

# GETRIEBEBAU NORD

Member of the NORD DRIVESYSTEMS Group

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## SK BR2-22/2200-C

Part number: 278 282 220

External chassis braking resistor for connection to a NORDAC PRO SK 500E and SK 500P



It only is allowed for qualified electricians to install and commission the module. An electrician is a person who, because of their technical training and experience, has sufficient knowledge relating to

- switching on, switching off, isolating, earthing and marking power circuits and devices,
- proper maintenance and use of protective devices in accordance with defined safety standards.

### **! DANGER!**

#### **Danger of electric shock**

The frequency inverter continues to carry hazardous voltages for up to 5 minutes after it was switched off.

- Work must not be carried out unless the device has been disconnected from the voltage and at least 5 minutes have elapsed since the mains was switched off!

### **! CAUTION**

#### **Danger of burns**

The module and all other metal components can heat up to temperatures above 70 °C.

- Sufficient cooling time must be allowed for when working on the components in order to avoid injuries (local burns) to parts of the body coming into contact with the components.
- In order to avoid damage to neighbouring objects, sufficient clearance must be maintained during installation.

### **NOTICE**

#### **Validity of this document**

This document is only valid in combination with the operating instructions for the relevant frequency inverter. Safe commissioning of this module and the frequency inverter depends on the availability of this information.

Technical Information / Datasheet		SK BR2-22/2200-C			
Brake resistor	TI 278282220	1.1	4121	en	

**Scope of delivery**

Module		
1 x	<b>Braking resistor</b>	Incl. connection terminals



**Field of use**

Dynamic braking (frequency lowering) of a three-phase motor via a frequency inverter results in generator braking energy that – depending on the particular application – is dissipated by a braking resistor. This excess energy is converted into heat.

The braking resistor is designed for the NORDAC *PRO* SK 500E and NORDAC *PRO* SK 500P series of units and depends on the mains voltage and the power. The braking resistor is equipped with a temperature switch and a potential-free normally closed contact for temperature monitoring.



Similar to illustration

**Technical Data**
*Electrical data*

<b>Number of terminals</b>		4
<b>Resistance</b>	$\Omega$	22
<b>Max. continuous power <math>P_n</math></b>	W	2200

<sup>1)</sup> The stated value applies to a single use within 120 s.

<b>Short-time power <math>P_{max}</math> 1)</b>		
for 1.2 s	kW	66.0
for 7.2 s	kW	20.0
for 30 s	kW	7.0
for 72 s	kW	3.3

*General*

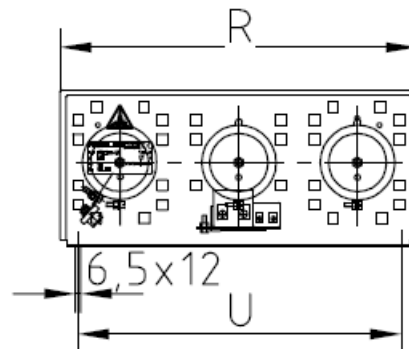
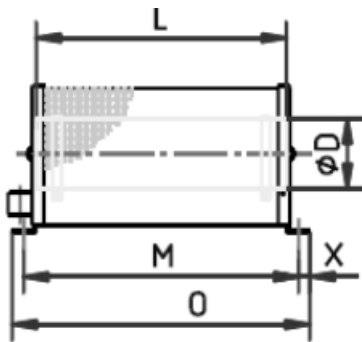
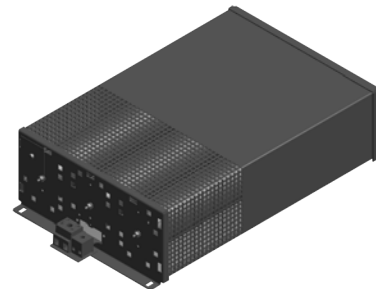
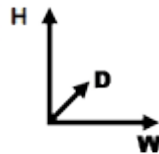
<b>Temperature range</b>	$^{\circ}\text{C}$	0 ... 40 (100% ED/S1)
<b>Weight</b>	kg	6.4

