

Construction

ELCUT Thermal Cutoffs come with axial or radial lead wires, both having the same basic design. The thermal element is welded across a pair of lead wires and is coated with a special compound to protect it from oxidation. This ensures stable and reliable fusing off of the thermal elements. The coated element is housed in a special insulated container and is hermetically sealed. The final product is a miniaturized, alloy-type thermal cutoff with extremely simple construction.

Operational Principles

The special resin compound starts to liquefy when the ambient temperature rises, specifically, as the temperature reaches the melting point of the thermal element. The resin compound generates a surface tension that causes it to form a bulb-like shape which pulls the liquefied element apart. This, in turn, permanently breaks the electrical circuit. (See construction diagram)

The Explanation of Technical Terms

• Cut-off (Fusing-off) Temperature

The temperature at which the thermal cutoff opens (fusing-off) while passing 0,1 amp or less in a controlled oil bath at a rise of 1°C per minute. The Cut-off Temperature is not the Rated Functioning Temperature

• Holding Temperature (Th or Tc)

The highest temperature of the thermal cutoff at which it will not open the circuit for 168 hours while passing rated current. (Applicable to CSA, C-UL and CCC)

• Maximum Temperature Limit (Tm)

The highest temperature at which continuity does not occur for 10 minutes after the fusing off of the thermal cutoff.

• Rated Functioning Temperature (Tf)

Rating of the Fusing-off temperature based on safety standards. Tolerance of Rated functioning temperature is +0,-10°C for IEC 60691. Tolerance for METI is ±7°C except some types. ELCUT Thermal Cutoffs are rated to satisfy those requirements.

• Rated Current (Ir)

The allowable maximum current, which a Thermal Cutoff is able to carry.

• Rated Voltage (Ur or Vr)

The allowable maximum voltage, which a Thermal Cutoff is able to be applied.

⚠ Cautions

These materials describe the cautions for using thermal cutoffs. If these cautions are not strictly observed, thermal cutoffs may function at temperatures lower than the functioning temperatures shown in the catalog, or they may not function at all even if they exceed the functioning temperatures indicated in the catalog. Problems resulting from improper use of thermal cutoffs are the responsibility of the user, and not of Uchihashi Estec.

- (1) The electrical ratings and rated functioning temperatures of thermal cutoffs are prescribed. Use thermal cutoffs within the rating ranges.
- (2) Install thermal cutoffs so that their temperatures do not continuously exceed Maximum use temperatures shown in each leaflet.
- (3) Do not use thermal cutoffs in special conditions, where the use of ordinary electrical equipment such as consumer electronics and electronic office equipment is not appropriate. For example, the use in liquids, in organic solvent, in environments of corrosive gases (mainly sulfurous acid gas and nitrogen oxide gas), in high or low pressure, or in high humidity shall be prohibited. Under such conditions, thermal cutoffs may function at temperatures lower than the functioning temperatures or they may not function even if they exceed the functioning temperatures because of hermetically damaged epoxy resin caused by its deterioration.
- (4) Thermal cutoffs are developed under the assumption that they will be used in ordinary electrical equipment such as consumer electronics and electronic office equipment. Do not use them in aeronautical equipment, life-support equipment and other machinery for medical purposes, equipment used for engine control in transportation machinery, or in nuclear power equipment.
- (5) To have thermal cutoffs function as they should, users must select the thermal cutoffs suited to each piece of equipment, and properly choose the positions and methods for installation. Users themselves should decide which type to install in each kind of equipment, and should avail themselves of not only information offered by Uchihashi Estec, but also their own tests, to confirm that their selections are the best. Such tests should involve the preparation of an adequate number of final products for testing, as well as repeated testing under both normal usage conditions and abnormal conditions.
- (6) Care must be taken, when designing, for the fact that self-temperature rise by energizing will cause thermal cutoffs to function under less ambient temperature.
- (7) Long-term exposure under high-temperature environment may cause thermal cutoffs to fuse off improperly due to thermal deterioration. Therefore, using thermal cutoffs at as low temperature as possible will be recommended. Maximum use temperature is the temperature at which we make sure improper fusing off after specified time do not occur.

When used in special conditions described in above item (3) or (4), please consult a sales person of Uchihashi Estec.

取得安全規格 Approved Safety Standards



ISO 取得 Approved ISO Standards

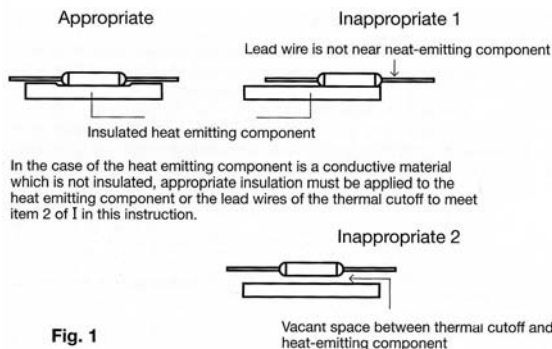


Applications instructions for ELCUT thermal cutoffs.

The following instructions include explanations of cautions to be observed in designing equipment for the installation of ELCUT thermal cutoffs (thermal links) and in the use of thermal cutoffs to ensure that they function as intended. When designing equipment in which ELCUT thermal cutoffs are to be installed, and then using the thermal cutoffs, we ask that you carefully read these instructions and gain a full understanding.

Cautions to be observed when designing for use of thermal cutoffs.

Ensuring that the thermal cutoffs thermosensitive functions are fully exercised requires that equipment be designed so that thermal cutoff lead wires are as long as possible. When using thermal cutoffs in equipment with winding functions such as transformers and motors, install the thermal cutoffs in places with good heat conductance, which will allow them to most directly sense the heat of the windings. Design equipment so that the bodies and both lead wires of thermal cutoffs are evenly heated (see fig.1).



