mayr®

your reliable partner

DC voltage modules

mayr® – DC Voltage Modules

versatile – reliable – intelligent

Wide product range for diverse tasks

❒ **Supplying**
Half-wave rectifiers, bridge rectifiers and ROBA®-switch fast acting rectifiers supply mayr®safety brakes with DC coil nominal voltage or overexcitation voltage for high tightening forces and short switching times or with reduced holding voltage for lowest energy consumption.

❒ **Monitoring**
ROBA®-brake-checker modules allow permanent brake monitoring through the sensorless monitoring of the brake condition.

❒ **Controlling / Regulating**
ROBA®-torqcontrol controls the spring force - and therefore also the braking torque of safety brakes - via coil voltage and coil current.

❒ **Safe controlling**
The safe brake control unit ROBA®-SBCplus can control and monitor two brakes and fulfills the highest requirements for personal protection.

❒ **Protecting**
The spark quenching unit reduces the switch-off voltage and the wear on contacts.

The optimum control unit for different consumers

mayr DC voltage modules harmonize perfectly with electromagnetic ROBATIC®clutches and ROBA®-quick brakes, with ROBA®-takt clutch-brake combinations and ROBA-stop®safety brakes. In addition, they can also be used with solenoids, valves or DC magnetic coils.

Your Advantages:

- ❒ 40 years of experience in development and application in-house
- ❒ Highest torques and short switching times through overexcitation
- ❒ Minimum energy consumption through voltage reduction
- ❒ Low-self-heating, long service lifetime
- ❒ Voltage is maintained constantly in spite of variations in input voltage
- ❒ UL / CSA - certified
- ❒ EMC-conform – resistant to interference
- ❒ partly with integrated protection circuit

Intelligent safety

ROBA®-brake-checker
Sensorless monitoring of
❒ Switching condition
❒ Wear
❒ Critical coil temperatures and
❒ Malfunctions

Cost-effective alternative to microswitches and proximity switches

Low downtimes and costs through highest system availability
❒ No sporadic failures as is the case with mechanical switches
❒ No risks due to freezing or dirt
❒ No risk of incorrect signals
❒ No risk of cable breakage

mayr® – DC Voltage Modules

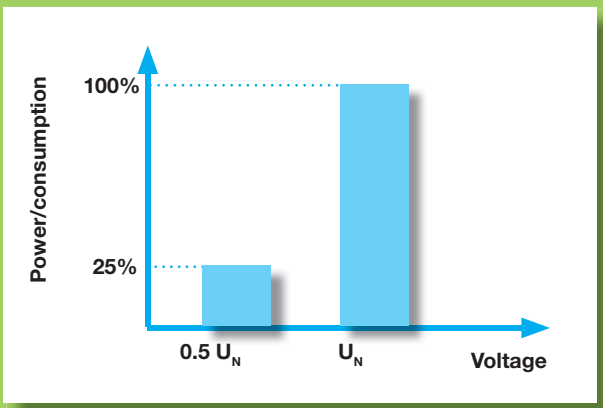
Optimum system solutions for DC consumers

Minimum energy consumption

↓

Power reduction

- ❒ Safety brakes are released with nominal voltage
- ❒ Brakes are held open with 1/2 the nominal voltage
- ❒ Power consumption 25 % of nominal power
- ❒ Energy savings of 75 %

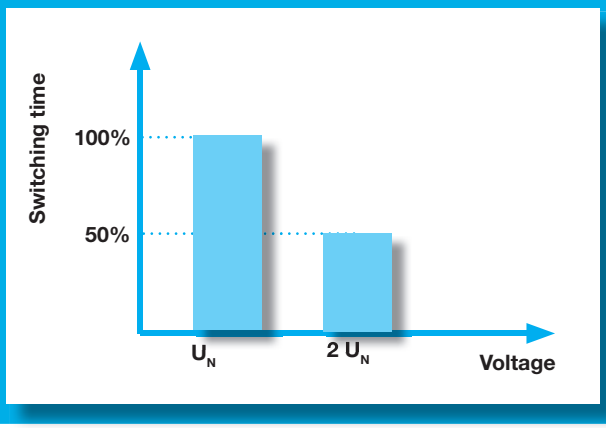


Maximum performance density

↓

Overexcitation

- ❒ Release of safety brakes with double the nominal voltage
- ❒ Maximum attraction forces
- ❒ Minimum switching times



