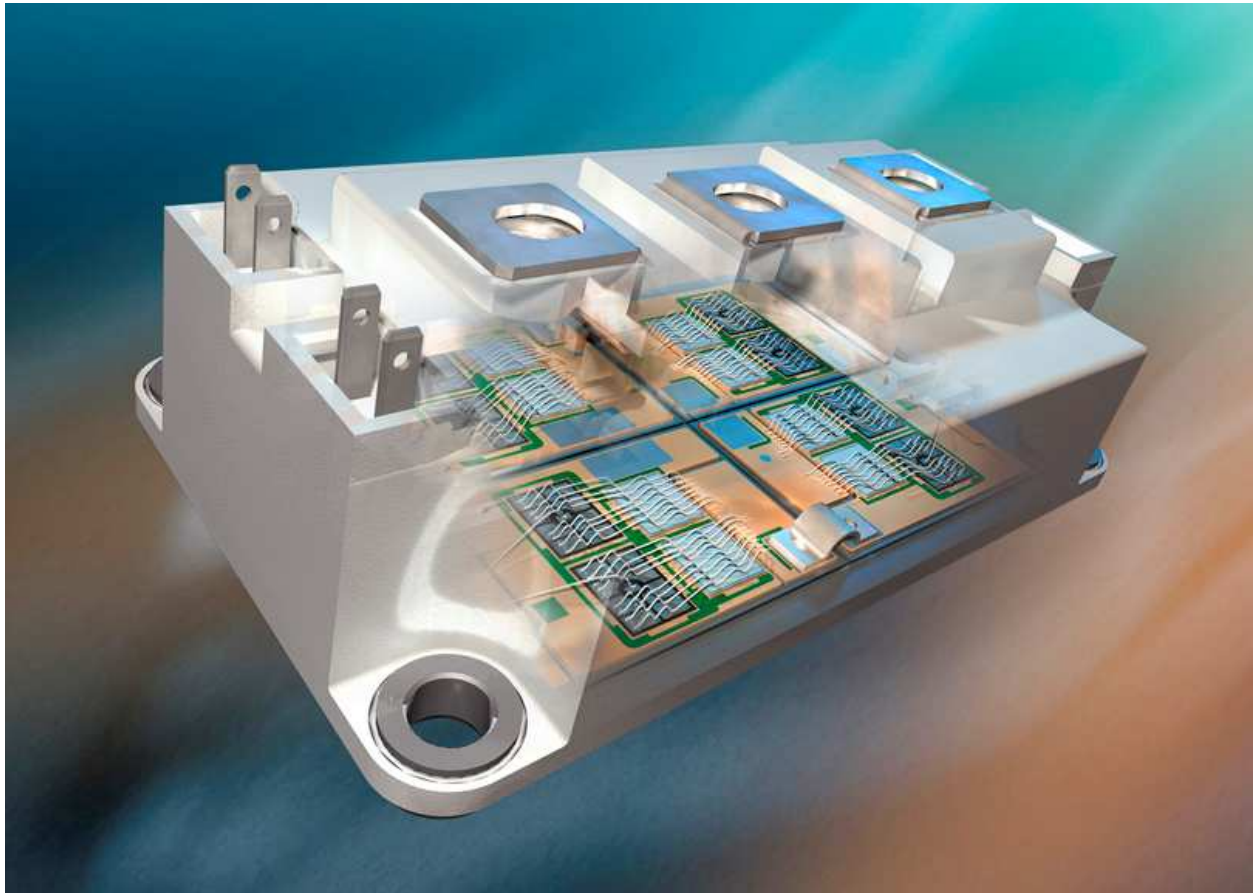


Mounting Instructions

SEMITRANS[®] IGBT Modules



Norbert Schäfer

Mai 2011

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.