Appropriate insulation distances (clearance and creepage distances in accordance with IEC 60664-1) need to be kept between lead wires of the thermal cutoffs and other conductive materials. When designing and products, be sure that thermal cutoffs are not installed in locations where they would be subject to severe or continuous vibration. Design end products so that, after a thermal cutoff functions due to abnormal heating of the equipment, the thermal cutoff does not reach a temperature above its maximum temperature limit owing to overshoots. Install thermal cutoffs so that their function is triggered only by abnormally high temperature. Although thermal cutoffs are highly reliable, there are limits to the abnormal states which a single thermal cutoff can cope. Further, if a thermal cutoff is damaged for some reason, it is possible that it will not break a circuit under abnormal conditions. If there is a possibility that personal or property damage would arise if a circuit is not broken during abnormal equipment operation (i.e. when there is a high required safety level) it is effective to add one or more thermal cutoffs with different temperature ratings. The mechanical strength and rigidity of the hardware used for mounting the thermal cutoff shall be adequate. Brackets, clamps or screws used for mounting the thermal cutoff shall withstand thrust and tensile forces, torques, vibrations and cyclic temperature changes expected during normal operating conditions of the equipment. The mounted thermal cutoff shall be adequately protected from harmful effects produced by possible spillage of liquids from the equipment, for example by covers. For sealing-in with impregnating fluids or use of cleaning solvents, investigation (trial test) with prototypes and initial products is required to ensure that intended sealing or cleaning does not affect marking and function of the thermal cutoffs for each individual application.

Cautions to be observed when installing thermal cutoffs.

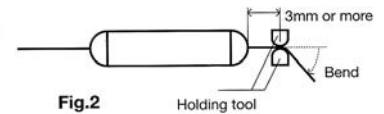
Do not twist the body or lead wires (i.e. do not turn or rotate lead wires respect to the body). Do not push lead wires toward, or pull them away from the thermal

Table 1

Series name	Maximum tension	Maximum pressure
32, 44, U2, S	4.4N	1.1N
12	5.7N	1.4N
X	7.7N	1.9N
21, 22	15.7N	3.9N

cutoff body at axial stresses exceeding those shown in Table 1 (room-temperature reference values). Values in Table 1 were calculated from lead wire diameter according to IEC60691. Tangential forces on the leads must be avoided (i.e.

pushing or pulling on the leads at an angle to the thermal cutoff body) as such forces may damage the thermal cutoff's seals. When bending a lead wire for installation, fix the part of the lead between the body and the lead section top be bent using a tool, and gently bend the lead section that is at least 3 mm from the body. Never hold the body with a tool (see fig.2).



Do not damage lead wires by holding with a sharp instrument, and do not bend at a sharp angle. After a thermal cutoff has been connected, do not apply excessive force that will crush the thermal cutoff body, sealant or lead wires, and ensure that leads are not subjected to tension, pressing or twisting forces with respect to the thermal cutoff body.

Soldering and welding cautions.

Cautions to be observed when soldering and welding:

after soldering or welding, leave the thermal cutoff for at least 30 seconds to allow the sealant to cool before conducting any taping, fixing, bending, or redoing any soldering or welding. Any stress applied on the thermal cutoff before cooling may cause a broken wire or loss of air tightness, and this may inhibit the proper functioning of the thermal cutoff. If resoldering or rewelding is done before a thermal cutoff has cooled, the added heat may cause it to function. Cooling time varies depending on the soldering temperature (welding conditions), soldering time, conduct a test with the thermal cutoff that is to be used. If after soldering or welding, the sealant is burned, or thermal cutoff contents have permeated out, replace with a new thermal cutoff even if the resistance value reads normally.

Maximum permissible soldering time:

using long lead wires allows for a longer soldering time. Using the longest possible leads when soldering or welding. if you must solder or weld with a short lead wire, use a heat sink between the soldering or welding point and the sealant. Users should conduct tests for each application, and individually determine the soldering time that will not adversely affect the thermal cutoffs.

Connecting cautions :

when connecting leads by welding or crimping measure the electrical resistance of the connection with a low-range ohmmeter, and always ensure that you have a good connection with low resistance. If resistance is high, this could bring about a malfunction due to heating, or cause the thermal cutoff temperature to exceed the maximum use temperature. Perform sampling inspections to make sure that connections have sufficient mechanical strength.

Quality control cautions.

Inspect thermal cutoffs after delivery for any damage during shipment. Before and after installing thermal cutoffs in end products, check their electrical resistance, x-ray inspection will enhance the reliability of quality control. Storage conditions of ELCUT thermal cutoffs must be kept within -10 to + 40 °C and relative humidity 30% to 75%. Storage place must be free from quick atmospheric change (in temperature and/or humidity), direct sun, vibration and / or impact. Please observe the cautions in this application instructions. If a thermal cutoff is not properly used, it may function at a temperature lower than its functioning temperature, or it may not function even if it exceeds its functioning temperature.

Repair and replacement.

Thermal cutoffs are not repairable.

Replacement of thermal cutoffs is not recommended by safety reasons. Because, insulation characteristics and other safety characteristics of the equipment may be affected by the excessive heat. Replacement of functioned thermal cutoff must be made by the customer's risk ensuring following conditions: replace with the same manufacturer's same thermal cutoff having the same type No.

Install the thermal cutoff in exactly the same way.

The cause/reason of the thermal cutoff function is cleared completely. Insulation characteristics and other safety characteristics of the equipment are not decreased.

Resistance to tracking and further information.

Resistance to tracking depends on type of the thermal cutoff. Please feel free to contact our sales department for further information includes resistance to tracking.



*Do you need more
information ?*

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*Design or construction of
any products and technical information
are subject to change
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