

Active energy management devices and safe brake resistors for Siemens SINAMICS products



Siemens
Product Partner
for Drives Options

Active energy management devices and safe brake resistors for Siemens SINAMICS products

As a Siemens product partner for drives options, KOCH offers tailor-made solutions for the Siemens product range – from standard products through to ready-to-connect systems in an installation. The close collaboration, qualification, certification, and intensive transfer of knowledge during every project phase give rise to solutions that fulfil the many different application requirements.

KOCH provides suitable solutions for all energetic situations of an electrical drive system, for which the optimal dimensions are determined together with you. We strive to deliver maintenance-free plug & play systems that can be connected directly on site.

In the following areas, KOCH is the right contact for you, offering expertise and extensive application experience:

1. **Managing regen energy:** In the event of excessive energy in the drive, KOCH products secure the functionality of the system or increase its energy efficiency.
2. **Securing the power supply:** In the event of too little energy in the drive due to grid disturbances or interruptions, KOCH solutions minimise the downtime and restart costs. During planned grid interruptions, they provide an off-grid energy supply.
3. **Balancing energy:** In case of frequent and intense changes in speed and direction, KOCH systems calm the energy balance of the drive and thereby ensure that the drive electronics experience far less strain. This helps avoid unplanned standstills or downtime.
4. **Reducing heat development:** Replacing the brake resistors with active energy management systems reduces losses and minimises air-conditioning requirements.
5. **Using energy reserves:** The KOCH systems can increase the performance or cycle rate of the drive by utilising energy reserves and by means of a higher starting voltage level for acceleration.
6. **Reducing peak loads:** The KOCH systems minimise infrastructure costs and negative circuit feedback by using additional power and energy reserves.

Additionally, KOCH delivers specially developed, tested, and approved safe brake resistors for various Siemens frequency converter series. These can be found from page 7 onwards. KOCH can draft offers for and implement adaptations to specific machine or installation requirements, even at short notice.

Of course, KOCH is also available to provide sizing support.

Your competent contact for all active energy management systems and safe brake resistors is:

Jens Knaus

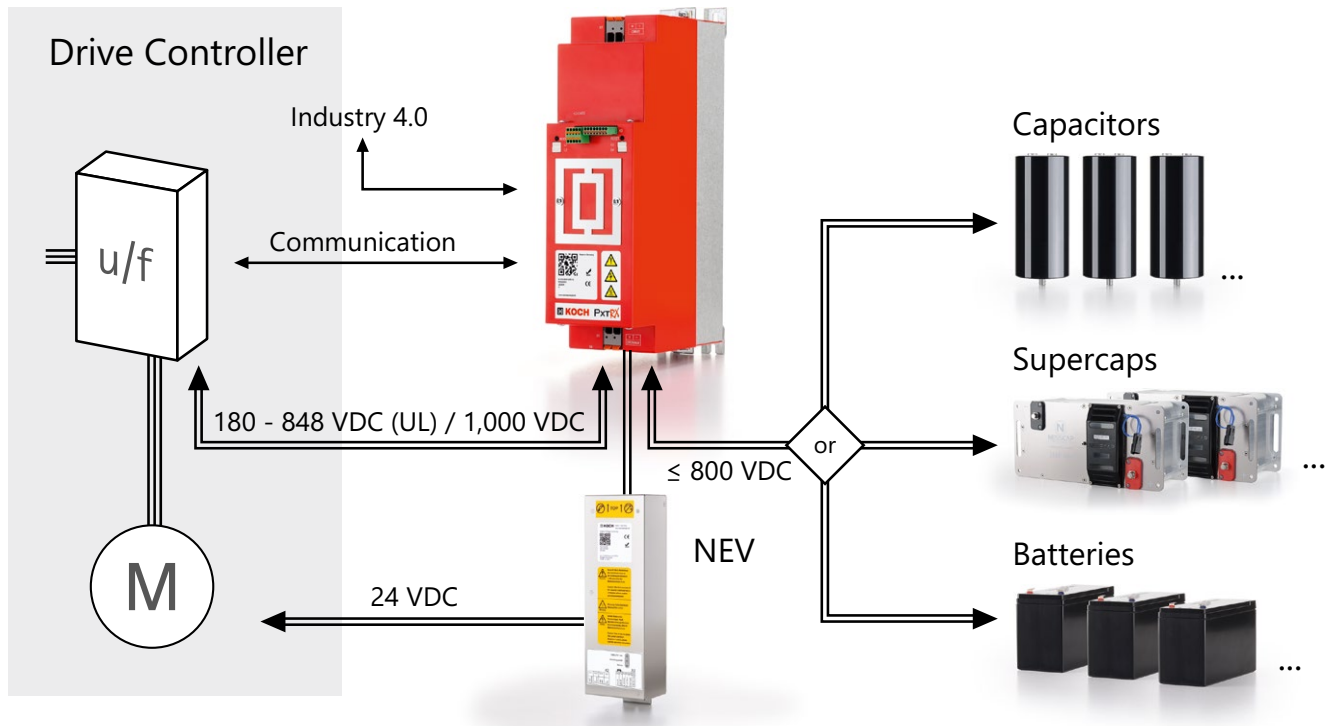
Call us or send us an email. We will get back to you promptly.
Tel. +49 7251 / 96 26 238, j.knaus@bremsenergie.de



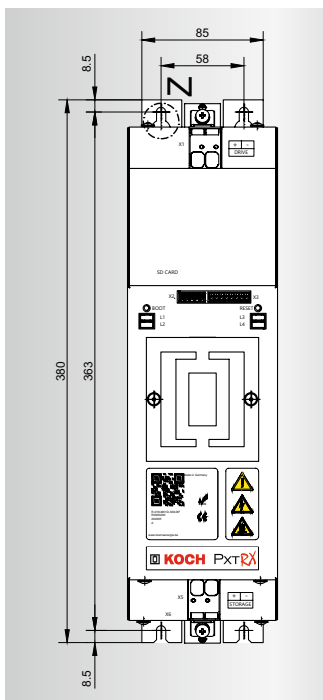
The system PxTRX

The requirements of the DC link of the drive controller, meaning the drive system, are crucial for the composition of the PxTRX system. The required power, amount of energy, and number of cycles given in an application case are decisive.

Important: None of the utilised storage media require maintenance. The system works in a maintenance-free way.



