

Chapter 6 Recommended Mounting Method

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This chapter describes the recommended method of mounting the IGBT module and the PCB. In addition, refer to "Mounting Instruction" separately for detailed mounting method and cautions on M653 package products.

1. Instruction of Mounting the IGBT Module

1.1 Method of fastening the module to customer's system

Fig. 6-1 shows the recommended procedure of tightening screws for mounting the IGBT module. The fastening screws should be tightened with the specified torque. See the specification for the specified torque and screws size to be used.

1.2 Prohibited matters:

- (1) Excessive tightening torque: IGBT module shall not be used anymore.
Cause of cooling system destruction by deformation of the aluminum cooler and buckling of the stud.
- (2) Insufficient tightening torque:
Liquid leakage from the cooling flange may occur, or the screws may be loosened during operation, cooler destruction due to vibration during operation are expected.
- (3) Applying a load onto the cover of the cooler:
Cause of cooling system destruction, cooling water leakage are expected.

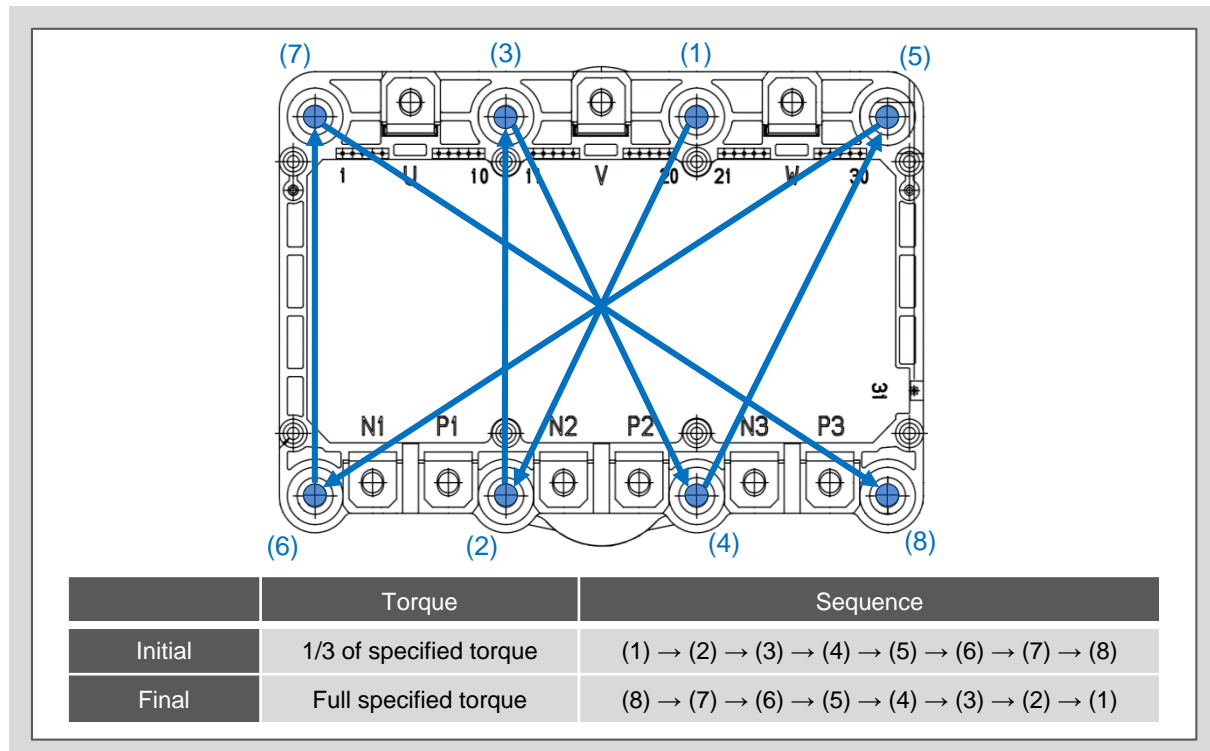


Fig. 6-1 Screw sequence for IGBT module

1.3 Flatness of fastening part

The flatness of the fastening portion of the module is specified in the specification. In addition, the following values are recommended for the system flatness at the module area.

