

# FRANKLIN AID



**Franklin Electric**

The Company You Trust Deep Down



Franklin Application/Installation Data (AID)... For The Professional Pump Installer and Driller

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## OVERLOADS – UNSUNG HEROES

If there is such a thing as an unsung hero in an electrical motor it has to be the overload. Overloads play a crucial role in protecting submersible electric motors from overheat conditions. For this reason, Franklin Electric supplies overloads for all of its single-phase submersible motors. Depending on the motor design and horsepower, the overloads may be located externally in a control box or internally in the motor itself.

### The Job of an Overload

As you know, all electrical currents generate heat. Although in some cases we can use this to our advantage, in the case of an electric motor, that heat works against us. In extreme cases, such as a locked rotor, this heat can even cause motor failure. The job of the overload is to prevent just that.

There are two primary conditions that cause a motor to overheat and fail: a lack of a cooling flow of water past the motor, and a high current (amp) condition. While the first condition is straightforward, a high current condition may be caused by several factors, including low voltage, high voltage, a shoot to Earth, or an overloaded motor. Regardless of the reason, when the motor gets too hot, we have to cut power to the motor. This is where overloads really earn their pay by preventing motor failure and saving it for another day.

Remember that the components in each Franklin Electric control box have been carefully selected for use with a Franklin Electric submersible motor. Using a control box from another manufacturer will void the warranty on your Franklin motor.

### Overload Placement

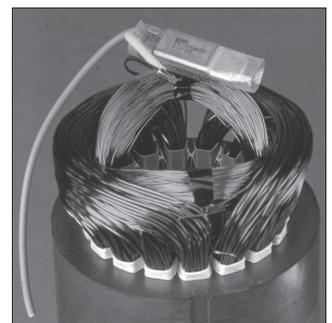
In general, the closer an overload is located to the motor it is protecting, the better it is for the motor. If the overload is located inside the motor, it can detect an overheat condition from a lack of cooling flow. A control box overload is not in a position to do this (literally).

In addition, overloads located in control boxes can be affected by extreme external conditions. That is, although overloads used in Franklin Electric control boxes will hold the motor's nameplate maximum amps in temperatures up to 50°C, ambient temperatures due to hot pump houses or direct sunlight can force internal control box temperatures much higher. This reduces the amount of current the overload can carry, and nuisance tripping may occur. Nuisance tripping of overload protectors during extreme temperature conditions may be alleviated by reducing the motor current or by providing a cooler environment for the overload, either by moving the control box or placing the overload in the motor itself. *(For more information, please refer to Franklin AIM Manual sections titled "Control Box and Panel Environment".)*

Why aren't all overloads located inside the motor? As noted above, whether overload protection is located inside the motor (internal placement) or the control box (external placement) depends on the motor design and rating. It is simply an issue of physical space and packaging. As motor ratings get larger, their currents increase as well. This requires larger overloads, which eventually become too large to package in the confines of a submersible motor.

### Internal Overloads (Automatic Reset)

All ratings of Franklin Electric 2-wire submersible motors, as well as the 50 Hz 1.5 KW PSC single-phase submersible motors, utilize a single overload that is built into the motor. These overloads, which trip in response to high internal motor temperatures caused by high amperage and/or inadequate motor cooling, automatically reset themselves after a cool-down period. Once reset, the pump will restart when



the system calls for water. Franklin motors with internal overloads can be identified by the words “THERMALLY PROTECTED” located below the nameplate.



THERMALLY PROTECTED

### External Overloads (Manual Reset)

Franklin 3-wire single-phase motors use manual reset overloads located in the control box. These control boxes have two separate overloads: one for the start winding and one for the main winding. Looking at the front of the control box, the main winding overload is located on the left side, and the start winding overload on the right. External overloads trip when the current (amperage) exceeds what the motor can handle.

### Resetting Tripped Overloads

An overload that is tripping often is indicating that something is wrong with the system. After an overload has tripped, it is suggested that you wait for at least one minute to allow the system to cool down. If the overload continues to trip, then investigate further. Look for things like: high or low voltage, pumping too much water, earth faults with a megger, etc.

### Incorrect Control Box

Using a control box from another manufacturer will void the warranty on your Franklin motor.

There are suppliers that historically sold a Franklin Electric motor and control box with their pump and

marketed the assembly with a well known trade name (ie “Ultra”). This supplier has substituted FE motors and controls boxes with an imported brand, but has continued to use the same trade name. You may be ordering an “Ultra” system thinking you are getting a Franklin Electric motor, but actually receive an off brand motor. Be warned that replacing one “Ultra” system with another that you may not be offering the same products.

These control boxes and motors are not compatible with Franklin Electric products. Using a new “Ultra” control box on an existing installation could potentially shorten the life of your motor.

Franklin Electric has a proud heritage and has always marked every pump, motor, and control box with its name and logo. Ask for Franklin Electric by name to insure you receive the same high quality products you have always trusted.

### Summary

Regardless of their location or type, overloads are critical to the life of a submersible motor. To wrap up our discussion, keep the following in mind:

- Overloads are thermal devices. They detect heat from high current or other conditions.
- The ideal location for an overload is in the motor, as close to the windings as possible. All Franklin Electric single-phase 2-wire motors and the 1.5 KW PSC motors are manufactured with built-in overloads.
- In higher horsepower ratings, physical limitations prohibit placing the overload in the motor. As a result, overloads for Franklin 3-wire single-phase motors are located in the control box

Finally, to maximize the service life for your submersible motor, make sure it always carries proper overload protection. When conditions heat up, you’ll be glad you did.

## TOLL FREE HELP FROM A FRIEND

Phone Franklin toll-free on **1300 FRANKLIN** for answers to your installation questions on submersible pumps and motors.

When you call, we will offer assistance in troubleshooting submersible systems and provide answers to your pump and motor application questions.

[www.franklin-electric.com.au](http://www.franklin-electric.com.au)



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