

Mounting Instructions SEMITRANS[®] IGBT Modules

1. ESD Protection

SEMITRANS[®] IGBT modules are electrostatic sensitive devices. All modules SEMITRANS[®] 2,3 and 4 are supplied with ESD protection via a conductive connection between the gate and emitter terminals. This connection should be kept intact until the driver has been connected. Module assembly must be carried out by qualified staff wearing conductive grounded bracelets at ESD protected, grounded workstations.

2. Mounting instructions

In order to ensure good thermal contact and to obtain the thermal resistance values specified in the data sheets, the contact surface of the heat sink must be clean and free from dust particles, as well as fulfilling the following mechanical specifications:

- Unevenness: < 20 µm over a distance of 100 mm
- Roughness R_z: < 10 µm

Before assembly onto the heat sink, the module base plate or the contact surface of the heat sink is to be evenly coated with a thin layer (approx. 50 µm) of a heat sink compound such as Wacker-Chemie P 12 (silicon-based, 30g tube: SEMIKRON ID No. 30106620). For even distribution the use of a hard rubber roller or a silk screen process is recommended.

To secure SEMITRANS[®] IGBT modules, the use of either M6 steel screws (DIN, property class 4.8) in combination with suitable washers and spring lock washers or combination screws is strongly recommended. When doing so, the torque value specified must be observed. The screws must be tightened in diagonal order with equal torque in several steps until the specified torque value M_s has been reached.

Housing	Screw	Mounting torque M _s [Nm]	
		Min	Max
SEMITRANS [™] 2	M6	3	5
SEMITRANS [™] 3	M6	3	5
SEMITRANS [™] 4	M6	3	5

Table 1: Tightening torque for module mounting

It is further recommended that the screws are re-tightened according to the given torque value following a period of a few hours, as part of the heat sink compound may spread under the mounting pressure.

For the electrical terminals, suitable screws, washers and spring lock washers or combination screws are to be used.. Here, the maximum and minimum thread reaches, which can be taken

from the module drawings (see data sheets), and the permissible tightening torque values M_t must be observed:

Housing	Screw		M_t [Nm]	
	Auxiliary Terminal	Power terminal	Min	Max
SEMITRANS® 2	-	M5	2,5	5,0
SEMITRANS® 3	-	M6	2,5	5,0
SEMITRANS® 4	(M4)	M6	(1,1) 2,5	(2,0) 5,0

Table 2: tightening torque for electrical terminals

When soldering flat plug connectors (using a grounded solder tool), a soldering temperature of $T_{\text{Solder}} = 235 \pm 5 \text{ °C} / 5 \text{ sec.}$ must be observed.

3. Power Terminals

Where possible, laminated DC-link bus bars should be used for connections on the DC side of the circuit. In this way, a minimum of stray inductance is produced, which in turn guarantees a low load with switching surges. In most applications, the use of inductance pulse capacitors (MKP, MKT ... $0.22 \mu\text{F}$... $1 \mu\text{F}$) at the DC terminals (collector TOP-IGBT/emitter BOT IGBT) is recommended to prevent parasitic oscillations.

4. Terminal pull forces

Cable connections of **half bridge modules** must be mounted in such way that the resulting pull forces per power terminal of the module are limited to **200N** and the resulting pull forces per control terminal of the module are limited to **60N**.

