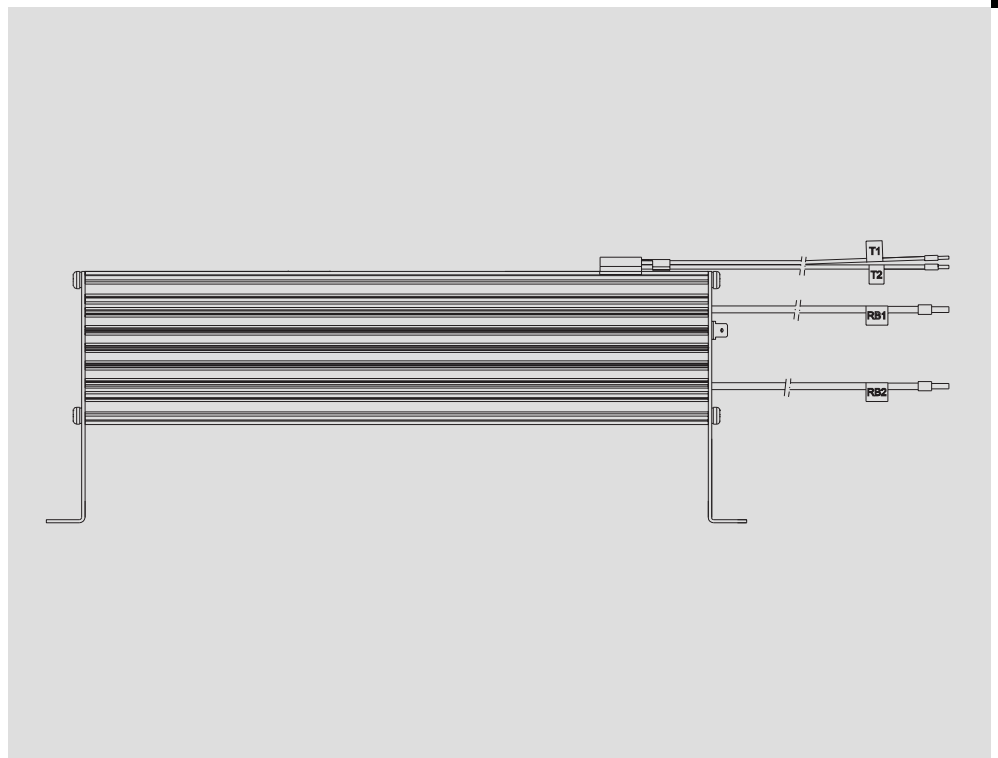
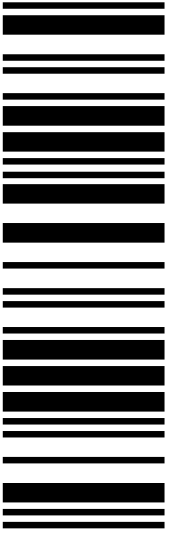


EDKRBP082R
13346334

L-force Drives

Mounting Instructions



ERBPxxxRxxxW

Brake resistor

Lenze



Please read these instructions and the documentation of the standard device before you start working!
Observe the safety instructions given therein!

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1 About this documentation

Validity information

Validity information

These instructions are valid for

- ▶ brake resistors ERBPxxxRxxxW

Target group

This documentation is directed at qualified skilled personnel according to IEC 60364.

Qualified skilled personnel are persons who have the required qualifications to carry out all activities involved in installing, mounting, commissioning, and operating the product.



Tip!





Information and auxiliary devices around the Lenze products can be found in the download area at

<http://www.Lenze.com>

Document history

Material number	Version			Description
13346334	7.0	02/2011	TD29	Revision

Conventions used

Type of information	Identification	Examples/notes
Spelling of numbers		
Decimal separator	Point	In general, the decimal point is used. For instance: 1234.56
Warnings		
UL warnings		Are only given in English.
UR warnings		
Text		
Program name	» «	PC software For example: »Engineer«, »Global Drive Control« (GDC)
Icons		
Page reference		Reference to another page with additional information For instance:  16 = see page 16

1 About this documentation

Notes used

Notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

Safety instructions

Structure of safety instructions:






Danger!




(characterises the type and severity of danger)

Note



(describes the danger and gives information about how to prevent dangerous situations)

Pictograph and signal word	Meaning
 Danger!	Danger of personal injury through dangerous electrical voltage. Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 Danger!	Danger of personal injury through a general source of danger. Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
 Stop!	Danger of property damage. Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph and signal word	Meaning
 Note!	Important note to ensure troublefree operation
 Tip!	Useful tip for simple handling
	Reference to another documentation

Special safety instructions and application notes for UL and UR

Pictograph and signal word	Meaning
 Warnings!	Safety or application note for the operation of a UL-approved device in UL-approved systems. Possibly the drive system is not operated in compliance with UL if the corresponding measures are not taken.
 Warnings!	Safety or application note for the operation of a UR-approved device in UL-approved systems. Possibly the drive system is not operated in compliance with UL if the corresponding measures are not taken.

2 Safety instructions

General safety instructions

General safety instructions



Danger!

Disregarding the following basic safety measures may lead to severe personal injury and damage to material assets!

- ▶ Lenze drive and automation components ...
 - ... must only be used for the intended purpose.
 - ... must never be operated if damaged.
 - ... must never be subjected to technical modifications.
 - ... must never be operated unless completely assembled.
 - ... must never be operated without the covers/guards.
 - ... can - depending on their degree of protection - have live, movable or rotating parts during or after operation. Surfaces can be hot.
- ▶ All specifications of the corresponding enclosed documentation must be observed. This is vital for a safe and trouble-free operation and for achieving the specified product features.

The procedural notes and circuit details provided in this document are proposals which the user must check for suitability for his application. The manufacturer does not accept any liability for the suitability of the specified procedures and circuit proposals.
- ▶ Only qualified skilled personnel are permitted to work with or on Lenze drive and automation components.

According to IEC 60364 or CENELEC HD 384, these are persons ...

