

Energizing Productivity Tunnel Boring Machine

Situation:

The belt conveyor of a tunnel boring machine has to transport the excavation material.

Problem:

To secure the necessary belt tension, two drives are working with different speed against each other. That causes braking energy in one of the two drives.

Intention:

The brake energy has to be managed safe and quick with an external brake resistor.

Solution:

- > Our resistor combination [BAS4.8010D-1000H](#) (4,8 kW / 15 Ohm / IP20).



Results:

1. The brake energy is managed safely and quickly
2. Individual design
3. Modular system



Managing
braking energy

Further information:

[Tunnel Boring Machine](#)

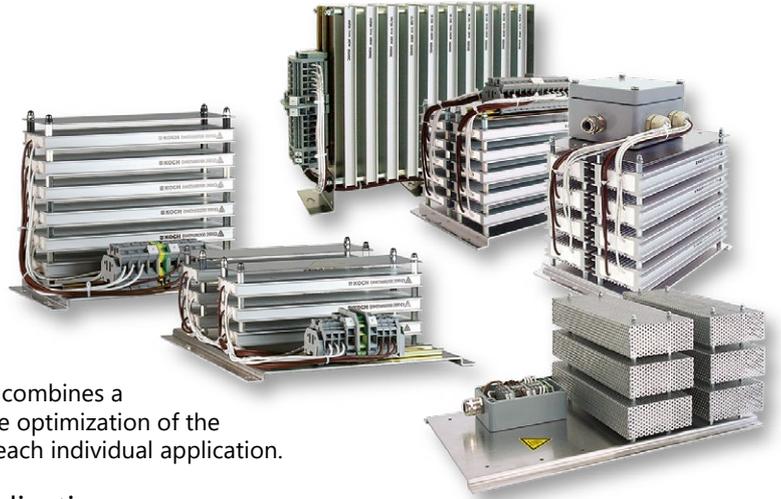
We look forward to hearing from you!

Our modular system for safe brake resistors

We manufacture resistor combinations by an extensive set of accessories for high performance applications.

The modular system is based on individual modules of the BWD series 250 to 1000 with nominal output of 100 to 400 watts.

In addition to its high performance, this modular system combines a compact design with extreme flexibility. This results in the optimization of the braking resistor in accordance with the specifications of each individual application.



Optimized to the requirements of your application:

- Required power - no „unnecessary over-dimensioning“
- Many resistance values – based on the inverters requirements
- Mechanical design – according to the existing installation space
- Assembly - horizontal or vertical
- Protection class IP 20 or IP 65¹ - according to installation location and environmental conditions
- Individual modules with UL and CSA standard approval
- Several braking resistors in a resistor combination, e.g. for moving and hoisting gear
- Optional: Temperature switch, strain relief, protective cover, etc.

Technical specifications of individual modules ($\vartheta_A = 20^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit	Conditions
Tolerance (resistance)		± 5	%	Room temperature
Insulation resistance	R_{ISO}	≥ 100	$M\Omega$	$U_{mess} = 1,000 \text{ VDC}$
Inductance	L	≤ 30	μH	$f = 300 \text{ kHz}, U_{mess} = 50 \text{ mV}$
Capacity against enclosure	C	≤ 300	pF	$f = 300 \text{ kHz}, U_{mess} = 50 \text{ mV}$
Thermal time constant	τ	approx. 550	s	BWD250/500
		approx. 600	s	BWD600
		approx. 850	s	BWD1000
Energy absorption BWD250	Q	4	kJ	with 1.2 s (1% duty cycle)
		8	kJ	with 7.2 s (6% duty cycle)
Energy absorption BWD500	Q	7,5	kJ	with 1.2 s (1% duty cycle)
		15	kJ	with 7.2 s (6% duty cycle)
Energy abs. BWD600/1000	Q	13	kJ	with 1.2 s (1% duty cycle)
		26	kJ	with 7.2 s (6% duty cycle)
Maximum permissible operating voltage	U_B	$\leq 700 \text{ AC}$	V	Taking into consideration
		$\leq 1,000 \text{ DC}$	V	the „intrinsic safety“ ²
		$\leq 600 \text{ AC}$	V	according to CSA and UL
		$\leq 848 \text{ DC}$	V	
Isolation voltage	U_{iso}	$\geq 4,000 \text{ AC}$	V	$f = 50 \text{ Hz}; t = 1 \text{ s}$
Max. permissible case temp.	ϑ_C	≤ 250	$^\circ\text{C}$	unobstructed convection
		≤ 300	$^\circ\text{C}$	unobstructed conv. (BWD1000)
Storage temperature	ϑ_S	-25 ... +85	$^\circ\text{C}$	