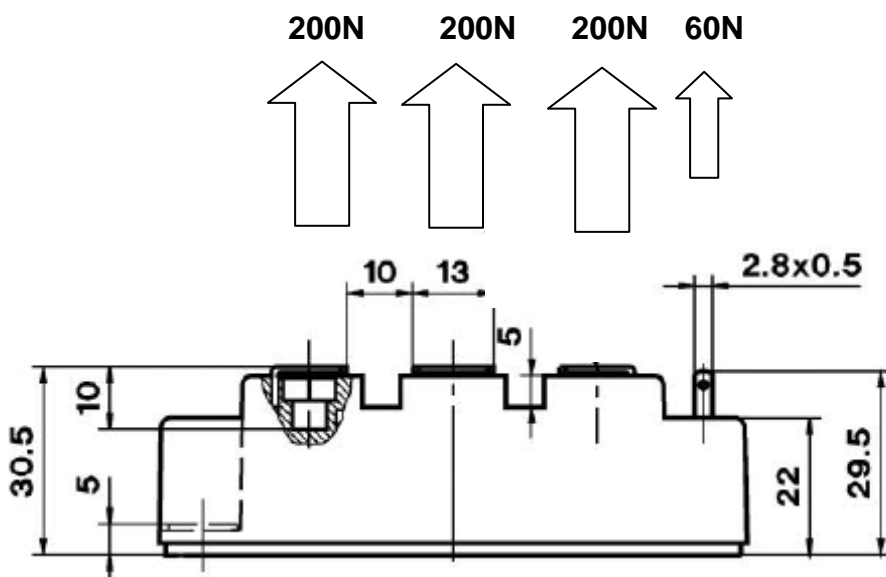


Figure 1: Half bridge module (SEMITRANS® 2)

Cable connections of **half bridge modules** must be mounted in such way that the resulting pull forces per power terminal of the module are limited to **250N** and the resulting pull forces per control terminal of the module are limited to **60N**.

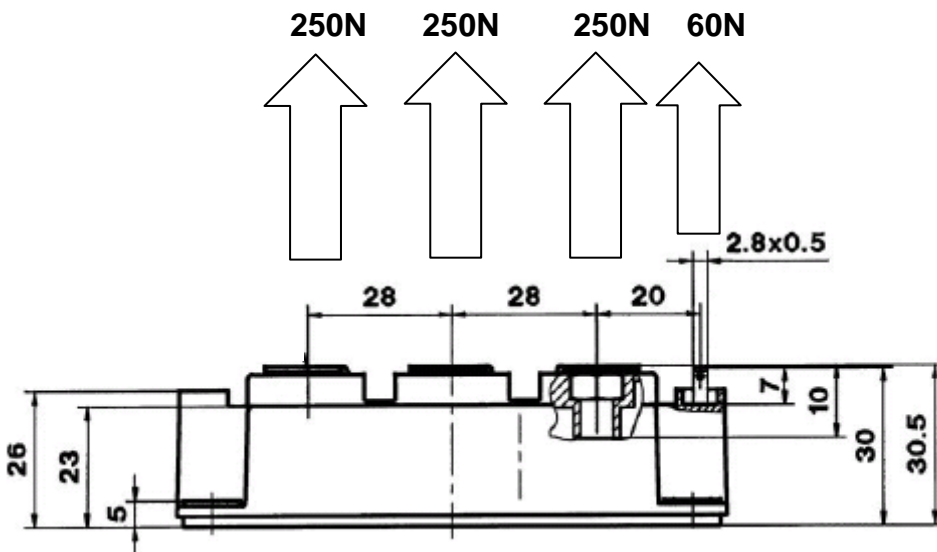


Figure 2: Half bridge module (SEMITRANS® 3)

Cable connections of **single switch modules** must be mounted in such way that the resulting pull forces per power terminal of the module are limited to **250N** and the resulting pull forces per control terminal of the module are limited to **150N**.