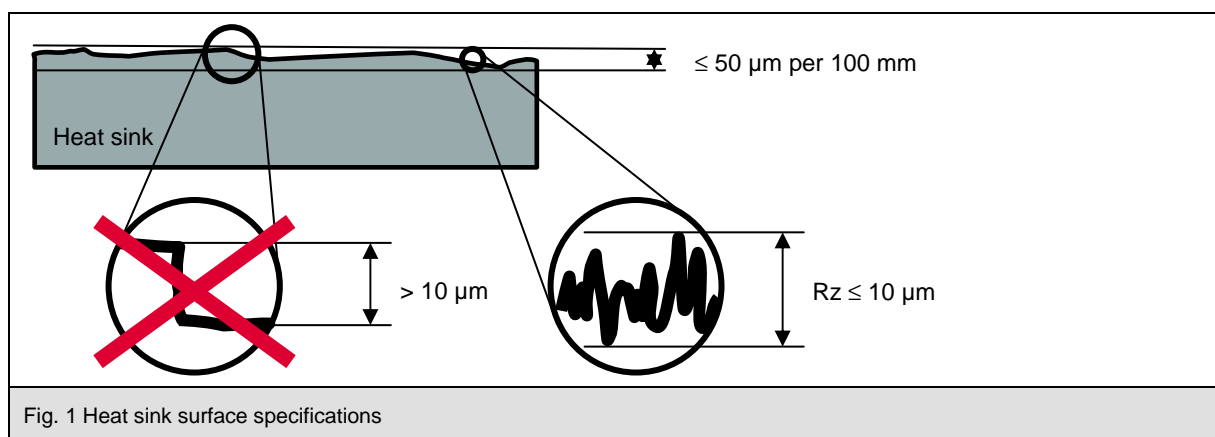
Module assembly must be carried out by qualified staff wearing conductive grounded bracelets at ESD protected, grounded workstations.

2 Heat sink specifications

Preparation, surface specifications

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

- ◆ The heat sink must be free from grease and particles
- ◆ Unevenness of heat sink mounting area must be $\leq 50 \mu\text{m}$ per 100 mm (DIN EN ISO 1101)
- ◆ Roughness "Rz" $\leq 10 \mu\text{m}$ (DIN EN ISO 4287)
- ◆ No steps $> 10 \mu\text{m}$ (DIN EN ISO 4287)



3 Thermal compound

Before assembly onto the heat sink, the module baseplate or the contact surface of the heat sink is to be evenly coated with a thin layer (50 μm – 100 μm) of a thermal compound such as P12 from WACKER CHEMIE or silicone-free paste HTC from ELECTROLUBE.

SEMIKRON recommends using screen printing to apply thermal paste. In certain cases a hard rubber roller might be suitable for the application of thermal paste.

The thickness of the layer can be determined using a measurement gauge.

	<p>Supplier:</p> <p>ELCOMETER Instruments GmbH Ulmer Strasse 68 D-73431 Aalen Germany</p> <p>phone: +49-7361-52806-0 web: www.elcometer.de</p>
<p>Fig. 1 Wet Film Thickness Gauge 5 – 150 µm</p>	

4 Mounting torques

To secure SEMITRANS® IGBT modules, the use of either M6 steel screws (DIN 7045, 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

