

ENGINEERING NOTE

MOTOR

Protecting Motors from Moisture Problems

Improper protection of a motor's winding from moisture can damage the motor and cause premature failure. Although it is impossible to seal a motor against the entrance of all moisture it is possible to avert failures by recognizing the causes of moisture build-up and applying preventative measures.

Causes of Moisture Build-Up

Moisture can accumulate inside of a motor:

- During storage
- When the motor is operated intermittently
- From splashing during washdown or outdoor installations

Storage

If the motor is stored for an extended period of time without operating, the motor must be stored in a dry, protected area. If improperly stored, the temperature of the motor can reach the dew point at which time moisture can collect on and inside the motor, causing corrosion and gradual deterioration of the varnish insulation on the motor windings.

Intermittent Operation

When a motor is in operation its internal temperature is higher than the surrounding atmosphere and condensation inside the motor is improbable. But when the motor is turned off and cools down, condensation can form within the motor. For a motor that is operated very intermittently the problem is aggravated since the motor never runs long enough to dry out the residual moisture.

Preventing Damage Due to Moisture

Once it is recognized that it may be impossible to completely prevent moisture from within a motor, certain steps can be taken to prevent the moisture from accumulating and causing damage.

A motor that is to be stored for an extended period of time must be stored in a dry, protected area. Upon removing the motor from storage or anytime you suspect moisture may be present in a motor, check the winding insulation integrity with a megohmmeter. The insulation resistance between each phase and ground should be at least 1000 times motor voltage rating. (Example: a 230V motor should have a 0.23 megohm reading). Lesser reading may indicate that moisture has entered the motor

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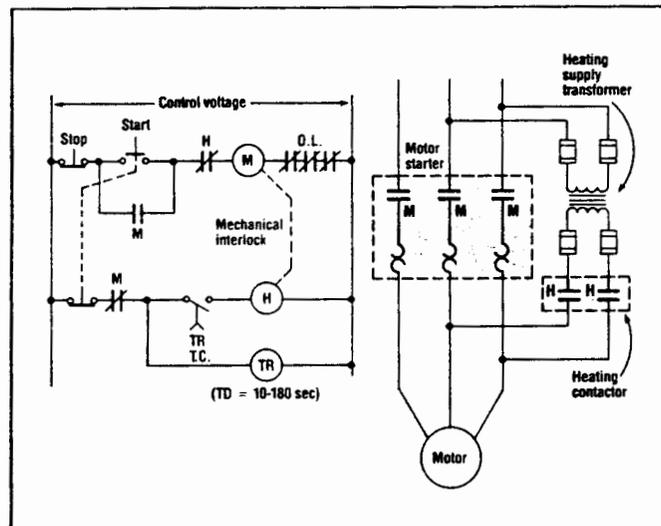
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winding and the motor must be dried before use. Drying can be achieved with hot air up to 90°C or by resistance heating with an auxiliary AC voltage of 10% to 20% of rated motor voltage. Care should be taken to ensure that during drying the motor current is not more than 20% of the nameplate rated current and that the temperature rise does not exceed 90°C. If a great degree of moisture is present within the motor, the motor may require disassembly and a thorough internal cleaning. Then after drying the windings, the windings should be varnish dipped and baked to eliminate any insulation imperfections.

One way to prevent moisture from accumulating in a motor when it is idle, is to keep the windings warmer than the surrounding atmosphere. This will prevent condensation and aid in drying out any residual moisture. There are two recommended ways of doing this:

I²R Heating Method

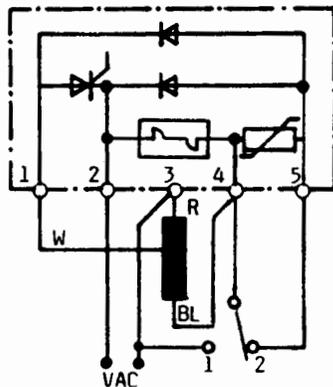
In the I^2R heating method, a trickle voltage is applied to two phases of the motor when it is not in use. The third phase is not used so that the motor will not try to rotate. A trickle voltage of 10% to 20% of the motor rated voltage is applied via an isolating transformer with a current not to exceed 20% of nameplate rated current. The trickle voltage must be switched off while the motor is in operation.



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For Eurodrive motors supplied with brakes, the brakes can be kept warm when not in operation by the use of the BGH rectifier control unit.



Pos. 1 - For heating the brake
Pos. 2 - For normal brake operation

Resistance Heating Method

In the resistance heating method, flexible strip heaters are placed inside the motor housing. The strip heaters are available in 115VAC or 230VAC and the recommended wattage rating for the SEW-Eurodrive motors are as follows:

Motor Frame Size	Strip Heater Wattage
DT71/DT80	18
DT90/DT100	24
DV112M/DV132S	36
DV132M,ML/DV160M	48
DV160L/DV180	72
DV200/DV225	96

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Severe Duty Motors

One of the best ways to protect motors from moisture damage is to specify the SEW-Eurodrive Severe Duty Motor. These motors are designed for severe environments and difficult moisture conditions. Severe Duty Motor features include corrosion resistant housings and fasteners, condensation weep holes, and additional coating of polyurethane red insulator enamel on the windings. The condensation weep holes are strategically located to prevent the accumulation of moisture within the motor while the polyurethane enamel provides additional moisture resistance.

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