<b>Approvals</b>	CE, RoHS, cURus
<b>Protection class</b>	IP20
<b>Mounting <sup>1)</sup></b>	
Screws	4 x M5 x 8 (mounting surface)

<sup>1)</sup> Not included in the scope of delivery

*Dimensions*

<b>Overall dimensions [mm]</b>	W x H x D	275 x 120 x 475
<b>Fastening [mm]</b>	U / M	240 x 426




## Information

### Temperature monitoring

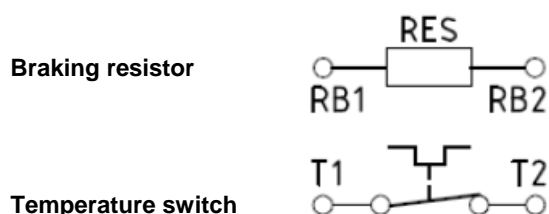
For connection of the external braking resistor to the NORDAC PRO SK 5xxE and SK 5xxP a temperature switch is available for temperature monitoring. The normally closed contact T1/T2 is connected via a free digital input of the frequency inverter. We recommend to parametrise the digital input with the *Voltage Disable* function.

Switching power of the normally closed contact:

- 2 A at 24 V DC
- 2 A / 230 V AC

Detailed information can be found in the manual; for further information refer to Chapter  "Further documentation and software [www.nord.com](http://www.nord.com)".

### Connections



### Resistance

Designation	PE connection	RB1	RB2
<b>Cross section / type</b>		AWG 20/6 / screw terminals	
<b>Terminals</b> Braking resistor	M4 bolt	G10 device terminal	
Frequency inverter terminal block SK 5xxE → X2 SK 5xxP → X3	PE	+ B	-B
<b>Tightening torque</b> Braking resistor	N/S	1.5 - 1.8 Nm	
Frequency inverter SK 5xxE + SK 5xxP		2.5 - 4.5 Nm	

### Temperature switch

Designation	T1	T2
<b>Cross section / type</b>	AWG 24/12 / screw terminals	
<b>Terminals</b> Braking resistor	G5 device terminal	
Frequency inverter terminal block SK 5xxE → X5 SK 5xxP → X11	Voltage supply	Digital input
<b>Tightening torque</b> Braking resistor	0.6 - 0.8 Nm	

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** Information**

Optionally, a retrofit kit / cover with part number 278282003 can be mounted for the terminal block of the chassis braking resistor. If the terminal block cover is used, dimensions of the braking resistor vary.

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**Assignment to frequency inverters**



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** Information**

Overview in the manual

The braking resistors provided by the NORD DRIVESYSTEMS Group are tailored to the individual frequency inverters. If external braking resistors are used, it is usually possible to choose between 2 or 3 alternatives.


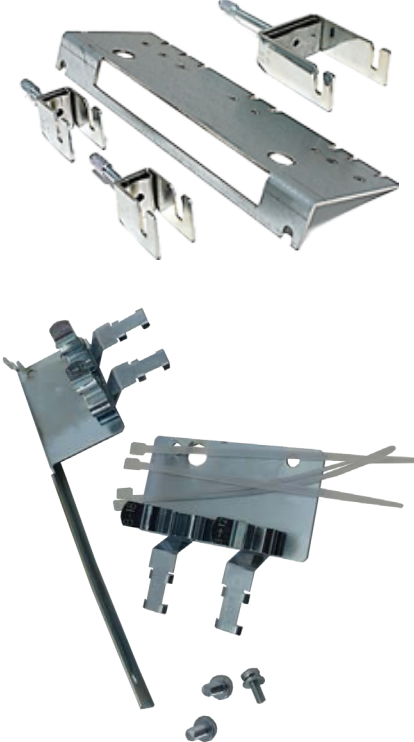
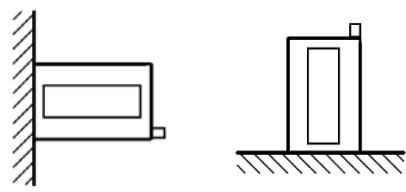
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Detailed information can be found in Chapter  Braking Resistor (BR) of the respective frequency inverter manual  "Further documentation and software [www.nord.com](http://www.nord.com)".