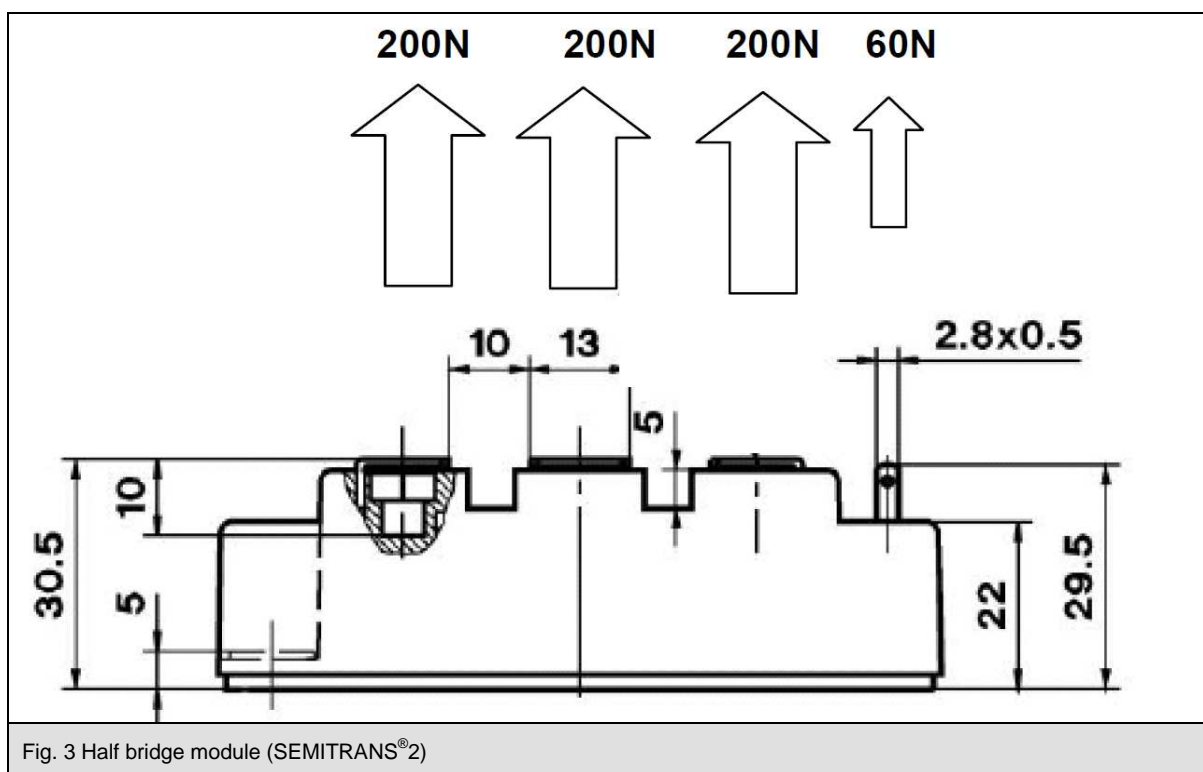
5 Power Terminals

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 µF ... 1µF) at the DC terminals (collector TOP-IGBT/emitter BOT IGBT) is recommended to prevent parasitic oscillations.

6 Terminal pull forces

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 200N and the resulting pull forces per control terminal of the module are limited to 60N.



SEMITRANS[®]3

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.

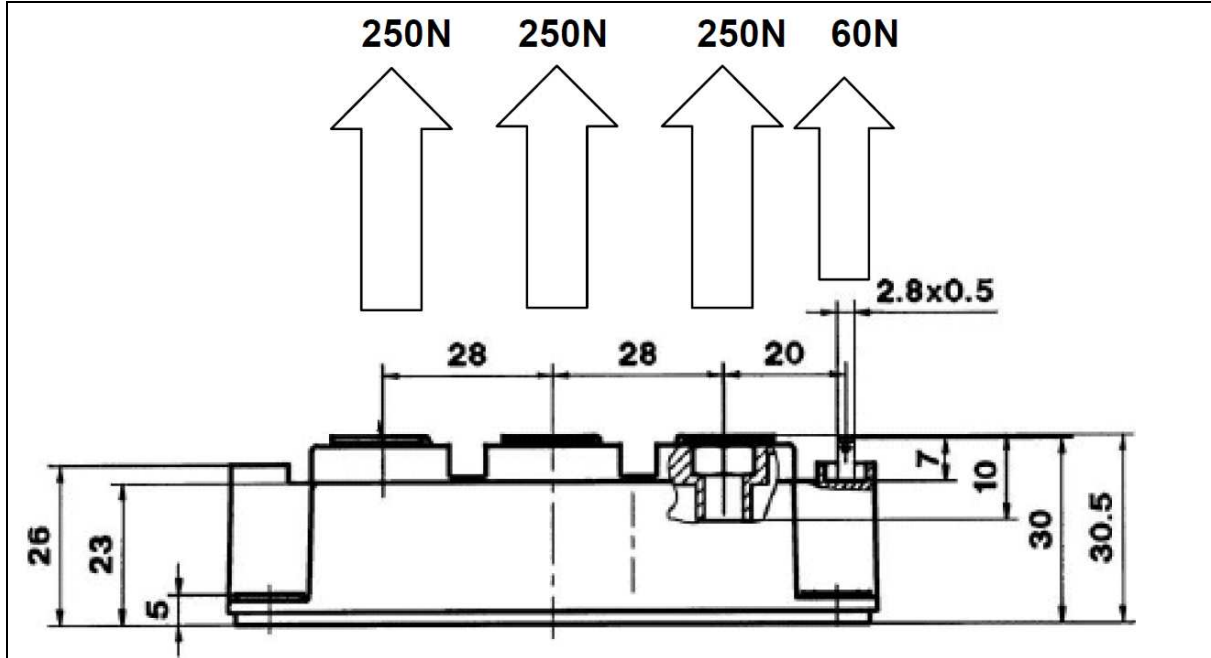


Fig. 4 Half bridge module (SEMITRANS[®]3)

SEMITRANS[®]4

Cable connections of inverter 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.