¹ Test conditions: Water jet from nozzle 6.3 mm inside diameter, flow rate 12.5 l / min +/- 5%, water pressure according to volume flow, distance 2.5-3m, test duration 3min.

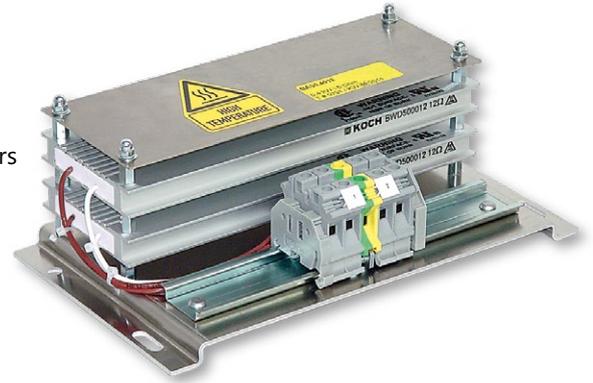
² With fourfold type power and free convection. 1. no short-circuit, 2. no fault to frame, 3. self-extinguishing, 4. no melting of casing. Type power always corresponds to 35% duty cycle of the respective resistor type.

We look forward to hearing from you!

Brake resistor combination BAS³...

Short-circuit-proof, „intrinsically safe“² resistor for operation with drive controllers (brake transistors), consisting of a combination of individual resistor modules of the 500/600/1000 series, mechanically connected with screw terminals.

These resistor combinations are outstanding in their compact design by virtue of their versatile base plates. Version with IP20 protection class available.



Rated power (kW)
0.2 - 7.2 or upon request

Technical specifications
The technical data can be found on page 2 of this document.

Resistance (Ohm)
1 - 17,360 or upon request

Dimensions and mounting holes (mm)
Mounting plates for brake resistor combinations BAS. Detailed dimensions for specific versions available upon request.



Dimensions (mm)
Upon request

Individual solutions



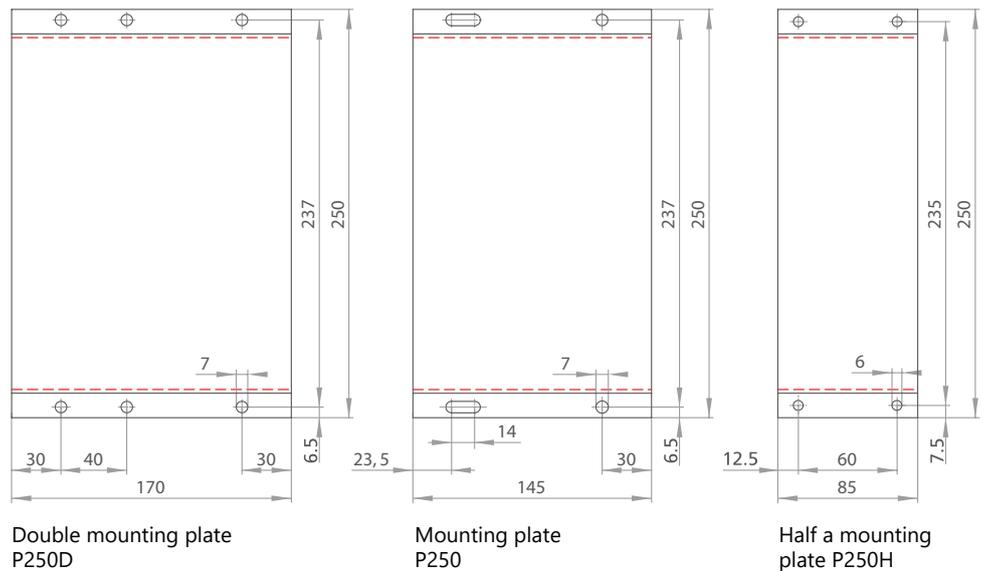
BAS combination on small mounting plate P250H