Installation dimensions and mounting-holes (mm)



Key features of the PxTRX devices

Performance

- > 30 A continuous current
- > 60 A peak current for 45 seconds
(25% duty cycle at 180s cycle time)
- > up to 50 kW peak power

Wide voltage range

- > Min. Operating voltage level 180 VDC
- > Max. Operating voltage level 848 VDC (UL) / 1,000 VDC (IEC)
- > Min. starting voltage level for the system (DC link or Energy storage) approx. 45 VDC

Safety functions

- > Reverse polarity protection to DC link
- > Integrated precharge circuit
- > LSS charge protection switch: connection of charged energy storage modules possible
- > Integrated load monitoring on both sides
- > Internal fuses

Communication

- > 3 digital inputs / 3 digital outputs
- > K-Bus for operating data output
- > 4 LEDs
- > SD card
- > Reset button for restart
- > Boot button for boot loading from SD card

Energy and Cycles per PxTRX

Storage	Energy	Number of cycles
Elcos	1.4 up to 40 kJ	> 100 mio.
Supercaps	80 up to 1,600 kJ	> 1 mio.
Batteries	3,000 bis 280,000 kJ	> 1,000

Realize advantages!

Voltage dip or power failure

Goal: Power supply in case of voltage dip or power failure



Situation:

The critical drive with an output of 45 kW is not protected against voltage dips or power failures.

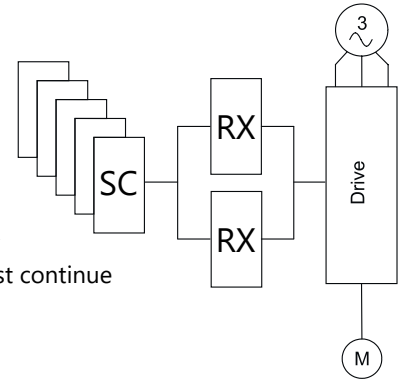
Problem:

In order to prevent the very expensive workpiece from being destroyed and thus to maintain the ability to deliver and to avoid penalties, the critical drive must continue to operate for a guaranteed minimum of 10 seconds in the event of a voltage dip or power failure.

Solution:

Two PxtRX connected in parallel with a correspondingly large energy storage system consisting of supercapacitor modules.

- > Controlled continuation of the machine during short voltage dips
- > Controlled stop of the machine in case of power failure
- > Bringing the machine into a defined state with complete preservation of the workpiece



Managing brake energy

Goal: Energy saving, avoidance of unplanned down times



Situation:

The machine brakes every second with an initial power of 20 kW within 0.4 seconds to 0. After 0.1 s pause the system speeds up again.

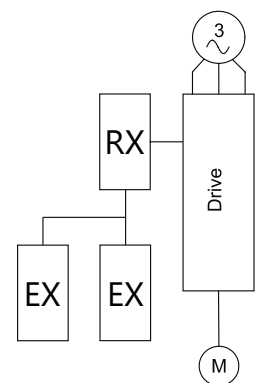
Problem:

Fast cycles and large masses lead to overloading of the drive electronics and thus to unplanned breakdowns. In addition, 2,000 Ws of electrical energy per cycle could be saved, i.e. around 2 kWh per operating hour.

Solution:

One PxtRX in combination with two PxtEX capacitor modules.

- > Power consumption reduced, saving 4 kJ per cycle or about 4 kWh per operating hour
- > Extension of the service life of the drive electronics
- > Possibly increase the number of cycles or increase productivity, mechanics permitting



Reduce power loads

Goal: Reduction of grid connection capacity, energy savings



Situation:

High costs due to high peak grid performance and high energy consumption.

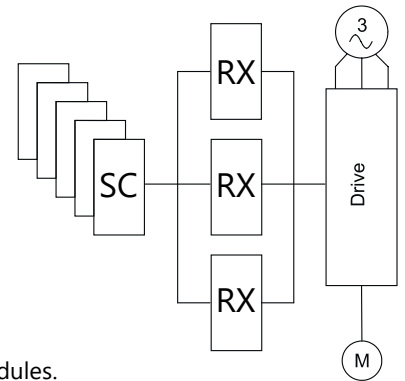
Problem:

The machine accelerates with a high load, resulting in high peak grid power. On the other hand, the braking energy is burned unused.

Solution:

Three PxtRX in combination with super capacitor modules.

- > Drastic reduction of the peak power required from the mains
- > Saving of the braking energy, which is buffered and made available to the system during acceleration



Independent operation from the mains

Goal: Existing system to be operated off-grid



Example:

Cross conveyor

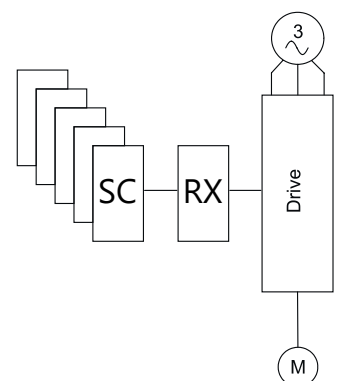
Problem:

Expenditure of time by the workers and the cable is interfering and wearing out.

Solution:

A PxtRX in combination with super capacitor modules.

- > The super capacitor modules are charged once and provide energy for the planned power cuts



Complete active energy management systems KTS

KTS refers to the standard control cabinets that we offer in case there is no space for our active energy management systems in the control cabinet of the machine or plant. We design the KTS individually to suit the customer and deliver it as ready-to-connect.

KTS-U - Energy in case of emergency

The systems with the designation KTS-U deliver the necessary energy completely without interruptions to bridge voltage fluctuations or power failures and thereby help the machine or plant to reach a safe position.

KTS-U



KTS-C - System for cyclical uses

The KTS-C series is used to buffer generative energy on its own or in combination with a UPS function. It is prepared for cyclical loads.

KTS-C



Additional information on our systems:

PxTRX

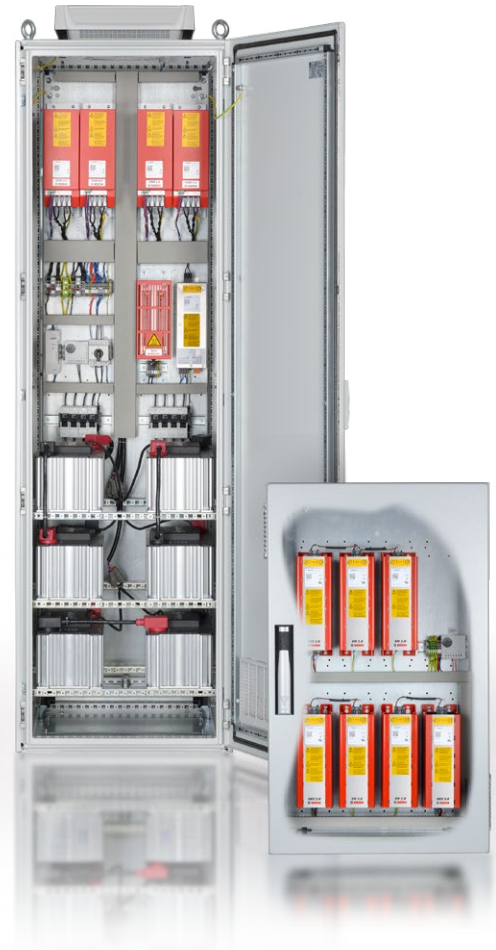


<https://bremsenergie.de/en/pxtrx>

PxTfX



<https://bremsenergie.de/en/pxtfx>



Sensible options for the KTS-U and KTS-C systems:

Safe discharge unit SDU

Connectible, overload-protected discharge unit for capacitances built into the KTS.



