

**CIRCLE THERMAL PROTECTOR <1>**

Common sense dictates that, since a submersible pump operates in it's own liquid environment it is necessary to provide built in motor protection. It is not practical to rely solely on overload protection in the control panel that is subject to a different set of ambient conditions. Tsurumi therefore incorporates built in motor protection for all submersible pumps that they manufacture.

The Circle Thermal Protector, (CTP) shown in Figure 1, is typically supplied on small to medium sized units (up to 30 HP).

Figure 1 (Shown inverted for illustration purposes)

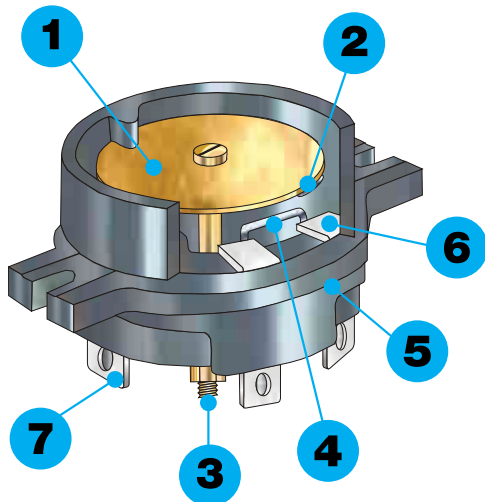


Figure 2

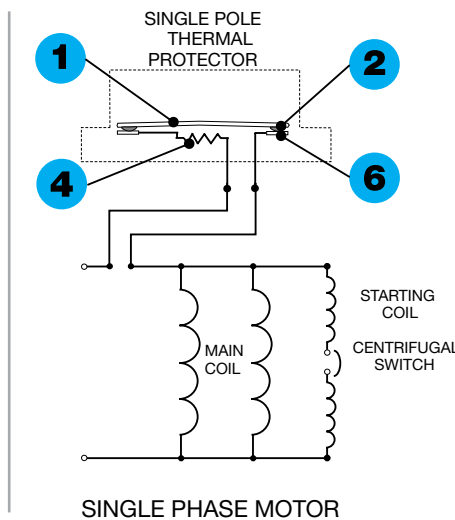
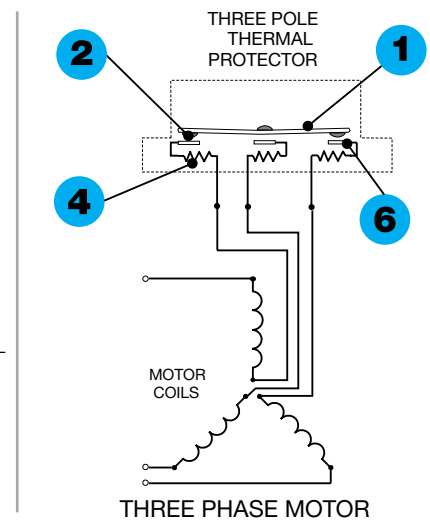


Figure 3



The Tsurumi CTP is a unique motor protector in that it not only senses excess heat build up in the motor, but will also sense excess amperage draw. The CTP protects the motor from the following problems that may occur during operation.

1. Locked rotor due to blockage or mechanical failure
2. Phase imbalance
3. Extended run dry conditions
4. Single phasing in three phase units
5. Low voltage

Incorporated in the Tsurumi design are the following features:

**1 SNAP ACTING DISK**

The snap acting disk is a bi-metallic disk that will deform in a predictable manner when a certain temperature is reached. Attached to the bottom of the disk are the **2** movable contacts

**3 CALIBRATION BOLT & NUT**

The calibration nut & bolt are used by the factory to calibrate the CTP.

**4 HEATER(S)**

The heater element is the amperage sensing part of the CTP. Should the motor windings start to draw excess amperage, the heater element will heat the snap acting disk up until the disk reaches actuating temperature.

**5 HOUSING**

The CTP housing is made of temperature resistant bakelite and provides a sturdy, insulated mounting base for the **6** stationary contacts and terminals **7**

In order to provide maximum protection, the Tsurumi CPT is mounted directly over the windings of the motor.

The CTP is supplied in two different configurations. One is a single pole model, which is used for single phase units (as shown in a typical wiring diagram, **Fig. 2**). In this diagram the snap acting disk is show in the closed position. The other is a three pole model which is used in three phase units, (as shown in a typical wiring diagram, **Fig. 3**). Should the actuating temperature be reached the snap acting disk will open the circuit as shown In the three phase motor diagram. When the motor cools down to a safe operating temperature the CTP will automatically reset and the motor will restart. In addition the CTP is sized according to horsepower and voltage