated undervoltage releases. Often, motor protection switches also protect the supply grid from short circuits by means of a short-circuit trigger, but this is not required for the device to be considered a motor protection switch. Motor protection switches for short-circuit and overload protection must be installed at the beginning of the motor power supply according to DIN VDE 0100. The short-circuit protection function can also be provided by a coupled circuit breaker at the beginning of the power supply.

OVERLOAD RELAYS

Overload or motor protection relays function on the same principle as the motor protection switch, but they do not shut off the motor themselves. If a motor protection relay triggers, one or several smaller contacts are actuated (auxiliary relays). Usually, one of these relays controls a contactor which then shuts off the device. Many motor protection and overload relays are designed so they can be mounted directly to a contactor and connected to it without any additional lines. In contrast to motor protection switches, a motor protection relay has no short-circuit trigger but only a thermal trigger (bimetal), which could react too slowly in the event of a short circuit. This is why fuses must be installed in power supply lines for one or several motors protected with motor protection relays.

Overload relays are also available for higher voltage levels of the power grid. They are connected via appropriately insulated transformers and trigger a power switch!

RISK OF FATAL INJURY FROM ELECTRICAL CURRENT!

The electrical installation must only be conducted by qualified electricians and in compliance with applicable regulations:

CONTROL UNITS

FOR SINGLE-PHASE AC MOTORS

Single-phase AC motors are divided into:
1. Motors with external thermal contacts
2. Motors with internal thermal contacts

The construction with internal thermal contacts is only suitable for smaller voltages, e.g. when thermal contacts are directly integrated in the circuit right in the motor coil.
Motors without external thermal contact connections can be switched on and off in single-speed operation with any commonly used installation switch.
For two-speed operation, however, a special rotary switch is needed, which also fits into any flush-mounted switch. Motor protection is provided at both speeds and in both operating modes.
The thermal contact functions by interrupting the power circuit to the motor when the maximum permissible temperature for the respective insulation class is reached, thereby shutting off the motor, and switching it back on after it has cooled.
Differing from this function, contactor switches can be configured so that the motor does not restart on its own after cooling below the maximum permissible temperature.

As a rule, it is possible to operate all motors without external thermal contact connections via the switching devices intended for the separate connection of the thermal contact.
For this purpose, the thermal contact connectors on the switching devices must be fitted with a wire bypass. With an electronic speed control developed specifically for single-phase AC motors, it is possible to flexibly adjust the speed of motors with and without external thermal contact connections from zero up to the rated speed.

By connecting resistors to the control circuit, this speed control device also allows for operating a motor in two or three different speeds with one contactor.
It is switched on and off by means of a manual switch integrated in the control device.

- VDE regulations including safety regulations
- Accident prevention regulations
- Installation instructions

PROTECTION CLASSES

FOR ELECTRIC MOTORS (IP)

The types of protection are divided according to DIN 40050 and labelled with internationally approved designations (IP= International Protection).

The abbreviation IP is followed by two digits:
The first digit stands for the protection against intrusion of solid particles.
The second digit describes the protection class against intrusion of water.

The standard motors used by us have protection class IP55. Upon request, we can also supply motors with protection class IP56.

For better understanding, the following is an overview of the protection classes:

First digit . Brief description of protection class

0	Unprotected
1	Protected against solid particles larger than 50.0 mm
2	Protected against solid particles larger than 12.0 mm
3	Protected against solid particles larger than 2.5 mm
4	Protected against solid particles larger than 1.0 mm
5	**Dust protection*¹**
6	Dust seal

Second digit . Brief description of protection class

0	Unprotected
1	Drip water protection
2	Drip water protection at inclines up to 15°
3	Rain protection
4	Splash protection
5	**Water jet protection*²**
6	Water surge protection
7	Pressurised water protection
8	Permanent pressurised water protection

***¹ Detailed description for the first digit:**
Full protection against contact with live or internal moving parts. Protection against harmful dust sediments. Intrusion of dust is not entirely prevented, but dust must not penetrate in sufficient amounts to impede the function.

***² Detailed description for the second digit:**
A jet of water from a nozzle pointed at the motor from all directions must not cause any harmful effects.

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