 - ... who are familiar with the installation, assembly, commissioning and operation of the product,
 - ... possess the appropriate qualifications for their work,
 - ... and are acquainted with and can apply all the accident prevent regulations, directives and laws applicable at the place of use.

Residual hazards



Danger!

Dangerous electrical voltage

The terminals of the brake resistor may carry dangerous voltages during operation of the basic device and **up to three minutes after mains disconnection.**

Possible consequences:

- ▶ Death or severe injuries when touching the terminals.

Protective measures:

- ▶ Before working on the brake resistor disconnect the basic device from the mains.
- ▶ Check all power terminals for safe isolation from supply.
- ▶ Select the mounting location so that the operating conditions mentioned in the technical data are always ensured.



Danger!

Hot surface during operation

During operation, the brake resistor becomes very hot. (For temperatures, see Technical data.)

Possible consequences:

- ▶ Severe burns when touching the brake resistor.
- ▶ Fire or smouldering fire if flammable materials or substances are placed near the brake resistor or may get to it.

Protective measures:

- ▶ Before working on the brake resistor, check its surface temperature.
- ▶ Select the mounting location so that the operating conditions mentioned in the technical data are always ensured.
- ▶ Protect the mounting location by suitable fire prevention and protection against contact.

2 Safety instructions

Residual hazards



Stop!

Possible overheating of the brake resistor during operation

Inadequate heat dissipation during operation can cause the brake resistor to overheat.

Possible consequences:

- ▶ The brake resistor is destroyed.
- ▶ The drive is not braked but coasts to a standstill.

Protective measures:

- ▶ Always connect the thermal contact of the brake resistor.
- ▶ Integrate the thermal contact into the overall equipment monitoring apparatus in such a way that the supply of power to the standard device is switched off if the brake resistor overheats (e.g. switch-off by means of mains contactor control).

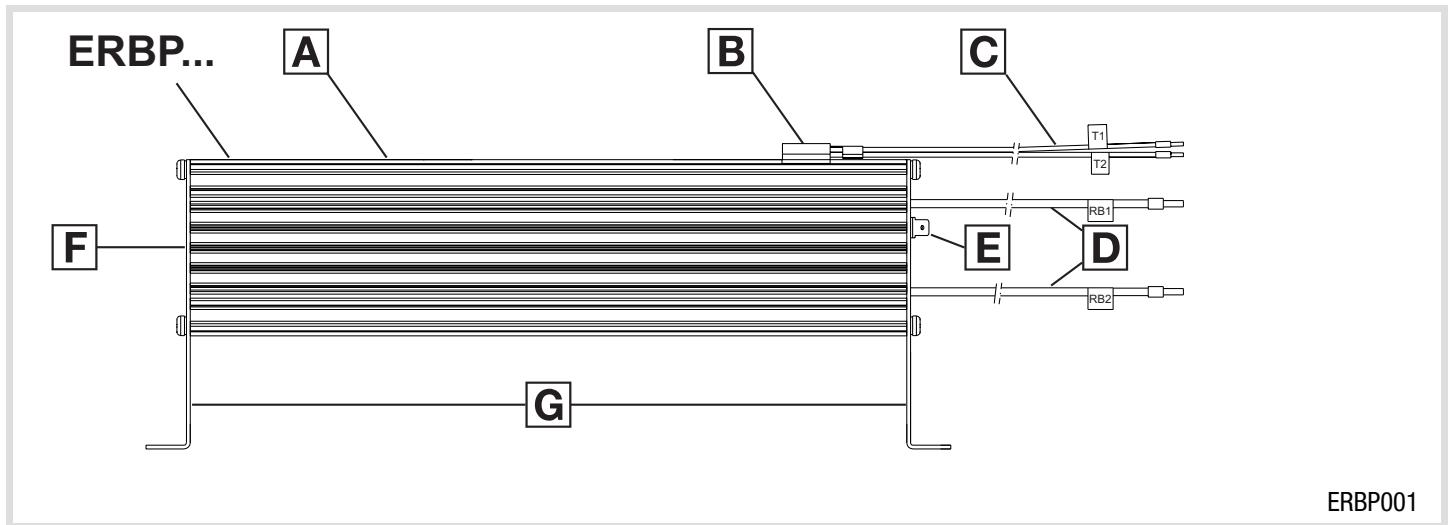


Warnings!

Conditions of Acceptability:

- ▶ The products covered by this report are intended for use with Power Conversion Equipment (drives) only.
- ▶ The Temperature Switch must be connected to the drive, so that the drive switches off in case when the maximum operating temperature is exceeded.
- ▶ Temperature tests and abnormal operation tests have only been conducted for single resistive elements and for continuous duty as indicated under RATINGS. For any grouping of the resistor elements an additional temperature test must be conducted, depending on the evaluation of the mechanical construction and the expected temperature rise.
- ▶ For any duty cycle operation in the end-use application it must be guaranteed that the maximum Wattage rating will not be exceeded. This may be evaluated by calculation. If there will be any concern regarding to this, additional temperature tests have to be conducted under end-use conditions.