### Installation

<b>Installation location</b>	Direct installation with connection cables that are provided for connection to a centralised NORDAC <i>PRO</i> frequency inverter: <ul style="list-style-type: none"> <li>In the vicinity of the frequency inverter within the control cabinet</li> </ul>
<b>Installation position</b>	In horizontal position on vertical mounting surfaces with terminals facing down
<b>Mounting</b>	With screw fasteners <ul style="list-style-type: none"> <li>Screws for mounting are not included in the scope of delivery</li> </ul>


### Installation steps


1.	<p>Installing the frequency inverter</p> <p>The SK 5xxE in size 6 or the SK 5xxP in size 5 is already mounted to the mounting surface.</p>	
2.	<p>Installing the EMC kit</p> <p>SK 5xxE frequency inverters must be equipped with an EMC kit SK EMC 2-4 (Part No. 275999041) for correct EMC connection. The shield of the braking resistor cable can be connected to a large area of the frequency inverter via the shielding terminal.</p> <p>For SK 5xxP frequency inverters, the two-part SK HE5-EMC-MS-HS5 EMC kit (Part No. 275292302) is optionally available for connection. The shield of the braking resistor cable is connected to a large area of the frequency inverter via the shielding clamp.</p> <p>For the SK 530P and SK 550P types, the scope of delivery includes a standard shielding sheet for fastening the power cable via cable ties.</p>	 <p>Similar to illustration</p>
3.	<p>Installing the external chassis braking resistor</p> <p>The braking resistor must be mounted correctly on the wall or the mounting surface close to the frequency inverter in vertical position with the 4 fastening screws which are provided.</p>	 <p>Permissible      Not permissible</p>

<p>4. Connection cable (BR + TS) Connect braking resistor to the frequency inverter via two connection cables that are provided.</p> <ul style="list-style-type: none"> <li>• Connect that one open wire end/shield of the shielded connection cable via EMC shielding terminal or clamp to the shield bracket of the frequency inverter</li> <li>• Connect the connection cable on both sides</li> <li>• Connect the connection cable shield with regard to EMC compliance</li> </ul> <p>Comply with specified tightening torques (see  Technical Data – General).</p>	
<p>5. Connection to braking resistor Connect wires of the BR connection cable to the corresponding terminal block of the braking resistor.</p> <ol style="list-style-type: none"> <li>1 Green/yellow wire/ PE ⇔ M4 bolt</li> <li>2 Wire 1 ⇔ RB1</li> <li>3 Wire 2 ⇔ RB2</li> </ol> <p>Connect wires of the TS connection cable to the corresponding terminal block of the braking resistor.</p> <ol style="list-style-type: none"> <li>4 Wire 1 ⇔ T1</li> <li>5 Wire 2 ⇔ T2</li> </ol>	
<p>6. Connection of the BR connection cable to the frequency inverter Connect wires from the other end of the BR connection cable at the bottom of the frequency inverter to terminal block</p> <ul style="list-style-type: none"> <li>• X2 of the SK 5xxE</li> <li>• X3 of the SK 5xxP</li> </ul> <ol style="list-style-type: none"> <li>6 Shield EMC kit Shield bracket/ shielding terminal</li> <li>7 Protective conductor PE</li> <li>8 Wire 1 B-</li> <li>9 Wire 2 B+</li> </ol> <p>Connection of the TS connection cable to the frequency inverter Connect wires from the other end of the TS connection cable at the signal terminal strip of the frequency inverter to the terminal block.</p> <ul style="list-style-type: none"> <li>• X5 of the SK 5xxE</li> <li>• X11 of the SK 5xxP</li> </ul> <ol style="list-style-type: none"> <li>10 Shield Shield bracket/ shielding terminal</li> <li>11 Wire 1 Digital input</li> <li>12 Wire 2 Voltage supply</li> </ol>	

## Parameter


For optimum operation of the braking resistor, the following frequency inverter parameters need to be changed.