Control units for all mains network voltages worldwide

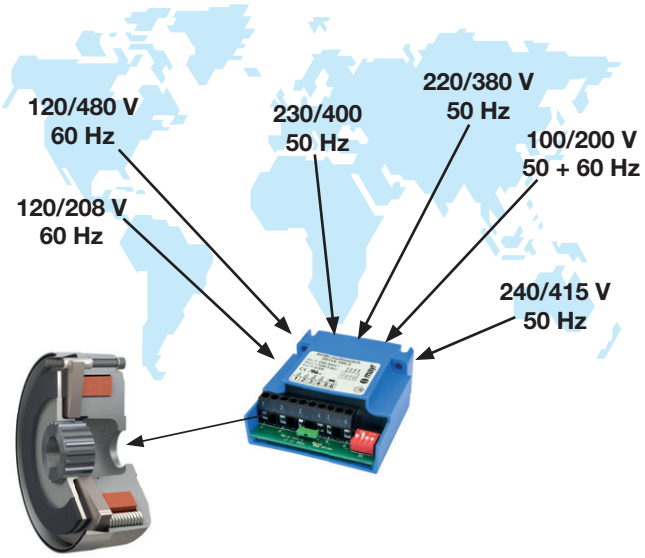
Variable input voltage – Constant output voltage

ROBA®-multiswitch

A fixed coil voltage independent of the mains network voltage.

For you, this means:

- ❒ Worldwide application of *mayr*®-brakes or other DC voltage consumers with uniform coil voltages.
- ❒ Mains voltage fluctuations have no influence on the system behaviour.
- ❒ No risk of coil failures due to incorrect connection voltages.



Supplying — Protecting — Monitoring — Checking

Electronic mayr® – DC Voltage Modules for Safety brakes

Function	Supplying						Protecting
Module	Type 024.000.6 Half-wave rectifier	Type 025.000.6 Bridge rectifier	Type 017._00.2 ROBA®-switch	Type 017.110.2 ROBA®-switch	Type 018.100.2 ROBA®-switch 24V	Type 019._00.2 ROBA®-multiswitch	Type 070.000.6 Spark quenching unit
Catalogue page	Page 6	Page 6	Page 7	Page 8	Page 9	Page 10	Page 11
Overexcitation / Power reduction			X	X	X	X	
DC-side disconnection				X	X		
Mains/input voltage	up to 600 VAC	up to 230 VAC	100 to 500 VAC	100 to 500 VAC	24 VDC	100 to 275 VAC 200 to 500 VAC	Max. 300 VDC
Output voltage/ Overexcitation voltage	up to 270 VDC dependent on the mains voltage VDC = 0.45 x VAC	up to 207 VDC dependent on the mains voltage VDC = 0.9 x VAC	90 to 450 VDC dependent on the mains voltage VDC = 0.9 x VAC	90 to 450 VDC dependent on the mains voltage VDC = 0.9 x VAC	24 VDC	90 VDC (Size 10) 180 VDC (Size 20) constant / independent of the mains voltage	
Nominal voltages			45 to 225 VDC dependent on the mains voltage VDC = 0.45 x VAC	45 to 225 VDC dependent on the mains voltage VDC = 0.45 x VAC	6 VDC 8 VDC 12 VDC 16 VDC	52 VDC (Size 10) 104 VDC (Size 20) constant / independent of the mains voltage	
Switching times			0.05 to 2 s	0.05 to 2 s	0.15 s / 0.45 s / 1 s, 1.5 s / 2.15 s	0.15 s / 0.45 s / 1 s, 1.5 s / 2 s	
Output current	4.0 A	2.5 A	3.0 A (at 250 VAC)	1.5 A	5.0 A	2.0 A (Size 10) 4.5 A (Size 20)	
Characteristics / Application	Standard application Compact construction	Standard application, preferred for noise-damped brakes Compact construction	Short separation time	Short separation time and short connection time	Short separation time and short connection time no wear on contacts	Short separation time Consistently controlled output voltage with variable input voltage	Reduces switch-off voltage and wear on contacts