Overview



Scope of supply

Pos.	Description
	Brake resistor
	Mounting Instructions

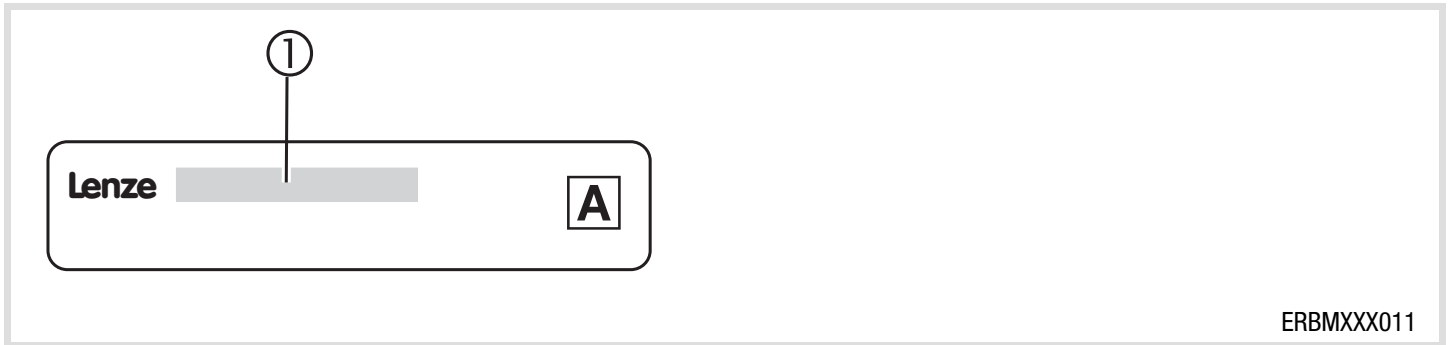
Brake resistor elements

Pos.	Description
A	Nameplate
B	Thermal contact
C	Connecting cable thermal contact
D	Connecting cable brake resistor
E	PE connection
F	Warning note
G	Fixing bracket

3 Product description

Overview

Identification



	①		
Type code	ERBx	xxxx	xxxx
Product series			
Resistance R_B [Ω]			
e.g. 470R = 470 Ω 075D = 7.5 Ω			
Permanent power P_d [W]			
e.g. 120W = 120 W 01k2 = 1.2 kW			

Application as directed

Brake resistors

- ▶ must only be actuated under the operating conditions specified in these operating instructions.
- ▶ are components
 - for mounting in a machine.
 - for assembly with other components to a machine.

Commissioning of the brake resistor is prohibited until it has been determined that the machine into which the brake resistor is to be mounted complies with the regulations of the EC Machinery Directive.

- ▶ are electrical equipment for mounting in control cabinets or similar closed electrical operating areas.
- ▶ comply with the protective requirements of the "Low voltage" EC Directive.
- ▶ are not machines as defined by the Machines EC Directive.
- ▶ are not household appliances, but are only designed as components for subsequent commercial use.

Drive systems with brake resistors

- ▶ The responsibility for compliance with the EC Directives in the machine application is that of the re-user.

Any other use shall be deemed inappropriate!

3 Product description

Dimensioning conditions

Dimensioning conditions

If brake resistors are used, observe the following:

- ▶ Mean value of regenerative power < permanent power P_d of the brake resistor.
- ▶ Regenerative power during braking time < heat quantity Q_B of the brake resistor.
- ▶ Braking time < 10 % of cycle time (braking time + dead time).
- ▶ Always connect the thermal contact and integrate it in a way into the system monitoring that the mains supply will be switched off when the standard device is overheated.

At all times, the following must apply: In the time interval $t_{cyc, RB}$ (brake resistor cycle) the cumulative braking times t_{brk} must always be \leq of the maximum total braking time $t_{brk, max}$.

Calculation

Brake resistor cycle $t_{cyc, RB}$:

$$t_{cyc, RB} = \frac{Q_B}{P_d} \text{ with}$$

Q_B Heat quantity in Ws

P_d Permanent power in W

Max. total braking time $t_{brk, max}$ within the time interval $t_{cyc, RB}$:

$$t_{brk, max} = \frac{Q_B \cdot R_B}{U_{max}^2} \text{ with}$$

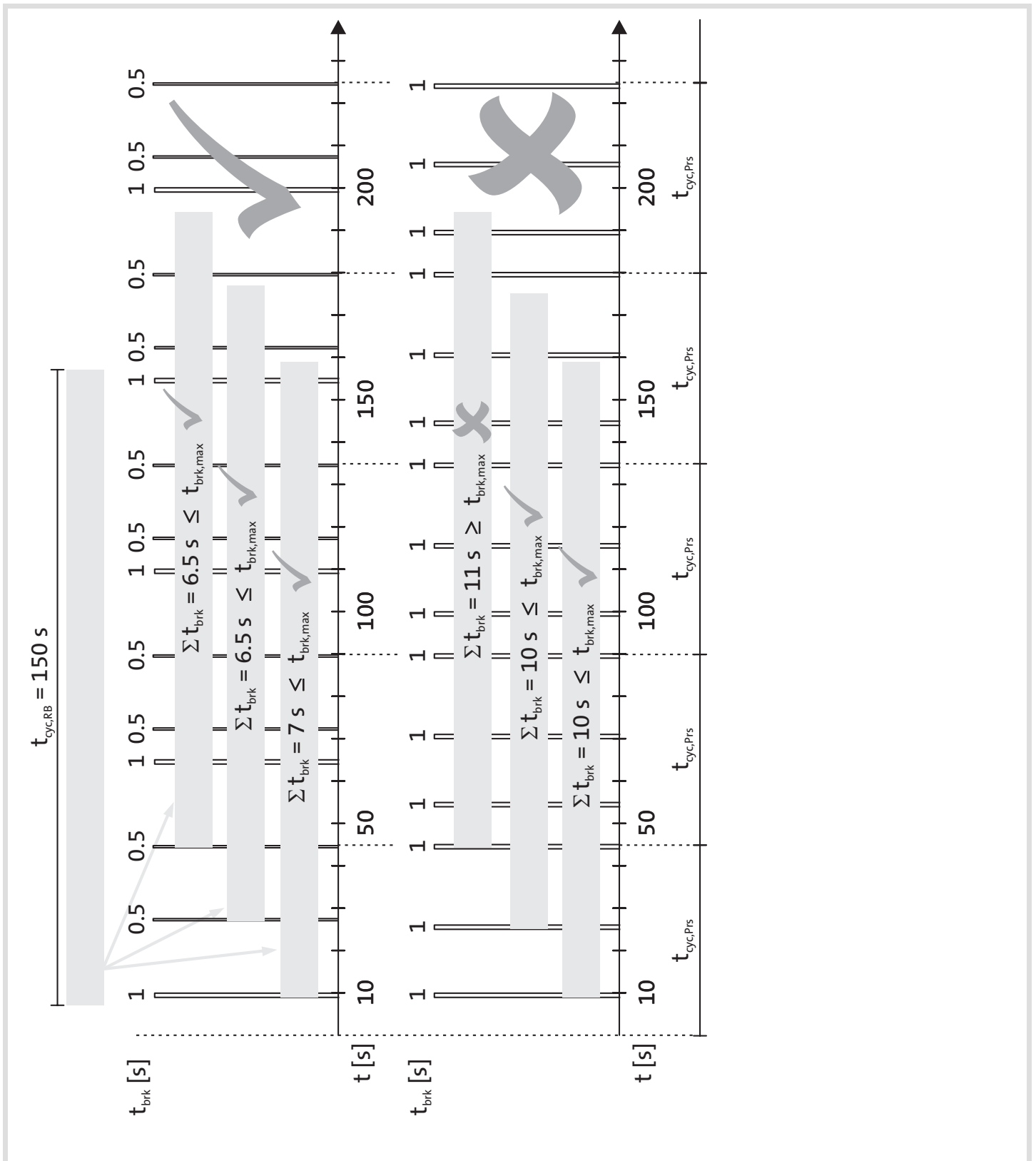
Q_B Heat quantity in Ws

R_B Resistance in Ω

U_{max} Max. operating voltage in V

Examples of the evaluation of the condition

The brake resistor cycle $t_{cyc, RB} = 150$ s and the max. total braking time $t_{brk, max} = 10$ s are given. The braking times t_{brk} and the process cycle $t_{cyc, prc}$ are exemplary.



In the above example, the dimensioning condition is observed at all times. In the example below, the dimensioning condition is once not observed, which means that the brake resistor selected is not suitable for the process specified. Use a brake resistor with a greater power (shorter brake resistor cycle $t_{cyc,RB}$).

4 Technical data

General data and operating conditions

General data and operating conditions

Conformity and approval

Conformity

CE	2006/95/EC	Low-Voltage Directive
----	------------	-----------------------

Approval

UR	UL508	Industrial Control Equipment, Underwriter Laboratories (File-No. E232497) for USA and Canada
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Protection of persons and equipment

Enclosure

EN 60529	IP21
NEMA 250	Protection against contact to type 1

Thermal contact

Design	NC contact, 180 °C
Switching capacity	250 V AC / 4 A



Environmental conditions

Climate

Storage	IEC/EN 60721-3-1	1K3 (-25 ... +60 °C)
Transport	IEC/EN 60721-3-2	2K3 (-25 ... +70 °C)
Operation	IEC/EN 60721-3-3	3K3 (-10 ... +55 °C) Current derating from +45 ... +55 °C: 2.5 %/°C
Site altitude		0 ... 4000 m amsl 1000 ... 4000 m amsl: Current derating 5 %/1000 m

Vibration resistance (9.81 m/s² = 1 g)

EN 50178, IEC 61800-5-1, Germanischer Lloyd, general conditions	Acceleration resistant up to 1 g
---	----------------------------------

Mounting conditions		
Mounting location		<ul style="list-style-type: none"> ● In the control cabinet ● The mounting location must comply with the device features mentioned in the chapter "General data". ● Flammable materials or substances may not be placed in the vicinity of the brake resistor. ● The heat generated by the brake resistor must be dissipated freely.
Mounting position		
Standard		Vertically suspended with connections at the bottom.
Variant		Horizontally standing with fixing bracket at the bottom. The permanent power P_d is to be reduced by 30 %!
Free spaces		
Standard		 47
Variant		 48

4 Technical data

Rated data

Rated data

Electrical data				
	R_B	P_d	Q_B	U_{max}
	[Ω]	[W]	[kWs]	[V _{DC}]
ERBP018R300W	18	300	30	800
ERBP027R200W	27	200	30	
ERBP033R200W	33	200	30	
ERBP033R300W		300	45	
ERBP047R200W	47	200	30	
ERBP082R200W	82	200	30	
ERBP180R200W	180	200	30	
ERBP180R300W		300	45	

R_B	Resistance
P_d	Permanent power
Q_B	Heat quantity
U_{max}	Max. operating voltage

Temperatures			
	T_{nom}	T_{TK}	T_{max}
	[°C]		
On the surface	250	300	600
On the clearance edge *)	90	200	300

