

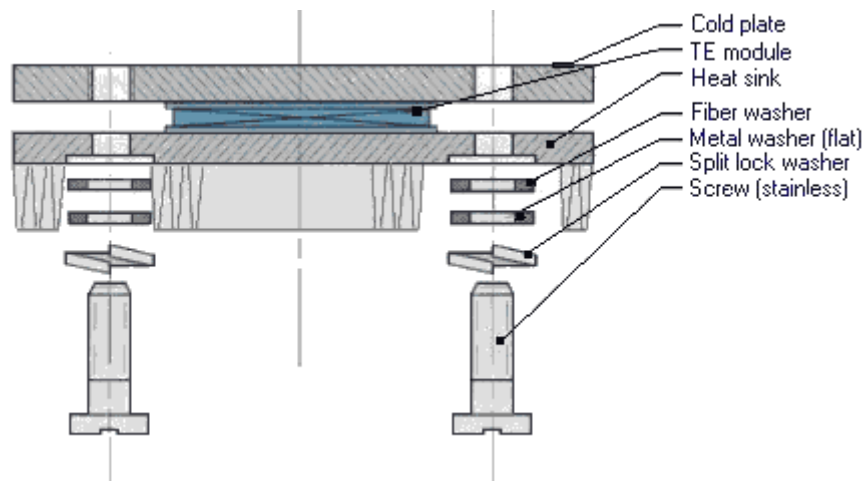
How To Install a Thermoelectric Module

Installing a TE module is relatively simple. Carefully following these guidelines will ensure that modules perform optimally and are not damaged. Noncompliance with these guidelines may result in a decrease in module efficiency or failure.

Typically it is recommended that a module/s be compressed between two clean, flat and parallel surfaces. A thermoelectric module contains somewhat fragile semiconductor material however, most modules are relatively strong in compression. Good interfaces (low thermal resistance) between the module and components in contact with it will optimize performance. With few exceptions, a module should not be used as a supporting member because a shear force may force a module open.

If two or more modules are installed in an assembly, their thickness should not vary by more than 0.05 mm. Should you require a very uniform thickness, select our "Lapped" option, which ensures a close height tolerance of ± 0.01 mm.

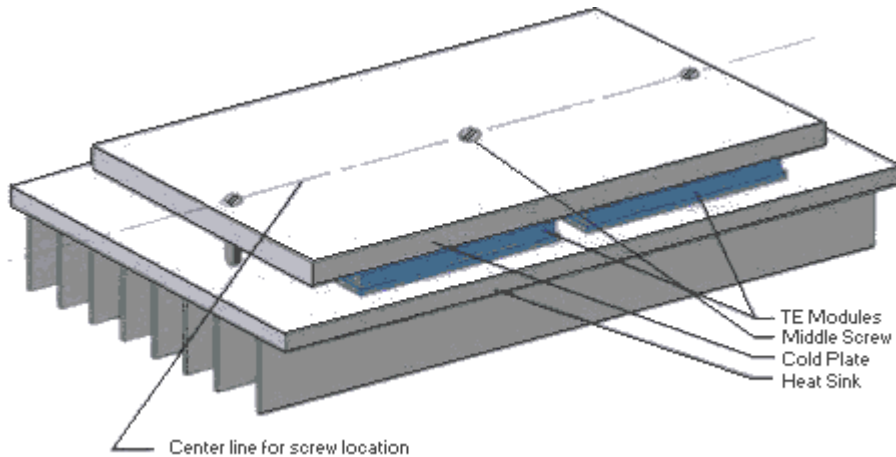
It is common to "clamp" a module between a cold plate, or other object to be cooled, and a heat sink. An example of the recommended configuration and components is pictured here.



To install the module/s, follow these directions:

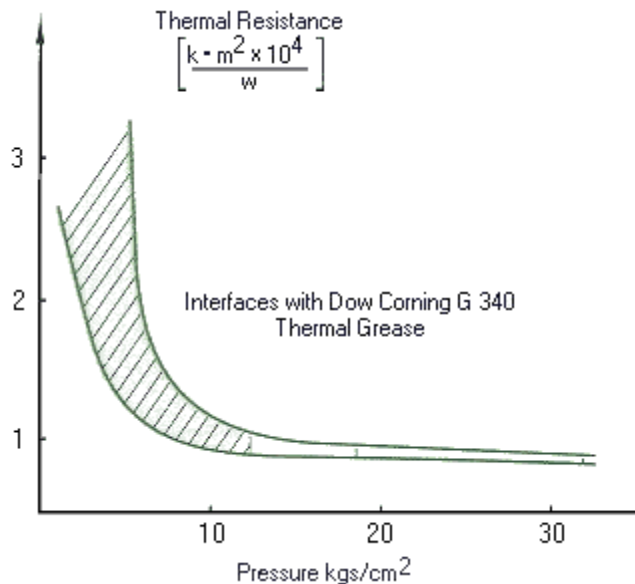
- 1.) Spread a thin layer of thermally conductive grease (i.e. [AOS 52022](#) or Dow Corning G340) in the location where the module will be seated on the heat sink. Place the module on the heat sink and gently move the module back and forth to squeeze out any excess grease.
- 2.) Spread a thin layer of thermal grease in the appropriate location of the cold plate, or object to be cooled, and place this onto the module (and heat sink). As above, gently remove any excess grease.

3.) Place all connecting hardware loosely into the sub-assembly. Beginning at the center evenly tighten connecting hardware by hand or until you meet slight resistance. In this example, you would begin with the middle screw located between modules on the module center line.



4.) Using a torque-limiting wrench, begin tightening in small increments from the center bolt outward.

5.) As shown in the following figure (data by Dr. J.G. Stockholm) the thermal resistance and dispersion of thermal grease depends upon the pressure against the module ceramics and reaches a relatively low value at a pressure of 10 kgf/cm². It is sufficient to provide pressure in the 10 - 15 kgf/cm² range for acceptable and stable thermal contact. The torque per clamping screw (Type 4 - 40, 6 - 32 manufactured from stainless steel) should be no more than 0.11 kgm for modules having an area of 40 x 40 mm.





6.) After reaching the desired torque value, leave the assembly for one hour. Check torque and re-tighten as necessary.

Design Recommendations

Both the heat sink and cold plate should be sufficiently rigid to prevent any bowing or deformation when clamping your assembly together. If components are not sufficiently rigid, modules will not perform optimally and may be damaged. Aluminum components should not be less than 6 mm thick and copper components not be less than 4 mm. Clamping screws should only be located on the module/s center line. We recommend the clearance between module edges and bolt holes be 3 mm. If space does not allow this, you may increase the distance but not exceed 12 mm.

Finally, If your finished product will be operating at temperatures near the dew point, or if the equipment will be routinely turned off, condensation from components may become water which can enter the module. This moisture can cause corrosion leading to performance deterioration or an electrical short. Adequate care should be taken to seal modules from moisture. If you prefer, order moisture protected modules that have been either “potted” to prevent the long term problems associated with electro-corrosion within the module (“P” suffix in part number) or order Epoxy sealed modules that have a bead of epoxy aircraft grade around the perimeter of the module and sufficiently far down the leads to prevent wicking (“E” suffix in part number). Together these offer exceptional protection from condensation however Epoxy sealing is recommended in most applications over only potting.

Additional information that may be important to you may include:

- [Module Specifications](#)
- [Module Prices](#)
- [Module Overview](#)
- [Basic Thermoelectrics](#)
- [How A TEC Works](#)