Parameter	Meaning	Remarks
<b>P556</b>	Braking resistor	Value of the braking resistor for calculation of the maximum brake power in order to protect the resistor. <ul style="list-style-type: none"> <li>• Error I<sup>2</sup>t limit (E003.1) is triggered. For further details, see  in P737.</li> </ul>
<b>P557</b>	Brake resistor type	Continuous power (nominal power) of the resistor, to display the actual utilisation in P737. For a correctly calculated value, the correct value must be entered into P556 and P557. <ul style="list-style-type: none"> <li>• 0.00 = Off, monitoring disabled</li> </ul>
<b>P700</b>	Actual operating status	This parameter holds information on the actual operating status of the frequency inverter, such as fault, maintenance, and reason for switch-on inhibit.
<b>P701</b>	Last fault	This parameter holds information on the frequency inverter's last faults.
<b>P737</b>	Usage rate brakeres.	This parameter holds information on the actual usage degree of the brake chopper or the actual utilisation of the braking resistor in generator mode. <ul style="list-style-type: none"> <li>• Depending on parameter settings P556 and P557.</li> <li>• If both are correctly set, the resistance is displayed.</li> </ul>

Refer to the frequency inverter manual for details  "Further documentation and software [www.nord.com](http://www.nord.com)".

## Error messages

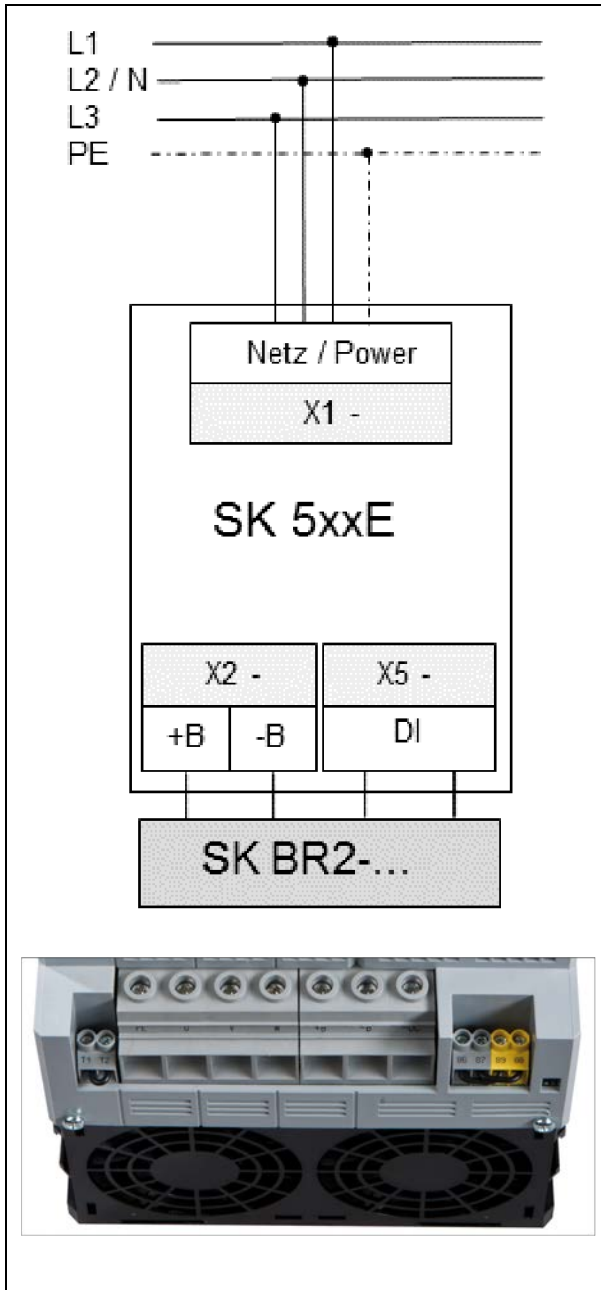
Error messages from the braking resistor - the current or archived message for the last fault - can be read out from the information parameter Current Fault P700 and the Last Fault P701 in the error memory of the frequency inverter.