Monitoring		Monitoring and Supplying			Checking / Controlling and Monitoring	Safe control and monitoring
Type 058.600.2 ROBA®-brake-checker DC Page 12	Type 059.500.2 ROBA®-brake-checker AC Page 13	Type 028.100.2 ROBA®-brake-checker plus DC Page 14	Type 028.600.2 ROBA®-brake-checker plus DC Page 15	Type 029.700.2 ROBA®-brake-checker plus AC Page 16	Type 068.200.2 ROBA®-torqcontrol DC Page 17	Type 021.100.2 ROBA®-SBCplus Page 18
		X	X	X	X	X
		X	X		X	X
Max. 50 VDC	Max. 207 VDC [1] Max. 432 VDC [1]	24 VDC (Size 2) 48 VDC (Size 4)	24 VDC	200 to 480 VAC	24 VDC or 48 VDC	24 VDC or 48 VDC
dependent on the supply	dependet on supply [1]	24 VDC (Size 2) 48 VDC (Size 4)	24 VDC	104 / 52 VDC 207 / 104 VDC 185 / 104 VDC 360 / 185 VDC	24 VDC or 48 VDC	24 VDC or 48 VDC
dependent on the supply	dependet on supply [1]	4 / 6 / 8 / 12 / 16 VDC (Size 2) 8 / 12 / 16 / 24 / 32 VDC (Size 4) constant / independent of the supply voltage	4 / 12 / 16 VDC further voltages available on request	52 VDC 104 VDC 185 VDC	4/6/8/12/16 VDC (24 VDC) 8/12/16/24/32 VDC (48 VDC) constant / independent of the supply voltage	6 VDC 8 VDC 12 VDC 16 VDC 24 VDC 32 VDC
		adapted to brake specifications	adapted to brake specifications	adapted to brake specifications	adapted to brake specifications	0.1 s to 2.5 s
10 A	3.5 A	10.0 A (Size 2) 5.0 A (Size 4)	5.0 A	2.0 A	10.0 A (24 VDC) 5.0 A (48 VDC)	24 VDC/2x5.5 A 48 VDC/2x2.75 A
integrated release and drop-out recognition Brake status display preventative function monitoring	integrated release and drop-out recognition Brake status display preventative function monitoring 1) Supply with half-wave rectifier, bridge rectifier oqqr ROBA®-switch not via ROBA®-multiswitch	integrated release and drop-out recognition Brake status display short separation time and short connection time no wear on contacts preventative function monitoring	integrated release and drop-out recognition Brake status display short separation time and short connection time no wear on contacts preventative function monitoring	integrated release and drop-out recognition Brake status display short separation time and short connection time preventative function monitoring	Setting of spring force and braking torque Integrated release and drop-out recognition Brake status display Short separation time and short connection time No wear on contacts	Controlling and monitoring up to two ROBA-stop® safety brakes , particularly in applications with requirements on personal protection according to standards on Functional Safety such as for example ISO 13849 and IEC 62061

Half-wave and bridge rectifiers / Type 02_.000.6

Application

Rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA-quick®, ROBATIC®), electromagnets, electrovalves, contactors, switch-on safe DC motors, etc.

Function

The AC input voltage (VAC) is rectified (VDC) in order to operate DC voltage units. Also, voltage peaks, which occur when switching off inductive loads and which may cause damage to insulation and contacts, are limited and the contact load reduced.

Electrical Connection (Terminals)

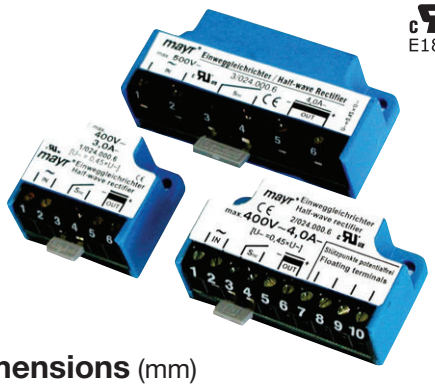
1 + 2 Input voltage
3 + 4 Connection for an external switch for DC-side switching
5 + 6 Coil
7 – 10 Free nc terminals (only for Size 2)