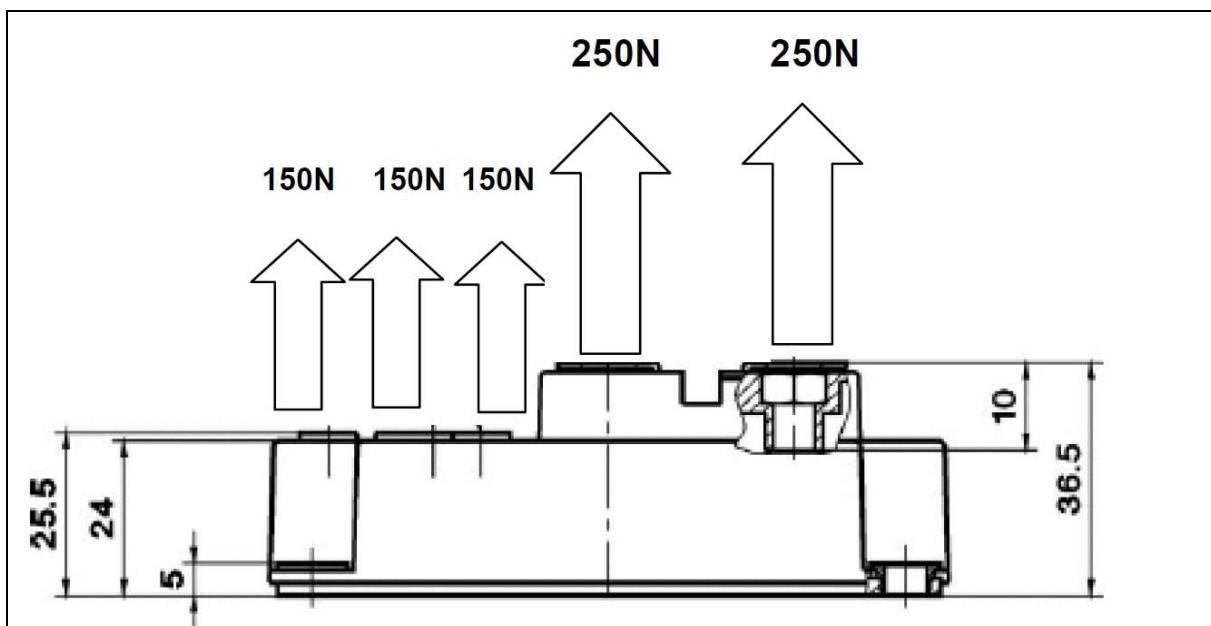
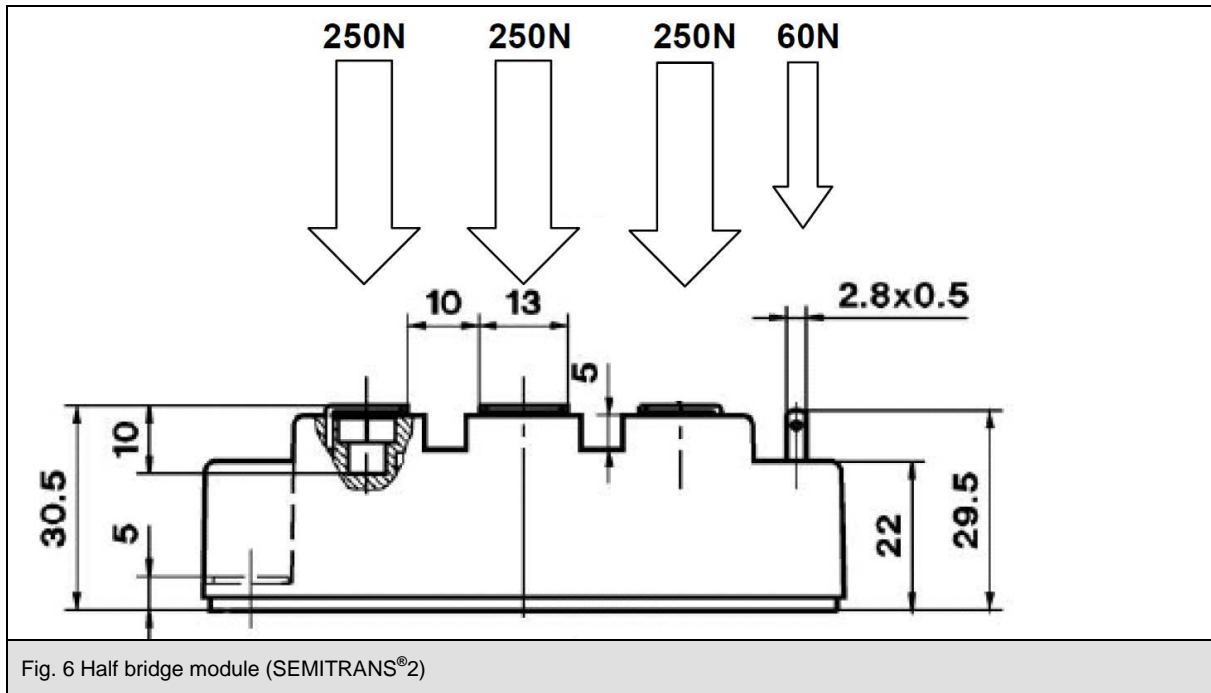