Error (E030/E050)	Meaning	Remarks
<b>3.1</b>	I <sup>2</sup> t overcurrent limit	Brake chopper: I <sup>2</sup> t limit has been triggered, 1.5x value for 60 s reached (  P556, P557) <ul style="list-style-type: none"> <li>• Avoid overcurrent in braking resistor</li> </ul>
<b>5.0</b>	Overvoltage Ud	Link circuit voltage too high <ul style="list-style-type: none"> <li>• Check the function of the braking resistor (cable break)</li> <li>• Resistance of connected braking resistor too high</li> </ul>

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Connection diagram



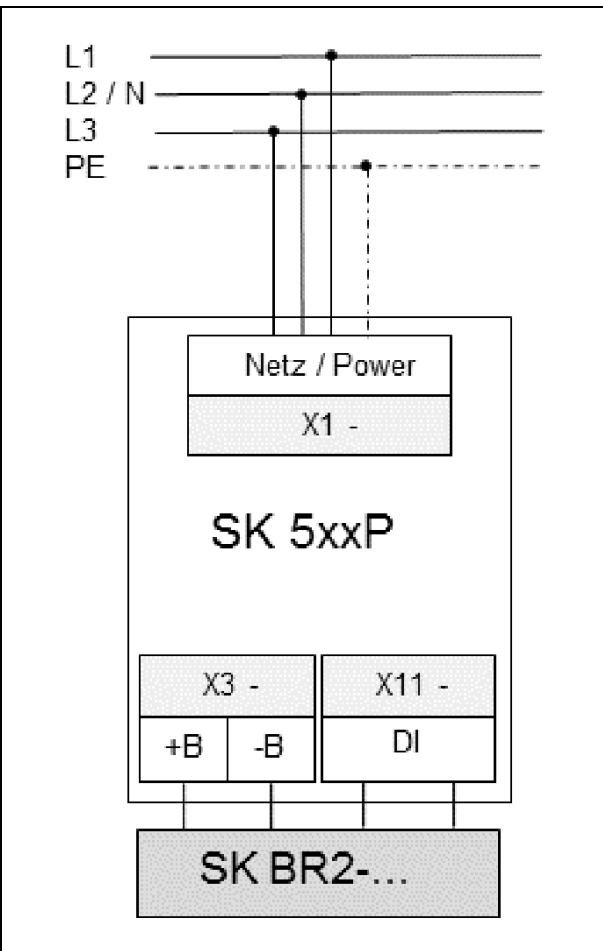
Horizontal design




SK BR2-22/2200-C




400 V devices in size 6



**SK 5xxP**



**400 V devices in size 5**



**Underside of SK 5xxP**

Further documentation and software [www.nord.com](http://www.nord.com)

Document	Designation
<a href="#">BU_0500</a>	Frequency inverter manual SK 500E – SK 535E
<a href="#">BU_0505</a>	Frequency inverter manual SK 54xE
<a href="#">BU_0600</a>	Frequency inverter manual SK 500P – SK 550P
<a href="#">F3050_E3000</a>	Flyer NORDAC PRO SK 500E
<a href="#">F3060_E3000</a>	Flyer NORDAC PRO SK 500E