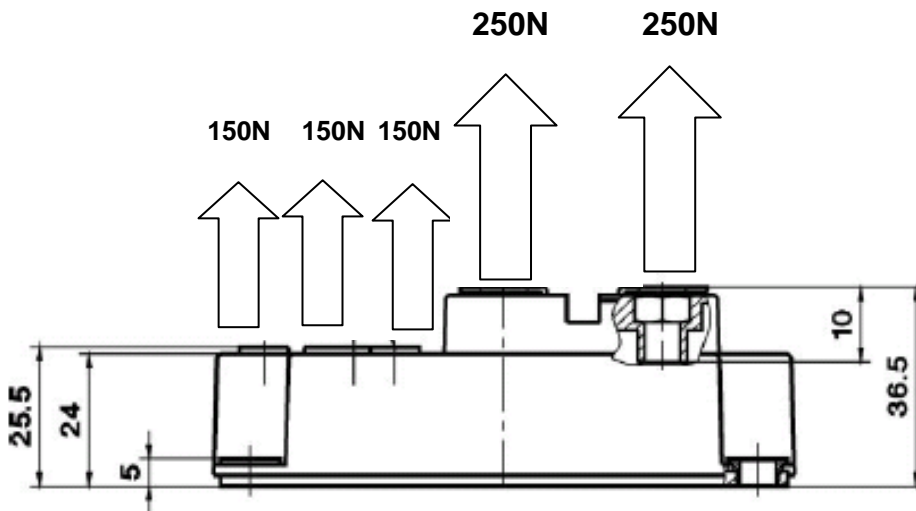


Figure 3: Single switch module (SEMITRANS® 4)

5. Terminal push forces

Cable connections of **half bridge modules** must be mounted in such way that the resulting push forces per power terminal of the module are limited to **250N** and the resulting push forces per control terminal of the module are limited to **60N**.

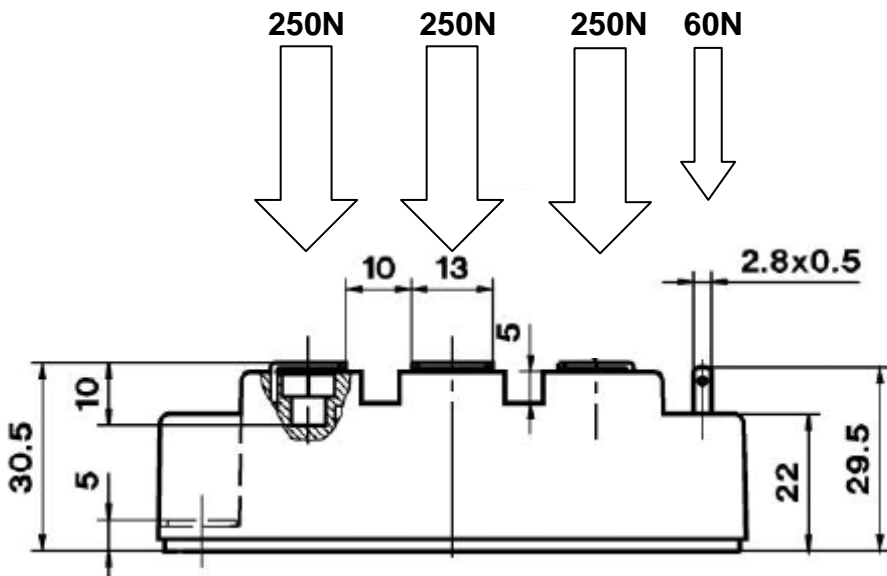


Figure 4: Half bridge module (SEMITRANS® 2)

Cable connections of **half bridge modules** must be mounted in such way that the resulting push forces per power terminal of the module are limited to **200N** and the resulting push forces per control terminal of the module are limited to **60N**.