24-Volt Emergency Energy Supply NEV

Power supply for the safe supply of 24-volt mains from the storages of the KTS.



Safe brake resistors for Sinamics S210 products by Siemens

The versatile Sinamics S210 servo inverter is mainly designed for dynamic, discontinuous applications.

For very high requirements, where the integrated braking resistor is not sufficient, an intrinsically safe braking resistor with temperature monitoring from Koch is used. For this purpose, an assignment of suitable brake resistors for the different power classes was defined in close cooperation with Siemens. Matching the S210 in the compact design by Koch, which meets the high requirements of the overall system. A safe operation of dynamic applications is thus guaranteed.



Advantages

- > compact
- > space saving
- > protection class up to IP 65¹
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing



Allocation - Safe brake resistors for SINAMICS S210

Sinamics Products	Rated Power [kW]	Koch number with Temperature sensor 190°C	Continuous Power for CE [W]	Continuous Power for UL [W]	Max. Peak Power [W]	Max. Brake Energy [kJ]
Mains voltage 1 AC 200 ... 240 V						
6SL3210-5HB10-1UF0	0.1 kW	BWG250047TS-190	50	50	350	0.7
6SL3210-5HB10-2UF0	0.2 kW	BWG250047TS-190	100	100	600	1.1
6SL3210-5HB10-4UF0	0.4 kW	BWG250047TS-190	100	100	1,300	1.8
6SL3210-5HB10-8UF0	0.75 kW	BWG500027TS-190	200	200	2,400	2.7
Mains voltage 3 AC 200 ... 240 V						
6SL3210-5HE10-4UF0	0.4 kW	BWG500027TS-190	200	200	600	0.9
6SL3210-5HE10-8UF0	0.75 kW	BWG600014TS-190	380	240	1,200	0.8
6SL3210-5HE11-0UF0	1.0 kW	BWG600014TS-190	400	240	1,700	0.8
6SL3210-5HE11-5UF0	1.5 kW	BWD500027K03LIP65IS	600	600	2,900	14.5
6SL3210-5HE12-0UF0	2.0 kW	BWD500027K03LIP65IS	600	600	3,800	13.9
6SL3210-5HE13-5UF0	3.5 kW	BWD600014K03LIP65IS	1,200	720	7,500	18.7
6SL3210-5HE15-0UF0	5.0 kW	BWD600014K03LIP65IS	1,200	720	9,500	17.8
6SL3210-5HE17-0UF0	7.0 kW	BWD600014K03LIP65IS	1,200	720	12,500	18.2
Mains voltage 3 AC 380 ... 480 V						
6SL3210-5HE10-4UF0	0.4 kW	BWG500100TS-190	200	200	1,200	5.2
6SL3210-5HE10-8UF0	0.75 kW	BWG600047TS-190	380	240	2,400	6.2
6SL3210-5HE11-0UF0	1.0 kW	BWG600047TS-190	400	240	3,400	6.1
6SL3210-5HE11-5UF0	1.5 kW	BWD500100K03LIP65IS	600	600	5,700	30.4
6SL3210-5HE12-0UF0	2.0 kW	BWD500100K03LIP65IS	600	600	7,600	30.4
6SL3210-5HE13-5UF0	3.5 kW	BWD600047K03LIP65IS	1,200	720	15,000	50.0
6SL3210-5HE15-0UF0	5.0 kW	BWD600047K03LIP65IS	1,200	720	19,000	47.5
6SL3210-5HE17-0UF0	7.0 kW	BWD600047K03LIP65IS	1,200	720	25,000	41.7

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.

Safe brake resistors in subframes for PM240-2 and G120C

Brake resistors must comply with specific requirements to meet the high-quality demands set by Siemens. Due to their intrinsic safety, high pulse loading capacity with a controlled surface temperature, and the compact, high-quality construction, KOCH resistors optimally fulfil these requirements. In addition, KOCH offers quick response times, absolute delivery reliability, and particularly short delivery times specifically for Siemens.

Since there is a lack of space in the control cabinet in a large number of applications, the need for resistors in a substructure frame was recognized and implemented. This customer-specific solution makes it possible to mount fitting resistors for the SIMANICS G portfolio between the inverter and the control cabinet panel in a space-saving way. They can also be mounted on a hat rail clamp. This not only saves space in the control cabinet, but also saves time.



Allocation – Safe brake resistors in subframes for Siemens converter SINAMICS G120C/PM240-2



SINAMICS products 6SL...	nominal voltage	Frame-size	Rated Power	KOCH number	max Power kW 5% duty-cycle ³
PM240-2 - Information to PM240-2 form: Installation manual , 12/2015, A5E33294624A AD					
6SL3210-1PB13-XXXX	200-240	A	0.55	BWD250200K01R0901SI	1.50
6SL3210-1PB13-XXXX	200-240	A	0.75	BWD250200K01R0901SI	1.50
6SL3210-1PB15-XXXX	200-240	B	1.1	BWD500072K01R1002SI	2.75
6SL3210-1PB17-XXXX	200-240	B	1.5	BWD500072K01R1002SI	2.75
6SL3210-1PB21-XXXX	200-240	B	2.2	BWD500072K01R1002SI	2.75
6SL3210-1PB21-XXXX	200-240	C	3.0	BWD600047K01R1401SI	4.00
6SL3210-1PB21-XXXX	200-240	C	4.0	BWD600047K01R1401SI	4.00
6SL3210-1PC22-XXXX	200-240	C	5.5	BWD600047K01R1401SI	4.00
6SL3210-1PC22-XXXX	200-240	C	7.5	BWD600047K01R1401SI	4.00
6SL3210-1PE11-XXXX	400	A	0.55	BWD250390K01R0901SI	1.50
6SL3210-1PE12-XXXX	400	A	0.75	BWD250390K01R0901SI	1.50
6SL3210-1PE13-XXXX	400	A	1.1	BWD250390K01R0901SI	1.50
6SL3210-1PE14-XXXX	400	A	1.5	BWD250390K01R0901SI	1.50
6SL3210-1PE16-XXXX	400	A	2.2	BWD500150K01R0901SI	2.75
6SL3210-1PE18-XXXX	400	A	3.0	BWD500150K01R0901SI	2.75
6SL3210-1PE21-XXXX	400	B	4.0	BWD600080K01R1002SI	4.00
6SL3210-1PE21-XXXX	400	B	5.5	BWD600080K01R1002SI	4.00
6SL3210-1PE21-XXXX	400	B	7.5	BWD600080K01R1002SI	4.00
6SL3210-1PE21-XXXX	400	B	7.5	BWD600150K02R1003SI	8.00
G120C - Information to G120C from: Operating manual, 01/2016, FW V4.7 SP6, A5E34263257A AD					
6SL3210-1KE11-XXXX	400	A	0.55	BWD250390K01R0901SI	1.50
6SL3210-1KE12-XXXX	400	A	0.75	BWD250390K01R0901SI	1.50
6SL3210-1KE13-XXXX	400	A	1.1	BWD250390K01R0901SI	1.50
6SL3210-1KE14-XXXX	400	A	1.5	BWD250390K01R0901SI	1.50
6SL3210-1KE15-XXXX	400	A	2.2	BWD500150K01R0901SI	2.75
6SL3210-1KE17-XXXX	400	A	3.0	BWD500150K01R0901SI	2.75
6SL3210-1KE18-XXXX	400	A	4.0	BWD500150K01R0901SI	2.75
6SL3210-1KE21-XXXX	400	B	5.5	BWD600080K01R1001SI	4.00
6SL3210-1KE21-XXXX	400	B	7.5	BWD600080K01R1001SI	4.00
6SL3210-1KE21-XXXX	400	B	7.5	BWD600150K02R1004SI	8.00