BAS combination on doubled mounting plate P250D

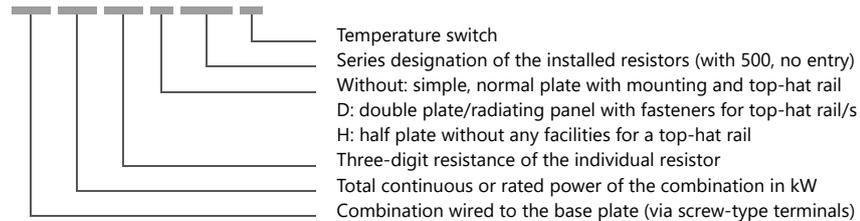


BAS combination in IP20 consisting of 18 single resistor modules



Nomenclature
Brake resistor combination BAS...

BAS2.4100D-1000TS



² With fourfold type power and free convection. 1. no short-circuit, 2. no fault to frame, 3. self-extinguishing, 4. no melting of casing. Type power always corresponds to 35% duty cycle of the respective resistor type.

³ Only IP20.

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Special solutions

Customized designs demonstrate our flexibility:

Due to the large variety mechanical and electrical options, almost no limits apply to match the requirements of each individual application.

Brake resistor combination BAF2.4D-250V24

24x 0.1 kW, Resistance values upon request

Includes:

Specific retaining plate, 24 resistors, each with its own separate, customized pickup

Rated⁴: up to 24x 0.1 kW with 100% D power up to 24x 3.0 kW with 1% D

Prot. class: IP 20



Brake resistor combination BAS0.3xxx-250U

3x 0.1 kW, Resistance values upon request

Includes:

Retaining plate, 3 resistors, not inter-connected incl. accessories

Rated⁴: up to 3x 3.0 kW with 100% D power up to 3x 0.1 kW with 1% D

Prot. class: IP 20



Brake resistor combination BAS1.2xxxH-1000G

3x 0.4 kW, Resistance values upon request

Includes:

Half retaining plate, 3 BWG-resistors

Rated⁴: up to 3x 0.4 kW with 100% D power up to 3x 12.0 kW with 1% D

Prot. class: IP 65¹



Brake resistor combination BAS1.2xxxDLADE

1.2 kW, Resistance values upon request

Includes:

Dual retaining plate, 6 resistors, protection cover

Rated⁴: up to 1.2 kW with 100% D power up to 36.0 kW with 1% D

Prot. class: IP 20

Temperature monitoring



Brake resistor combination BAS2.8DV2A

2x 1.4 kW, Resistance values upon request

Includes:

Specific retaining plate, 14 resistors

Rated⁴: up to 2x 1.4 kW with 100% D power up to 2x 42.0 kW with 1% D

Prot. class: IP 20

Temperature monitoring



Brake resistor combination BAS4.0xxxDTS-160

4.0 kW, Resistance values upon request

Includes:

Specific retaining plate, 20 resistors

Rated⁴: up to 4.0 kW with 100% D power up to 120.0 kW with 1% D

Prot. class: IP 20

Temperature monitoring



¹ Test conditions: Water jet from nozzle 6.3 mm inside diameter, flow rate 12.5 l / min +/- 5%, water pressure according to volume flow, distance 2.5-3m, test duration 3min.

⁴ Power at 70° C ambient temperatures

D = Duty cycle

We look forward to hearing from you!



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Subject to technical changes. MK_PRO_ANW-TUNNELBOHR_ENG_R01_0

