Yes, **bimetallic temperature switches** generally **do need contact protection when switching inductive loads**, although the degree of protection required can depend on the specific application and the nature of the inductive load. Here's why:

Key Reasons for Contact Protection with Inductive Loads:

1. **Inductive Kickback (Back EMF)** Just like reed switches, **bimetallic temperature switches** typically operate by opening or closing contacts based on the temperature, which may involve switching currents in inductive loads (such as motors, transformers, solenoids, etc.). When the switch opens to disconnect an inductive load, the energy stored in the magnetic field of the inductor will try to maintain the current flow, creating a **voltage spike** (known as inductive kickback or back EMF). This high-voltage spike can:
    - **Cause arcing**: The voltage spike can cause arcing between the contacts when they open, damaging the contact surfaces, degrading performance, and reducing the lifespan of the switch.
    - **Lead to contact degradation**: Repeated arcing can erode the contact material, leading to poor switching reliability, high resistance, and eventual failure.
2. **Over-Voltage Stress** Inductive kickback can produce voltage spikes that exceed the voltage ratings of the bimetallic temperature switch's contacts. These spikes can result in:
    - **Permanent damage** to the contacts if they are exposed to high voltage for extended periods.
    - **Intermittent or unreliable operation** due to the contacts being worn or pitted by arcing.
3. **Slow or Unreliable Current Interruption** Bimetallic temperature switches often have slower response times than solid-state switches, and their mechanical contacts are not as quick to open or close as reed or solid-state contacts. The sudden interruption of current in an inductive load can lead to **incomplete or slow current interruption**, especially under high inrush conditions or transient voltages. This can cause **contact bouncing** or failure to fully open, leading to further arcing or damage.

Protection Mechanisms for Inductive Loads:

To protect bimetallic temperature switches from these harmful effects when switching inductive loads, various **contact protection** strategies can be employed, including:

- **Flyback Diodes (Freewheeling Diodes)**: A diode placed across the inductive load (in parallel with the load) allows the current to dissipate safely through the diode when the switch opens, preventing the voltage spike caused by the collapsing magnetic field.
- **RC Snubber Circuits**: An **RC snubber** (a resistor and capacitor in series) can be placed across the contacts of the switch or across the inductive load. The capacitor absorbs the high-voltage spike, while the resistor dissipates the energy, reducing the possibility of arcing.

- **Varistors or TVS (Transient Voltage Suppressors)**: A **varistor** or a **TVS diode** can be placed across the switch contacts to clamp the voltage to a safe level during transients, protecting the contacts from high-voltage spikes.
- **Soft-Start Circuits**: For certain types of inductive loads, soft-start circuits or inrush current limiters can be used to reduce the magnitude of the current when the load is first energized. This helps to minimize the occurrence of large inductive spikes when switching.

Conclusion:

While **bimetallic temperature switches** do not typically suffer from the same level of precision and vulnerability to electrical transients as reed switches or solid-state switches, they still **require contact protection** when switching inductive loads. Without protection, the voltage spikes generated by the inductive load can cause arcing, wear, and potential failure of the switch. Therefore, adding components like flyback diodes, RC snubbers, or TVS diodes can help ensure the longevity and reliable operation of the bimetallic temperature switch in inductive load applications.