Fig. 5 Single switch module (SEMITRANS[®]4)

7 Terminal push forces

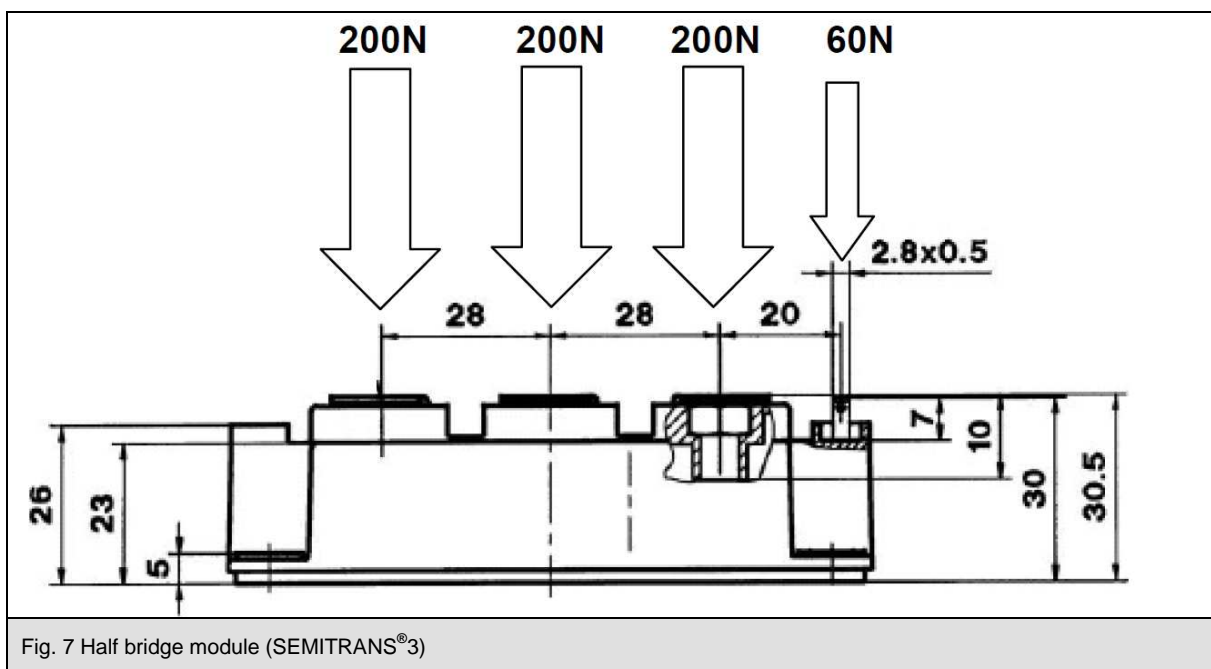
SEMITRANS[®]2

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.