Advantages

- > space saving
- > compact design
- > protection class up to IP65*
- > quick mounting with hat rail clamp
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing

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.

³ at an ambient temperature of 20°C

Technical data for all resistor types

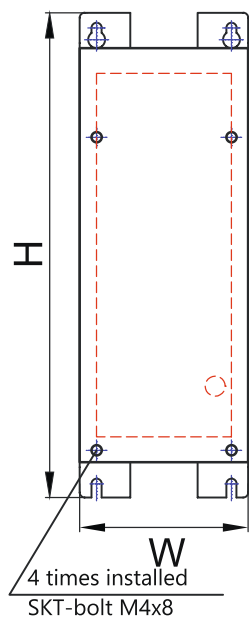
($\vartheta_A = 20^\circ\text{C}$, unless otherwise stated)

(Individual Parameter)

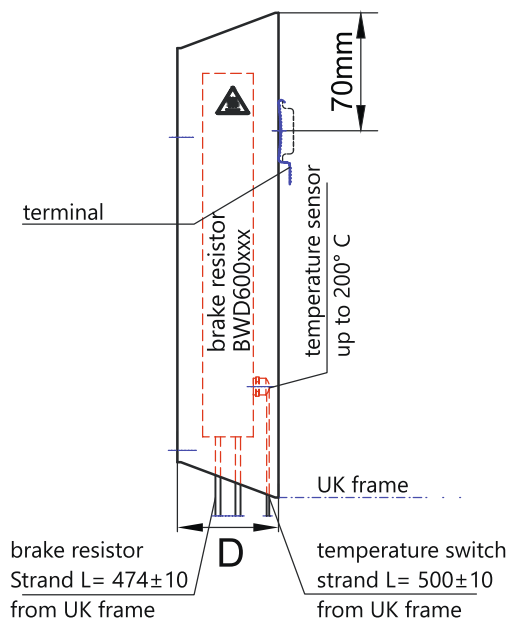
Parameter	Symbol	Value	Unit	Conditions	Number	Energy [kJ]		Weight appx. [g]	Strand AWG
						1%	6%		
Tolerance (resistance)		± 5	%	Room temperature	BWD250200K01R0901SI	4	8	1200	16
Temperature coefficient	TK	20 ... 100	$10^{-6}/\text{K}$		BWD250390K01R0901SI	4	8	1200	16
Insulation resistance	R_{ISO}	≥ 100	$\text{M}\Omega$	$U_{\text{mess}} = 1,000 \text{ VDC}$	BWD500072K01R1002SI	7.5	15	1500	16
Inductance	L	≤ 30	μH	$f = 300 \text{ kHz}, U_{\text{mess}} = 50 \text{ mV}$	BWD500150K01R0901SI	7.5	15	1500	16
Capacity against enclosure	C	≤ 300	pF	$f = 300 \text{ kHz}, U_{\text{mess}} = 50 \text{ mV}$	BWD600047K01R1401SI	13	26	2500	14
Certifications	cCSAus			Standard CSA-C22.2 and UL508	BWD600080K01R1001SI	13	26	2500	14
	cURus			Standard CSA-C22.2 and UL508	BWD600150K02R1003SI	26	52	3600	14
Maximum permissible operating voltage	U_B	$\leq 700 \text{ AC V}$	V	Taking into consideration the „intrinsic safety“ ² according to CSA					
		$\leq 1,000 \text{ DC V}$	V						
		$\leq 600 \text{ AC V}$	V						
		$\leq 848 \text{ DC V}$	V						
Isolation voltage	U_{iso}	$\geq 4,000 \text{ AC V}$	V	$f = 50 \text{ Hz}; t = 1 \text{ s}$					
Max. permissible case temp. ϑ_C		≤ 250	$^\circ\text{C}$	unobstructed convection					
Storage temperature	ϑ_S	-25 ... +85	$^\circ\text{C}$						

Installation dimensions and mounting-holes (mm)

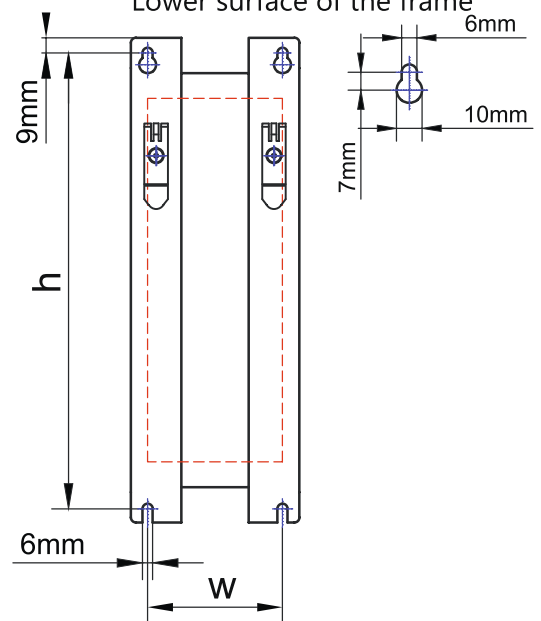
Upper surface of the frame



Side view

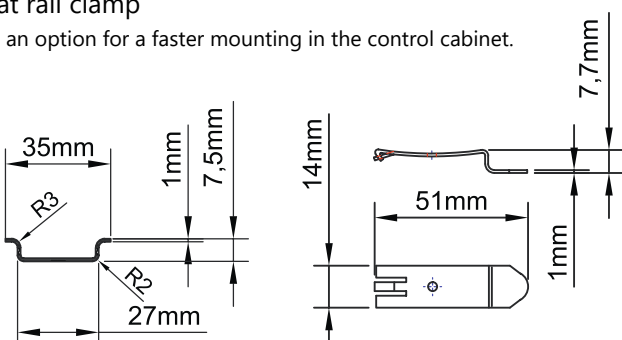


Lower surface of the frame



Hat rail clamp

As an option for a faster mounting in the control cabinet.