System flatness at the module area : $\leq 50\mu\text{m}$

Exceeding the requirement above may lead to damage of the power module.

1.4 Installation direction of the IGBT module

The IGBT module shall be installed on horizontal upward direction, but not upside down. If it were inclined or upside down, air bubble would be remained in the cooler when cooling water is flowed. Air bubble might make cavitation phenomenon and it is cause of water leakage.

1.5 Method of mounting the PCB and cautions

(a) As screws to be used at positions (1) to (8), specified screw size and tightening torque described in the specification sheet.

The length of the screw thread for PCB can be considered by the drawings of the module in the specification sheet.

Adjust the length of the screws depending on the types of the screws used if necessary.

(b) Fix the screws temporarily with 1/3 of the final fastening torque and in the sequence from (1) to (8) in Fig. 6-2.

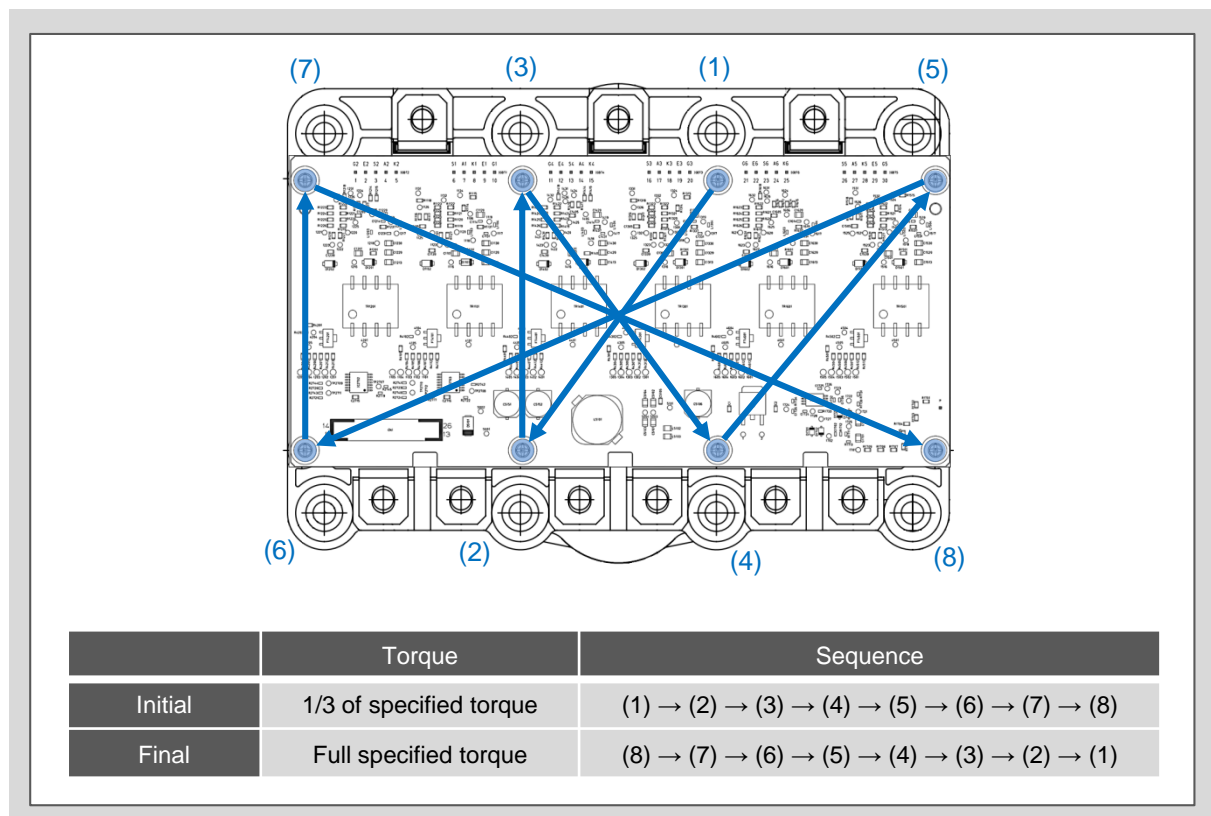


Fig. 6-2 Screw sequence for PCB fix

1.6 Electrostatic discharge protection

If excessive static electricity is applied to the control terminal, the module may be damaged. Please take countermeasures against static electricity when handling the module.

Assembly environment relating to ESD shall be within specified value shown in the specification sheet.