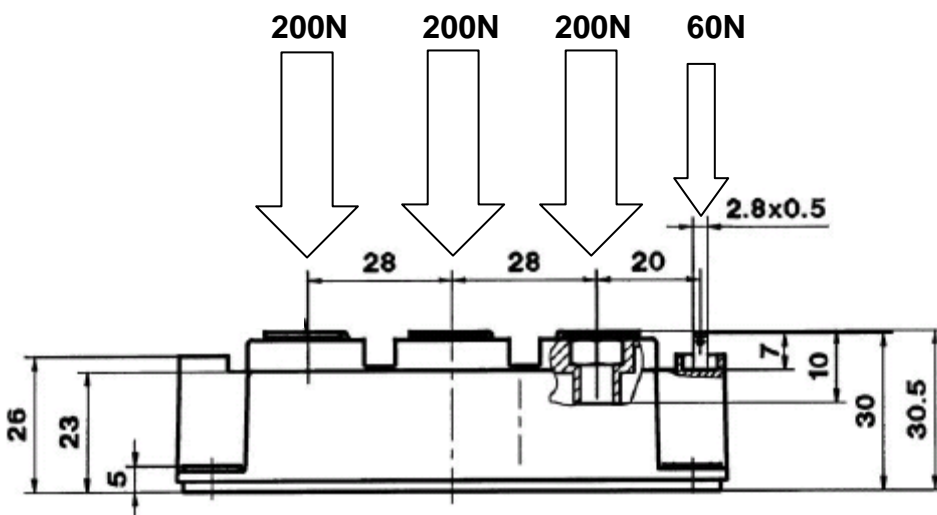


Figure 5: Half bridge module (SEMITRANS® 3)

Cable connections of **single switch modules** must be mounted in such way that the resulting push forces per power terminal of the module are limited to **250N** and the resulting push forces per control terminal of the module are limited to **60N**.

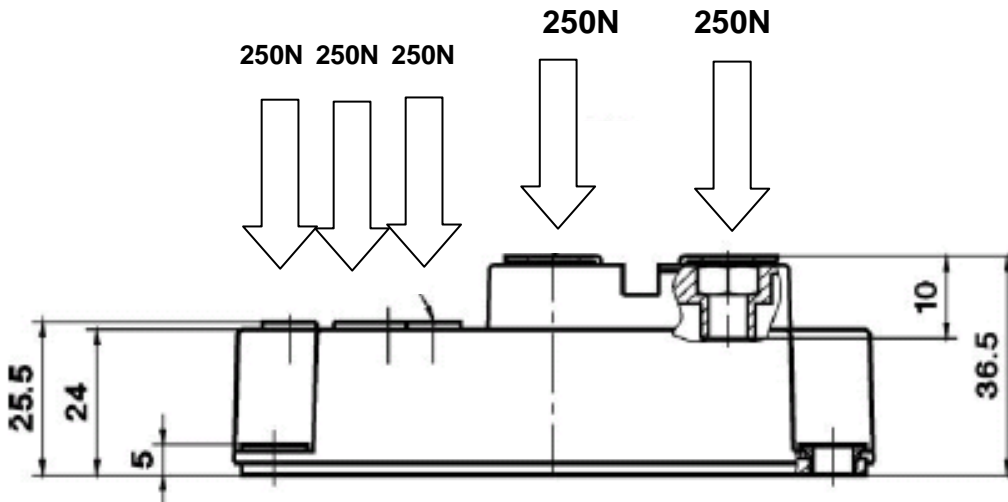


Figure 6: Single switch module (SEMITRANS® 4)

6. Driver connections

All control cables must be twisted conductor cables and kept as short as possible in order to minimize stray inductance and avoid electromagnetic interference and oscillation.

SEMIKRON recommends the use of SEMIDRIVER™ drivers (for more information refer to the SEMIKRON data book or data sheets available on the internet under: <http://www.semikron.com/>)

7. Mounting accessories

SEMIKRON offers a standard accessories kit (ID No. 3321100) for 10 SEMITRANS® 2, 3 and 4 modules each or 4 SEMITRANS® 6, 7 modules each.

Contents:

Units	Type
30	Cross recessed screws M4x8 Z4-1 DIN 7985-4.8
30	Cross recessed screws M5x12 Z4-1 DIN 7985-4.8
30	Cross recessed screws M6x12 Z4-1 DIN 7985-4.8
40	Cross recessed screws M6x16 Z4-1 DIN 7985-4.8
50	Push-on receptacles A2.8-0.5 (2.8 x 0.5)