THERMAL PROTECTORS

Thermal protectors (overloads) protect the motor's insulating materials from excessive heat. Examples of these materials are winding varnish, slot liners, and lead wire insulation. Overloads have bi-metallic strips with contacts on them that act like an on/off switch in the motor. The strips 'feel' the amount of heat present in the motor. When the heat is excessive, as in the case with an overloaded motor, the strips will bend and open the circuit to the motor. The overloads sense this heat in one of two ways. They either get placed right on the winding to sense the heat directly or they get mounted remotely in the motor's conduit box, for example. In a conduit box the overload has an extra component called an internal heating element. This element will create its own heat in the overload since it is not on the winding.

Some common types are described below.

Auto reset overload - This will automatically re-energize the motor after the motor cools down.

Manual reset - This will normally have a reset button that needs to be manually pressed to re-energize the motor.

One shot - This type will not reset. The motor will need to be replaced.

Impedance - This provides protection by way of the motor's inherent design which prohibits it from being able to generate excessive heat.

FACT Overload protection is a requirement of Underwriter's Laboratories (UL). The actual operation of an overload is intended to protect the motor winding from overheating.

FACT All Fasco motors are manufactured to an exact insulation specification and include some kind of inherent or built-in protection against overheating. The insulation system defines maximum allowable winding temperatures. The thermal protection is calibrated to the winding temperature to detect overload conditions.

FACT Be sure to disconnect the motor from the line before servicing, as the motor can suddenly re-start as it reaches the temperature needed for the overload to reset.

FACT 'Trip and reset' cycling of the thermal protection is one of the most common application problems for both PSC and Shaded-Pole motors. It generally indicates overheating of the motor due to misapplication. It is rare to have a defective protector. Usually, one of the following conditions exists:

1. Motor is overloaded - ampere draw will be 10% or more greater than the nameplated amps.
2. Motor is underloaded - ampere draw will be 25% less than nameplate.
3. A defective or wrong size capacitor is being used.

FACT Replacement motor has less ventilation than the original motor. Less motor ventilation can cause the motor to trip on the overload but it can take considerable time to reach this point. A high ambient temperature and/or exposure to sun are a couple of reasons the trip time can be shortened.

FACT Condition one and two from above can be confirmed by checking the ampere draw of the motor using an ammeter. Condition three's defective or wrong size capacitor will cause a motor to act as if it is overloaded. It will run slow, hot, and draw more than nameplate amps. If all else checks out OK, condition four suggests the application receive a motor with similar ventilation as the original.

FACT Cycling on overload is probably a misapplied motor. Current draw should not vary from the nameplate amps by more than 10% or less than 25%.

FACT Do not by-pass (jump) thermal protectors to eliminate nuisance trips. Check the application.

FACT An overloaded motor always runs hot, slow, and draws more than nameplate amps. Reading the motor current draw with an amp meter is the most accurate method of identifying an incorrect replacement.