1.7 Soldering of the control terminals

Soldering of the control terminals shall be performed based on the condition which is described on the specification sheet. Otherwise, disconnect between them might be happened.

2. Connection of the Main Terminal

2.1 Connection of the main circuit

- (a) Screw size: M5
- (b) Maximum fastening torque: refer to the specification sheet.
- (c) Length of the screw: Check the depth of screw holes on the outline drawing.
Adjust the length of the screws depending on the types of screws used if necessary.

2.2 Clearance and creepage distance

It is necessary to keep enough clearance distance and the creepage distance (defined as (a) in Fig. 6-3) from the main terminal to secure desirable insulation voltage. The clearance distance and the creepage distance must be longer than the minimum value shown in below.

Suitable insulation distance between a bus-bar and the main terminal screw of the module shall be designed when the module is installed to a power system.

Screws for tightening a control board on the module shall be electrically isolated. And the screws shall be appropriately selected by taking account of insulation distance between the control terminals of the module and the screws.

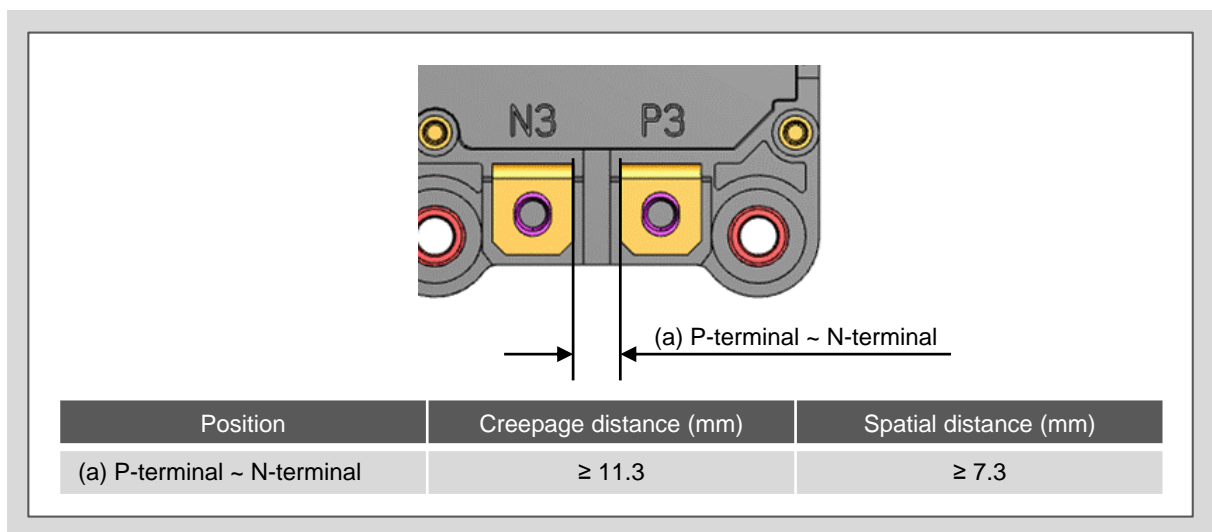


Fig. 6-3 Creepage distance and spatial distance at the P/N terminal