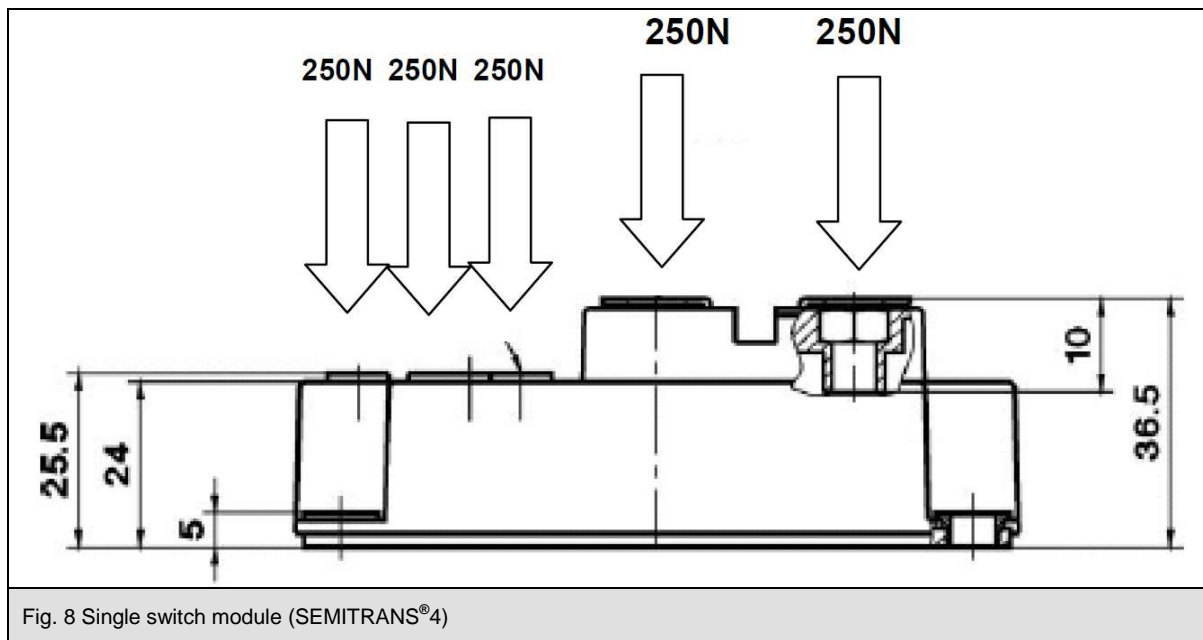
SEMITRANS[®]3

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**.



SEMITRANS[®]4

Cable connections of inle 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 250N.



8 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 SEMIKRON drivers (data sheets available on the internet under: <http://www.semikron.com>)

9 Mounting accessories

SEMIKRON offers a standard accessories kit (ID No. 33321100) for 10 SEMITRANS[®] 2, 3 and 4 modules each or 4 SEMITRANS[®] 6, 7 modules each.

Units	Type
30	Cross recessed screws M4x8 Z4-1 DIN 7045-4.8
30	Cross recessed screws M5x12 Z4-1 DIN 7045-4.8
30	Cross recessed screws M6x12 Z4-1 DIN 7045-4.8
40	Cross recessed screws M6x16 Z4-1 DIN 7045-4.8
50	Push-on receptacles A2.8-0.5 (2.8 x 0.5)

Table 3: Content of accessories kit

10 Disclaimer

SEMIKRON does not take on any liability for literal mistakes in the above displayed “Technical Information”. The content of the information is according to today’s standards and knowledge and written up with necessary care. A liability for usability and correctness is excluded. A liability for direct or secondary damages resulting from use of this information is excluded, unless regulated by applicable law. The given examples are not taking in consideration individual cases, therefore a liability is excluded. The content is subject to change without further notice. In addition to that, the SEMIKRON terms and condition apply exclusively, valid version displayed under <http://www.semikron.com>.