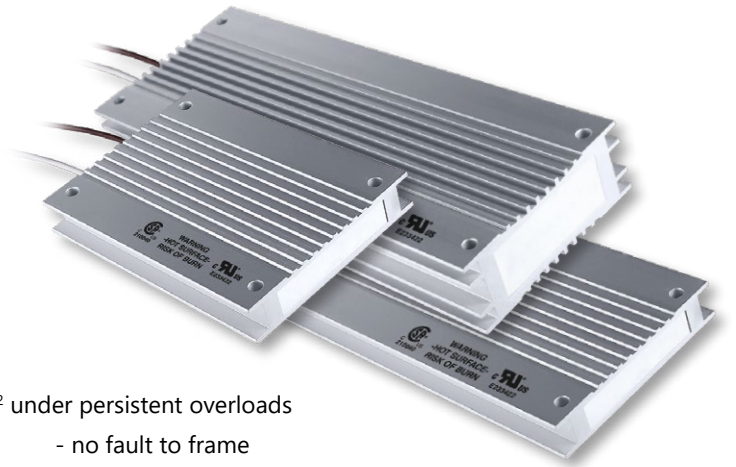
Dimension table

Frame				Mounting dimensions		
FS	H	W	D	FS	h	w
A	283	90	45	A	266	70
B _{G120C}	288	100	60	B _{G120C}	271	80
B _{PM240-2}	337	100	60	B _{PM240-2}	320	80
C	399	140	60	C	382	120

strand length from the end of the brake resistor approx. 500 mm
strand length from the lower edge of the subframe approx. 475 mm

Safe brake resistors with lateral attachment for PM240-2 and G120C

To install a brake resistor next to the inverter in a control cabinet, it is also necessary to mount the resistor in a compact and space-saving way. With the help of a simple mounting bracket, KOCH brake resistors meet all these demands.

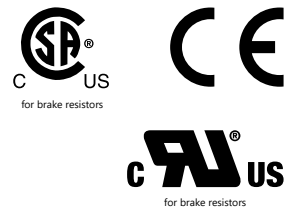


Advantages

- > compact
- > space saving
- > protection class up to IP 65¹
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing

Allocation – Safe brake resistor with lateral attachment for Siemens SINAMICS PM240-2/G120C products

SINAMICS products 6SL...	nominal voltage	Frame-size	Rated Power	KOCH number	max Power kW 5% duty-cycle ³
PM240-2 - Information to PM240-2 form: Installation manual, 12/2015, A5E33294624A AD					
6SL3210-1PB13-XXXX	200-240	A	0.55	BWD250200WE	1.50
6SL3210-1PB13-XXXX	200-240	A	0.75	BWD250200WE	1.50
6SL3210-1PB15-XXXX	200-240	B	1.1	BWD500072WE	2.75
6SL3210-1PB17-XXXX	200-240	B	1.5	BWD500072WE	2.75
6SL3210-1PB21-XXXX	200-240	B	2.2	BWD500072WE	2.75
6SL3210-1PB21-XXXX	200-240	C	3.0	BWD600047WE	4.00
6SL3210-1PB21-XXXX	200-240	C	4.0	BWD600047WE	4.00
6SL3210-1PC22-XXXX	200-240	C	5.5	BWD600047WE	4.00
6SL3210-1PC22-XXXX	200-240	C	7.5	BWD600047WE	4.00
6SL3210-1PE11-XXXX	400	A	0.55	BWD250390WE	1.50
6SL3210-1PE12-XXXX	400	A	0.75	BWD250390WE	1.50
6SL3210-1PE13-XXXX	400	A	1.1	BWD250390WE	1.50
6SL3210-1PE14-XXXX	400	A	1.5	BWD250390WE	1.50
6SL3210-1PE16-XXXX	400	A	2.2	BWD500150WE	2.75
6SL3210-1PE18-XXXX	400	A	3.0	BWD500150WE	2.75
6SL3210-1PE21-XXXX	400	B	4.0	BWD600080WE	4.00
6SL3210-1PE21-XXXX	400	B	5.5	BWD600080WE	4.00
6SL3210-1PE21-XXXX	400	B	7.5	BWD600080WE	4.00
G120C - Information to G120C from: Operating manual, 01/2016, FW V4.7 SP6, A5E34263257A AD					
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6SL3210-1KE12-XXXX	400	A	0.75	BWD250390WE	1.50
6SL3210-1KE13-XXXX	400	A	1.1	BWD250390WE	1.50
6SL3210-1KE14-XXXX	400	A	1.5	BWD250390WE	1.50
6SL3210-1KE15-XXXX	400	A	2.2	BWD500150WE	2.75
6SL3210-1KE17-XXXX	400	A	3.0	BWD500150WE	2.75
6SL3210-1KE18-XXXX	400	A	4.0	BWD500150WE	2.75
6SL3210-1KE21-XXXX	400	B	5.5	BWD600080WE	4.00
6SL3210-1KE21-XXXX	400	B	7.5	BWD600080WE	4.00



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.

