Thermal Management

The IMT series dc/dc converters have very low temperature increase above the base plate operating temperature because of the even thermal loading. There are no 'hot spots' inside these converters due to the use of flat transformers. However, excess heat still needs to be removed from the converter base plate.This is achieved by means of heat sinks and the use of forced air-cooling.

The most common method of dissipating the heat from the converter is to attach a suitable heat sink. To select the suitable heat sink, the following guidelines may be used:

1) Estimate the thermal resistance between the base plate and the heat sink. If thermal pad or thermal grease is used, a 0.2 °C/watt is a safe number.
2) The thermal resistance of heat sink to air is given by the fllowing equation:

$$Sa = ([Tb-Ta]/P_{diss}) - Bs$$

Where,

Ta = worst case operating ambient temperature
Bs = 0.2 °C/watt
P_{diss} = Power dissipation of the converter calculated from the efficiency of the converter
Tb = maximum base plate temperature

When attaching heat sink to the module, heat sink compound may be use. The torquing sequence is to start with one screw, go to the diagonal screw, and then tighten the remaining screws. All the four screws may be first hand tightened, and then apply the final torque per specification.

The thermal conductivity of heat sink to air improves significantly even if there is just a 100 linear feet per minute of air flowing through the heat sink.
Below are the thermal characteristics of BTC heat sink for the module:

Table 6. Forced Air Convection of BTC Module Heat Sink.

Air Flow	Thermal Resistance, Base Plate to Air
Free Air	5.0 °C/W
200 LFM	2.7 °C/W
400 LFM	1.7 °C/W
600 LFM	1.4 °C/W
800 LFM	1.2 °C/W

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