T_{nom} Maximum temperature for rated data

T_{TK} Temperature at which the thermal contact is activated

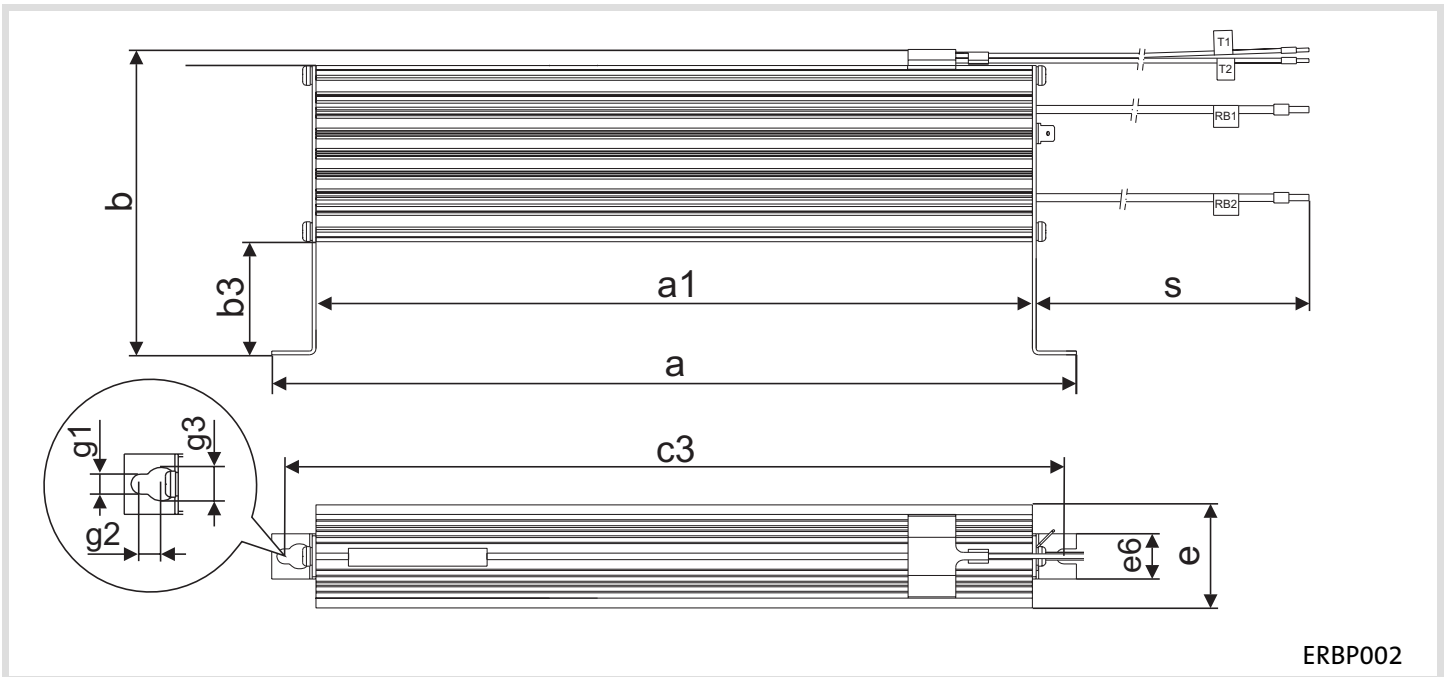
T_{max} Maximum temperature in the case of improper use


*) Measured for air as the ambient medium (small coefficient of thermal conductivity); if materials which heat up are located at the clearance edge (greater coefficient of thermal conductivity), the temperature continues to rise.

4 Technical data

Mechanical data

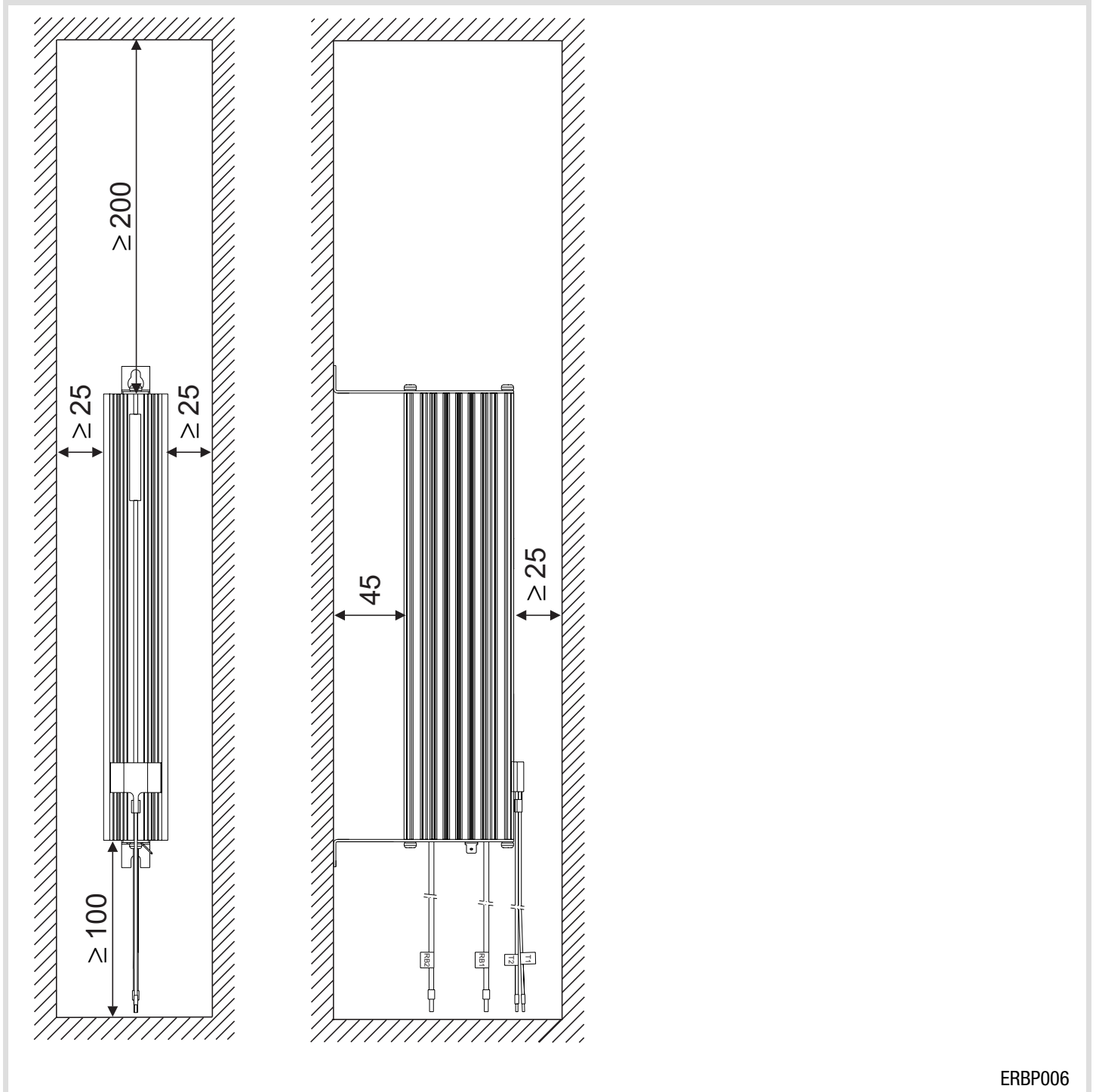
Mechanical data



	a	b	b3	a1	c3	e	e6	g1	g2	g2	s	
	[mm]											[kg]
ERBP018R300W	320			285	310	41	18	6	6	10	500	1.4
ERBP033R300W				1.0								
ERBP180R300W				1.0								
ERBP027R200W	240	122	45	205	230							1.4
ERBP033R200W												1.0
ERBP047R200W												1.0
ERBP082R200W												1.0
ERBP180R200W												1.4

Mounting clearance

Free spaces for standard mounting



ERBP006

All dimensions in millimetres.