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³ at an ambient temperature of 20°C

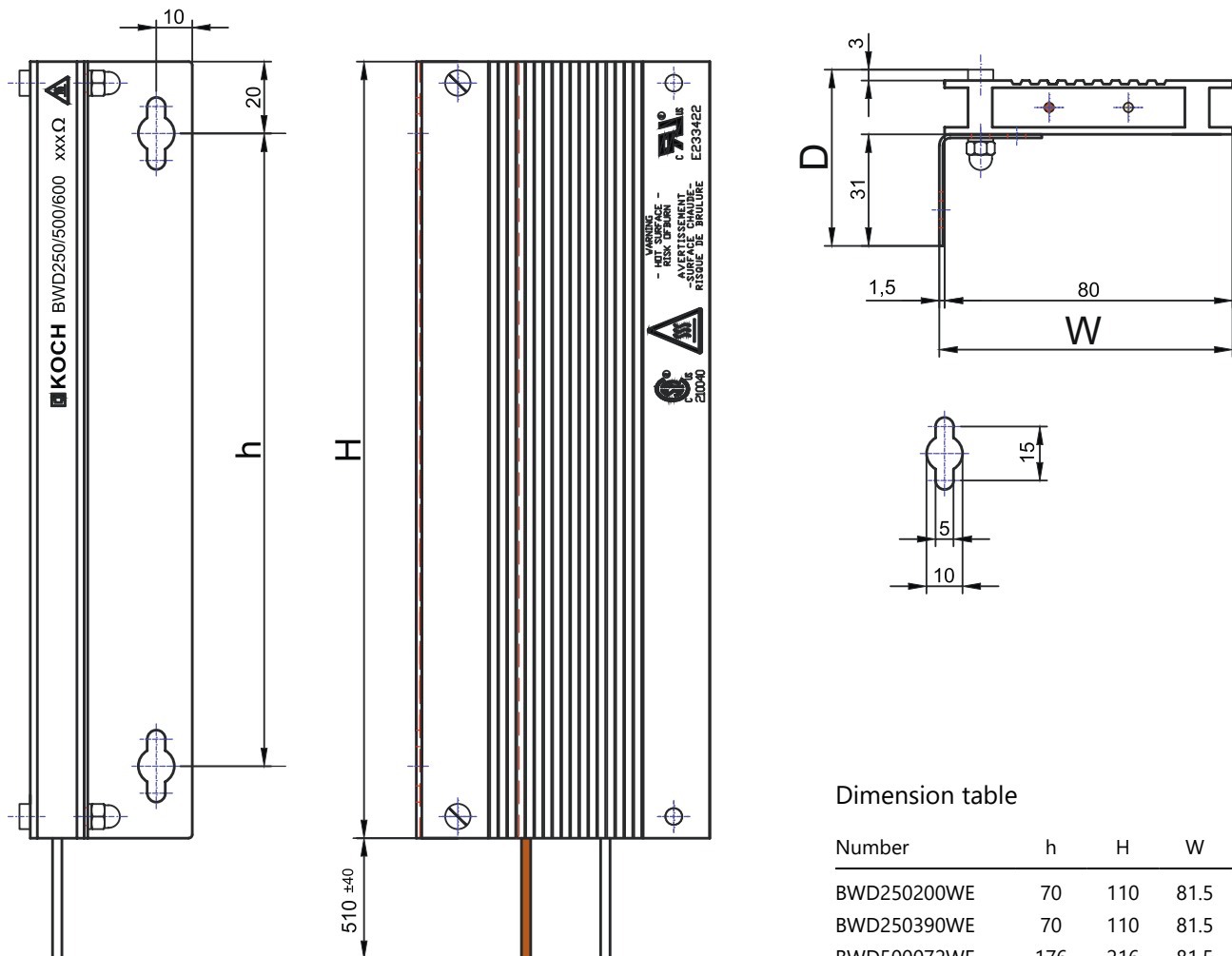
Technical data for all resistor types

($\vartheta_A = 20^\circ\text{C}$, unless otherwise stated)

(Individual Parameter)

Parameter	Symbol	Value	Unit	Conditions	Number	Energy [kJ]		Weight appx. [g]	Strand AWG
						1%	6%		
Tolerance (resistance)		± 5	%	Room temperature	without bracket				
Temperature coefficient	TK	20 ... 100	$10^{-6}/\text{K}$		BWD250200	4	8	280	16
Insulation resistance	R_{ISO}	≥ 100	$\text{M}\Omega$	$U_{\text{mess}} = 1,000 \text{ VDC}$	BWD250390	4	8	280	16
Inductance	L	≤ 30	μH	$f = 300 \text{ kHz}, U_{\text{mess}} = 50 \text{ mV}$	BWD500072	7.5	15	550	16
Capacity against enclosure	C	≤ 300	pF	$f = 300 \text{ kHz}, U_{\text{mess}} = 50 \text{ mV}$	BWD500150	7.5	15	550	16
Certifications	cCSAus			Standard CSA-C22.2 and UL508	BWD600047	13	26	1050	14
	cURus			Standard CSA-C22.2 and UL508	BWD600080	13	26	1050	14
Maximum permissible operating voltage	U_B	$\leq 700 \text{ AC}$	V	Taking into consideration the „intrinsic safety“ ² according to CSA	with bracket				
		$\leq 1,000 \text{ DC}$	V		BWD250200WE	4	8	300	16
		$\leq 600 \text{ AC}$	V		BWD250390WE	4	8	300	16
		$\leq 848 \text{ DC}$	V		BWD500072WE	7.5	15	600	16
Isolation voltage	U_{iso}	$\geq 4,000 \text{ AC}$	V	$f = 50 \text{ Hz}; t = 1 \text{ s}$	BWD500150WE	7.5	15	600	16
Max. permissible case temp.	ϑ_C	≤ 250	$^\circ\text{C}$	unobstructed convection	BWD600047WE	13	26	1100	14
Storage temperature	ϑ_S	-25 ... +85	$^\circ\text{C}$		BWD600080WE	13	26	1100	14

Installation dimensions and mounting-holes (mm)

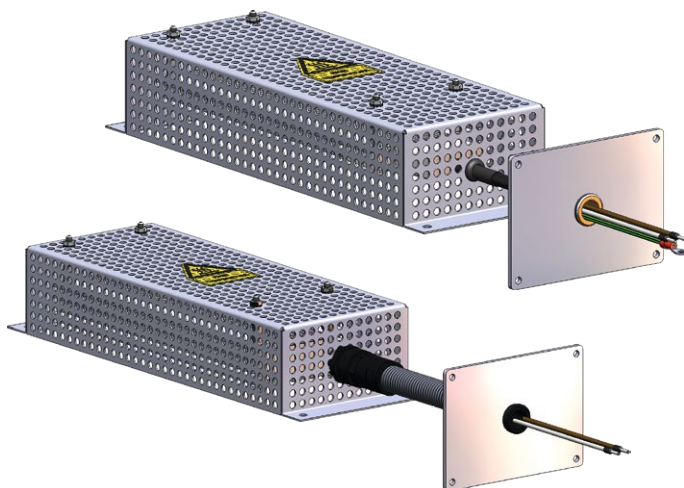


Dimension table

Number	h	H	W	D
BWD250200WE	70	110	81.5	49
BWD250390WE	70	110	81.5	49
BWD500072WE	176	216	81.5	49
BWD500150WE	176	216	81.5	49
BWD600047WE	176	216	81.5	64
BWD600080WE	176	216	81.5	64

Brake resistors for SINAMICS G110M products by Siemens

The decentral inverter with a high protection class (up to IP66) is built in a modular way, consists of a control unit and power module, and is designed for use as a motor-integrated inverter on SIMOGEAR gearmotor. A safe brake resistor that meets comparable requirements is best suited for these special demands. KOCH has also created a fitting solution here. Whether the inverter is equipped with an option such as a maintenance switch or a 24V power supply, or it is used without such an option, the external brake resistors can be connected easily and without hassle.



Advantages

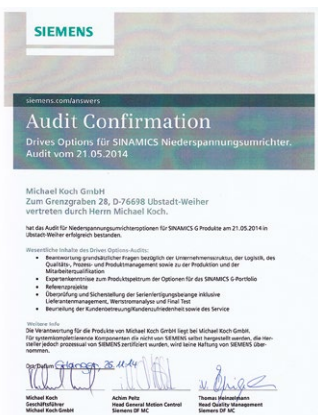
- > compact
- > protection class up to IP 65¹
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing



Allocation – Safe brake resistor with lateral attachment for Siemens SINAMICS G110M products

SINAMICS products	KOCH number	Execution	max Power kW 5% duty-cycle ³	Ohm value	nominal power [W]
Version with protection tube					
FSA	BWD600200K01SI-1	Without locking plate	4	200	240
FSB	BWD600080K01SI-1	Without locking plate	4	80	240
FSA	BWD600200K01SI-2	With locking plate	4	200	240
FSB	BWD600080K01SI-2	With locking plate	4	80	240
Version with shielded cable					
FSA	BWG600200K01SI-3	Without locking plate	4	200	240
FSB	BWG600080K01SI-3	Without locking plate	4	80	240
FSA	BWG600200K01SI-4	With locking plate	4	200	240
FSB	BWG600080K01SI-4	With locking plate	4	80	240

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.
³ 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.
⁴ at an ambient temperature of 20°C



Siemens Audit Confirmation

Michael Koch GmbH successfully passed the Siemens audit for low-voltage converters for SINAMICS G products on May 21, 2014 and was awarded the Siemens Audit Confirmation.

For more information to KOCH's safe brake resistors visit www.brakeenergy.com.

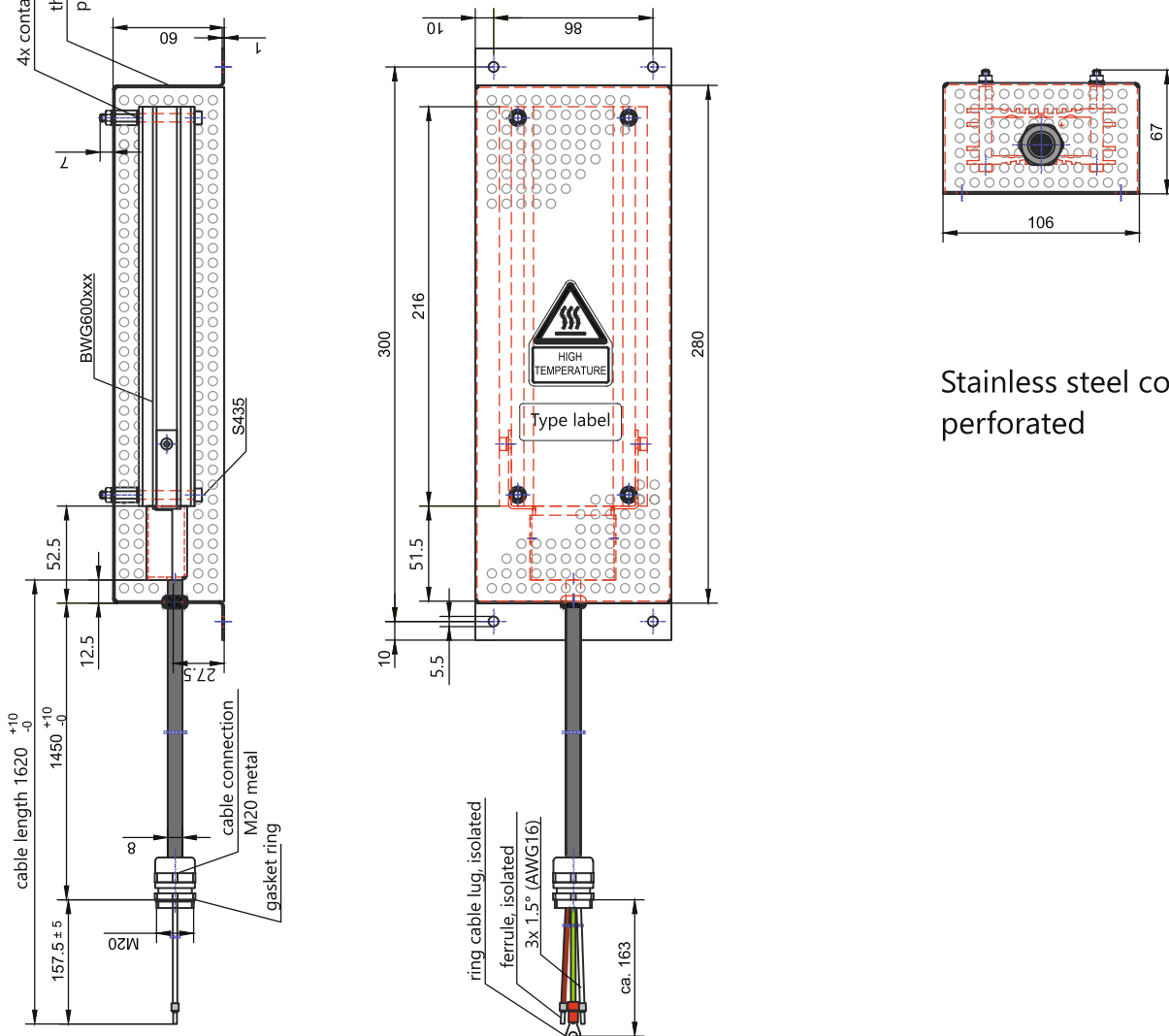
<https://bremsenergie.de/en/service/download-area/partner>

Technical data for all resistor types

($\vartheta_A = 20^\circ\text{C}$, unless otherwise stated)

Parameter	Symbol	Value	Unit	Conditions
Tolerance (resistance)		± 5	%	Room temperature
Temperature coefficient	TK	20 ... 100	$10^{-6}/\text{K}$	
Insulation resistance	R_{ISO}	≥ 100	$\text{M}\Omega$	$U_{\text{mess}} = 1,000 \text{ VDC}$
Inductance	L	≤ 30	μH	$f = 300 \text{ kHz}$, $U_{\text{mess}} = 50 \text{ mV}$
Capacity against enclosure	C	≤ 300	pF	$f = 300 \text{ kHz}$, $U_{\text{mess}} = 50 \text{ mV}$
Certifications	cCSAus			Standard CSA-C22.2 and UL508
	cURus			Standard CSA-C22.2 and UL508
Maximum permissible operating voltage	U_B	$\leq 700 \text{ AC}$	V	Taking into consideration the „intrinsic safety“ ² according to CSA
		$\leq 1,000 \text{ DC}$	V	
		$\leq 600 \text{ AC}$	V	
		$\leq 848 \text{ DC}$	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
Storage temperature	ϑ_s	-25 ... +85	$^\circ\text{C}$	

Installation dimensions and mounting-holes (mm)
Example of version with shielded cable



Stainless steel cover
perforated

Brake resistors for Sinamics V90 products by Siemens

The servo inverter Sinamics V90 is intended for use with applications for dynamic motion and processing.