5 Mechanical installation

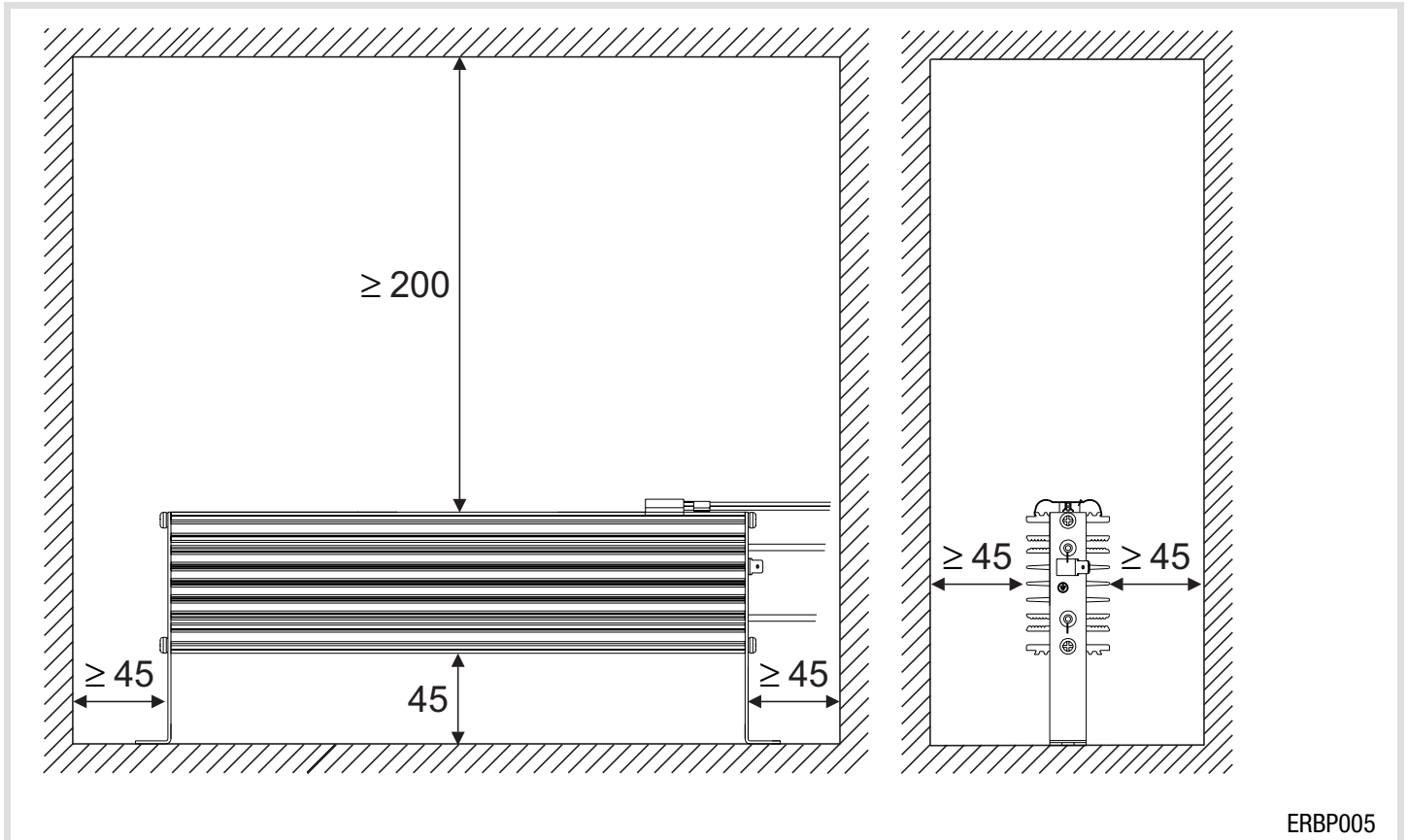
Mounting clearance

Free spaces for mounting variant



Danger!

With the mounting variant, the permanent power P_d of the brake resistor is to be reduced by 30 %!



All dimensions in millimetres.

Mounting steps

How to mount the brake resistor:

1. Select a suitable mounting location.
 - The mounting location must always ensure the operating conditions mentioned in the technical data; if required, additional measures must be taken.
 - Ensure unimpeded air circulation for heat dissipation.
2. Screw down the brake resistor at the mounting location.
 - The mounting location and the mounting material must ensure the permanent mechanical connection.

Important notes



Stop!

Possible overheating of the brake resistor during operation

Inadequate heat dissipation during operation can cause the brake resistor to overheat.

Possible consequences:

- ▶ The brake resistor is destroyed.
- ▶ The drive is not braked but coasts to a standstill.

Protective measures:

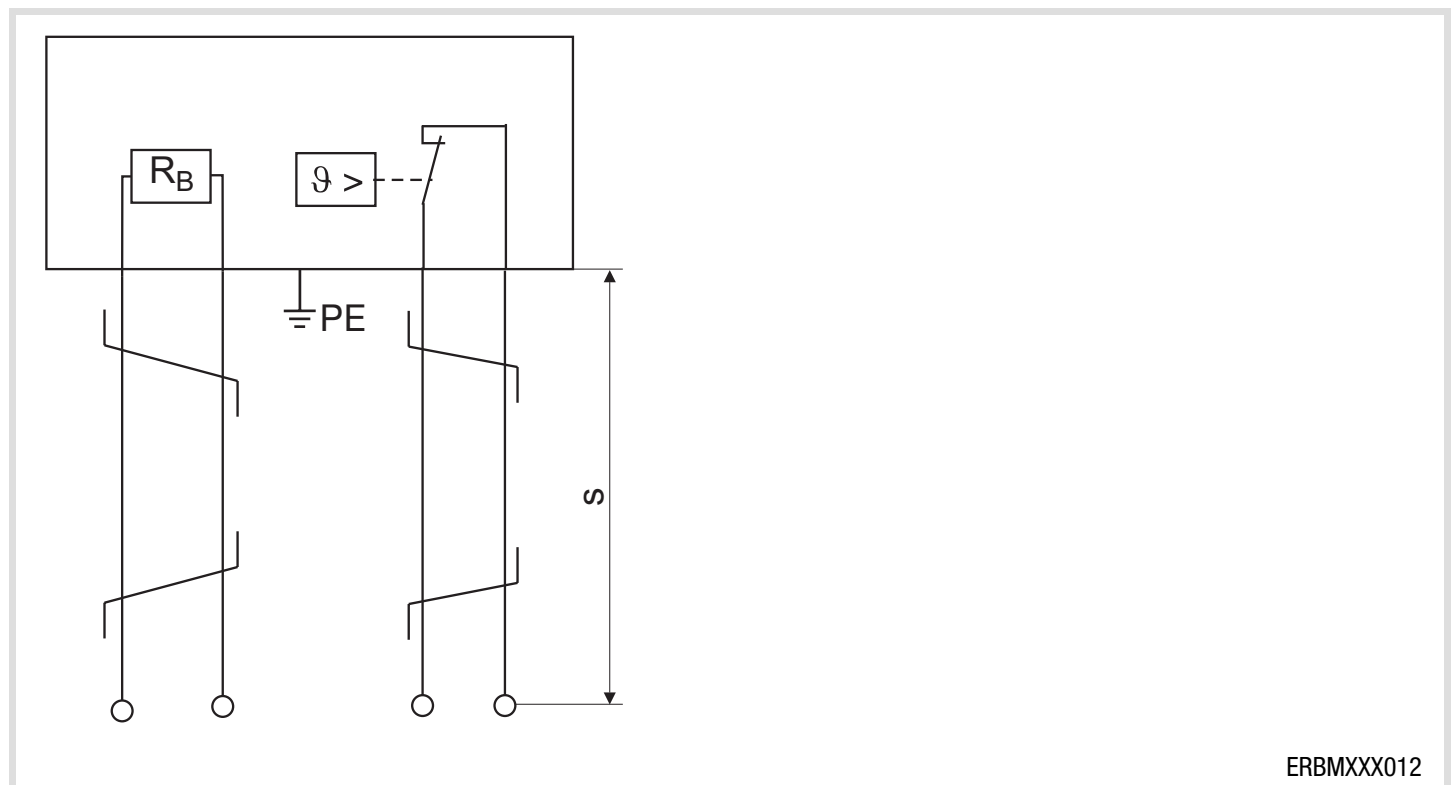
- ▶ Always connect the thermal contact of the brake resistor.
- ▶ Integrate the thermal contact into the overall equipment monitoring apparatus in such a way that the supply of power to the standard device is switched off if the brake resistor overheats (e.g. switch-off by means of mains contactor control).

Connection data

	Type of connection	Size of connection
RB1, RB2 (brake resistor)	prepared lead	2.1 mm ² 14 AWG
PE (PE conductor)	flat connector	6.3 x 0.8 mm
T1, T2 (thermal contact)	prepared lead	0.75 mm ² 18 AWG