The V90 already contains an integrated brake resistor. Nonetheless, some applications require an external brake resistor. KOCH offers safe brake resistors that are ideal for this purpose. They safely dissipate the generative electrical energy and thereby considerably improve the brake and delay capacities.



Advantages

- > compact
- > space saving
- > protection class up to IP 65¹
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing



Allocation - Brake resistors for SINAMICS V90

Voltage	Size	Resistor	max. power [kW]	Rated power [W]	max. Energy [kJ]	KOCH number	Resistor	max Power kW 5% duty-cycle ³	nominal power [W]
1 phase 200VAC - 240VAC	FSA (0.1 - 0.2kW)	150	1.09	20	0.8	BWD250150	150	1.5	100
	FSB (0.4kW)	100	1.64	21	1.23	BWD250100	100	1.5	100
	FSC	50	3.28	62	2.46	BWD500050	50	2.75	200
3 phase 200VAC - 240VAC	FSD (1kW)	50	3.28	62	2.46	BWD500050	50	2.75	200
	FSD (1.5 - 2kW)	25	6.56	123	4.92	BWD600027	27	4	240
3 phase 380VAC - 480VAC	FSAA	533	1.2	30	2.4	BWD250530	533	1.5	100
	FSA	160	4	100	8.0	BWD500160	160	2.75	200
	FSB	70	9.1	229	18.3	BWD600072	72	4	240
	FSC	27	23.7	1185	189.6	BWD600100K03LV	33.3	12	1200

Information on the partner program for drives options can be found at [Siemens.com](https://www.siemens.com).

<https://new.siemens.com/global/en/company/topic-areas/partners/product-partners-industry.html>



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.
³ at an ambient temperature of 20°C

Safe brake resistors for SINAMICS G110D products by Siemens

Decentral drive technology requires special solutions. The inverters must be adapted to the prevailing environmental conditions and must reliably fulfil their tasks. KOCH offers fitting brake resistors with a high protection class. KOCH is also capable of meeting specific requirements at any time. The solution shown here has a wave hose, which was needed as insect protection for an airport project. KOCH offers many other customer-specific solutions.



Advantages

- > compact
- > protection class up to IP 65¹
- > highly impulse secure
- > low inductance
- > „intrinsically safe“² under persistent overloads
 - no short-circuit
 - no fault to frame
 - self-extinguishing



Allocation – Braking resistors with lateral attachment to Siemens SINAMICS G110D products

SINAMICS products	nominal voltage	frame size	min/max power (HO - LO)	distance above/below	KOCH number	max Power kW 5% duty-cycle ³	Ohm value	nominal power [W]
G110D	400	A	0.75 - 3.0	100	BWD250390HSI	1.50	390	100
G110D	400	B	4.0	100	BWD500160HSI	2.75	160	200
G110D	400	C	5.5 - 7.5	100	BWD600080HSI	4.00	80	240

Technical data for all resistor types

(General parameters, see table page 11 at the top)

(Individual Parameter)

Number	Energy [kJ]		Weight appx. [g]
	1%	6%	
BWD250390HSI	4	8	1100
BWD500160HSI	7.5	15	1300
BWD600080HSI	13	26	1800

Dimension table

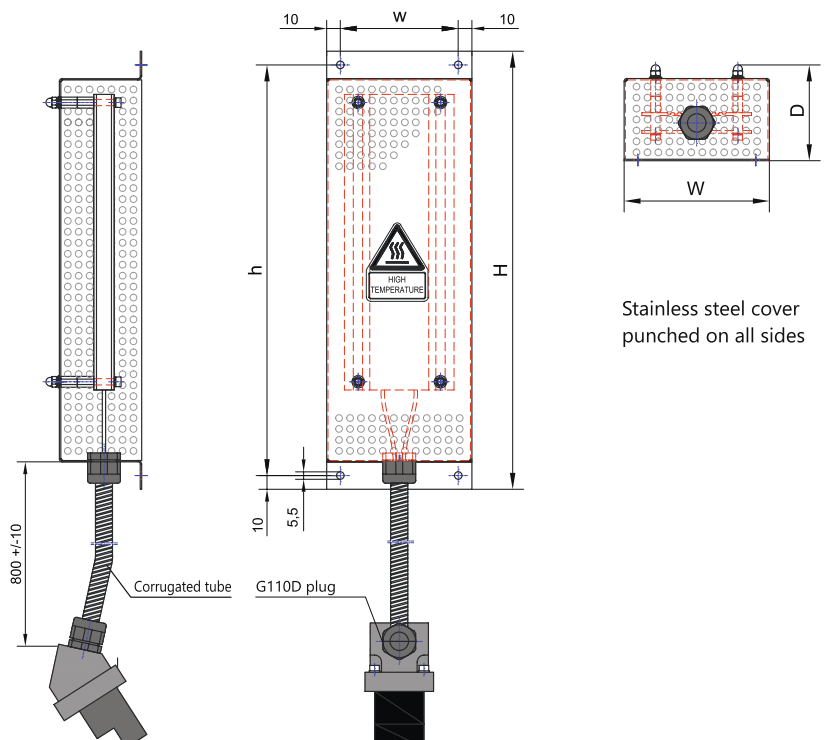
Number	H	W	D	h	w
BWD250390HSI	320	106	70	300	86
BWD500160HSI	320	106	70	300	86
BWD600080HSI	320	106	70	300	86

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.

³ at an ambient temperature of 20°C

Installation dimensions and mounting-holes (mm)



What we offer:

- Tested product quality
- Certified processes
- Individual application support
- Machine specific design and sizing
- Rapid reaction
- Quick delivery times
- On-time delivery
- Reliable partner
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- Direct customer relations

Use our communication channels:



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- Active energy management devices and systems
- Safe brake resistors

We look forward to hearing from you!



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www.brakeenergy.com, mail@bremsenergie.de

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