Connection plan

Variant 1: without cable extension



Twisted cables

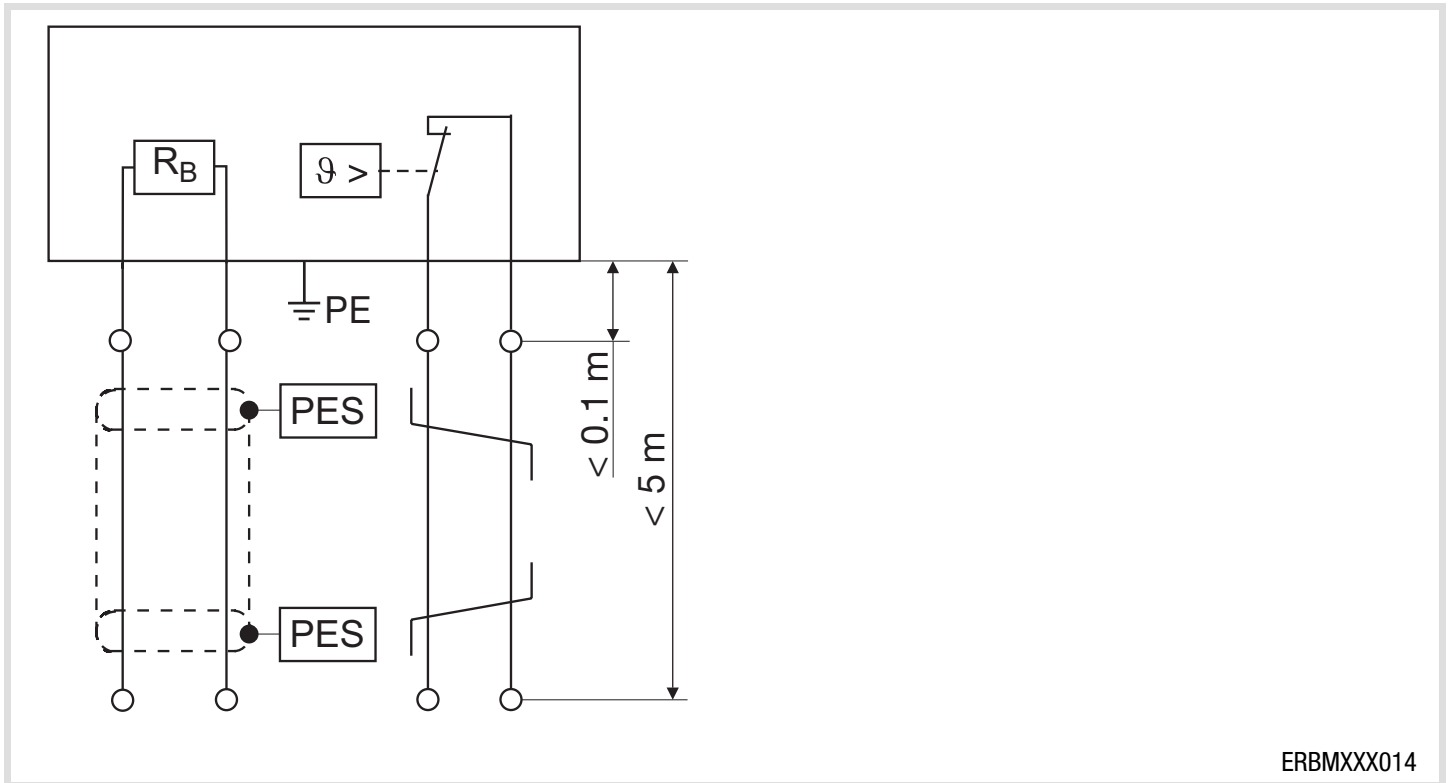
s

Length of prepared cables 46

6 Electrical installation

Connection plan

Variant 2: with cable extension



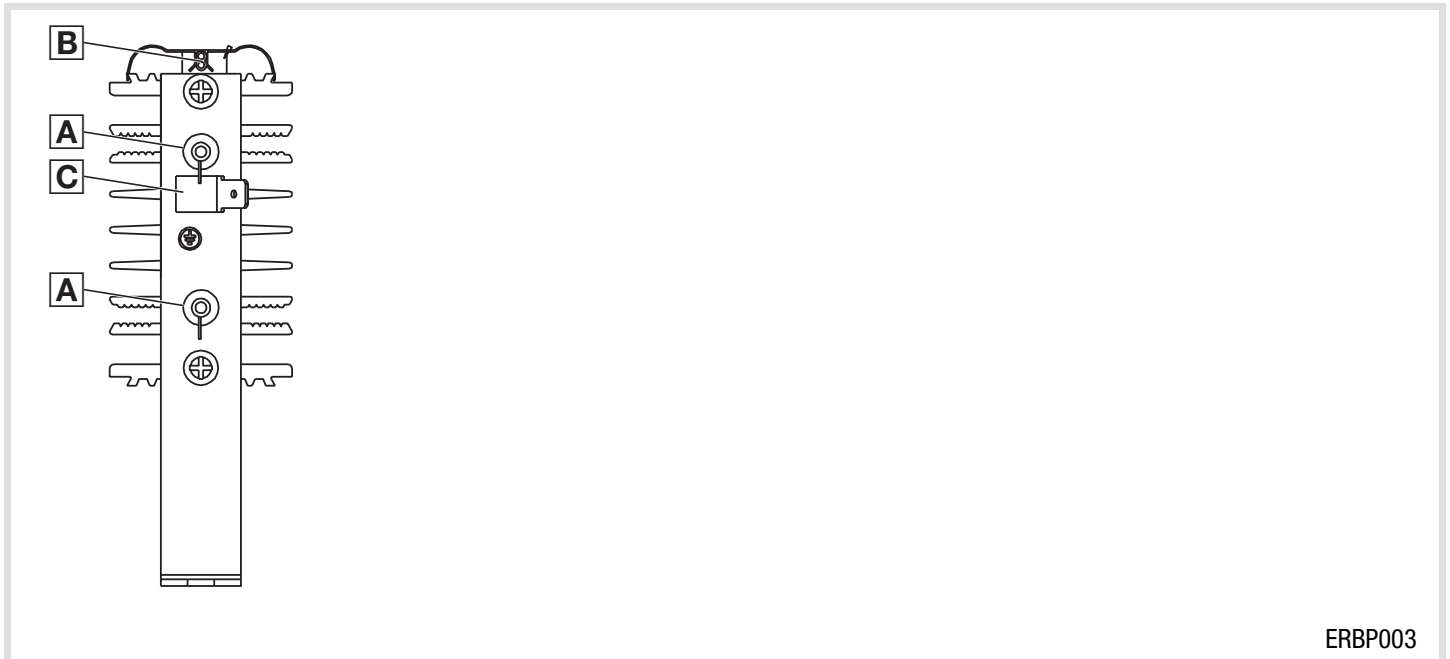
PES

HF-shield termination by extensive PE connection



Twisted cables

Mounting steps



ERBP003

How to connect the brake resistor:

1. Disconnect the basic device from the mains and check all power terminals for safe isolation from supply.
2. Connect brake resistor cables **A** (RB1, RB2: red flexible) and thermal contact cable **B** (T1, T2: blue flexible) (see documentation for the basic device).
 - If the prepared connecting cables are long enough, twist them. (See connection plan, variant 1)
 - If longer cables are required (max. 5 m), shorten the prepared cables to at least 10 cm and connect them to external terminal connections. From there on, use shielded cables. (See connection diagram, variant 2)
 - When integrating the thermal contact into the system monitoring ensure that the mains supply will be switched off when the brake resistor is overheated.
3. Connect PE cable to blade terminal **C** (6.3 x 0.8 mm).
 - Implement PE connection according to EN 61800-5-1.

7 Maintenance

Maintenance intervals

Maintenance intervals

The brake resistor is maintenance-free. Nevertheless, a visual inspection must be executed in short and regular intervals considering the ambient conditions.

Ensure that:

- ▶ the environment of the brake resistor still corresponds to the operating conditions included in the technical data.
- ▶ no dust or dirt impedes the heat dissipation of the brake resistor.
- ▶ the mechanical and electrical connections are correct.

Maintenance operations

Cleaning the brake resistor

1. Disconnect the standard device from the mains and wait at least three minutes.
2. Check temperature of the brake resistor and allow it to cool, if required.
3. Check the brake resistor for safe isolation from supply.
4. Clean brake resistor without using cleaning agents.