Order Number

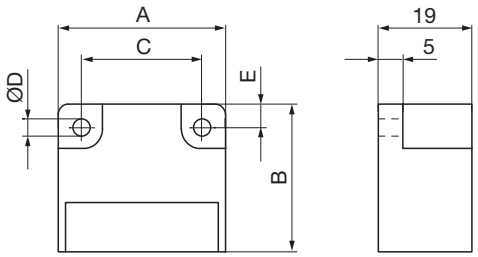
__ / 0 2 __ . 0 0 0 . 6

Size	
1 to 4	

4	Half-wave rectifier
5	Bridge rectifier



Dimensions (mm)



Size	A	B	C	ØD	E
1	34	30	25	3.5	4.5
2	54	30	44	4.5	5.0
3/4	64	30	54	4.5	5.0

Accessories: Mounting bracket set for 35 mm mounting rail acc. EN 60715, Article No. 1803201.

Technical Data

	Bridge rectifier		Half-wave rectifier			
Calculation output voltage	VDC = VAC x 0.9		VDC = VAC x 0.45			
Type	**1/025**	**2/025**	**1/024**	**2/024**	**3/024**	**4/024**
Max. input voltage	230 VAC	230 VAC	400 VAC	400 VAC	500 VAC	600 VAC
Max. output voltage	207 VDC	207 VDC	180 VDC	180 VDC	225 VDC	270 VDC
Output current at ≤ 50°C	2.5 A	2.5 A	3.0 A	4.0 A	4.0 A	4.0 A
Output current at max. 85 °C	1.7 A	1.7 A	1.8	2.4 A	2.4 A	2.4 A
Max. coil capacity at 115 VAC ≤ 50 °C	260 W	260 W	-	-	-	-
Max. coil capacity at 115 VAC up to 85 °C	177 W	177 W	-	-	-	-
Max. coil capacity at 230 VAC ≤ 50 °C	517 W	517 W	312 W	416 W	416 W	416 W
Max. coil capacity at 230 VAC up to 85 °C	352 W	352 W	187 W	250 W	250 W	250 W
Max. coil capacity at 400 VAC ≤ 50 °C	-	-	540 W	720 W	720 W	720 W
Max. coil capacity at 400 VAC up to 85 °C	-	-	324 W	432 W	432 W	432 W
Max. coil capacity at 500 VAC ≤ 50 °C	-	-	-	-	900 W	900 W
Max. coil capacity at 500 VAC up to 85 °C	-	-	-	-	540 W	540 W
Max. coil capacity at 600 VAC ≤ 50 °C	-	-	-	-	-	1080 W
max. coilistung bei 600 VAC up to 85 °C	-	-	-	-	-	648 W
Peak reverse voltage	1600 V	1600 V	2000 V	1600 V	2000 V	2000 V
Rated insulation voltage	320 VRMS	320 V_{RMS}	500 V_{RMS}	500 V_{RMS}	630 V_{RMS}	630 V_{RMS}
Pollution degree (insulation coordination)	1	1	1	1	1	1
Device fuses	To be included in the input feed line.					
Recommended microfuse switching capacity H The microfuse corresponds to the max. possible connection capacity. If fuses are used corresponding to the actual capacities, the permitted limit integral I^2t must be observed on selection.	FF 3.15A	FF 3.15A	FF 4A	FF 5A	FF 5A	FF 5A
Permitted limit integral I^2t	40 A^2s	40 A^2s	50 A^2s	100 A^2s	50 A^2s	50 A^2s
Protection	IP65 components, encapsulated / IP20 terminals					
Terminals	Cross-section 0.14 - 1.5 mm^2 (AWG 26-14)					
Ambient temperature	- 25 °C up to +85 °C					
Storage temperature	- 25 °C up to +105 °C					
Conformity markings	UL, CE	UL, CE	UL, CE	UL, CE	UL, CE	CE
Installation conditions	The installation position can be user-defined. Please ensure sufficient heat dissipation and air convection! Do not install near to sources of intense heat!					

ROBA®-switch / Type 017._00.2

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017._00.2

- Consumer operation with overexcitation or power reduction
- Input voltage: 100 - 500 VAC
- Maximum output current: 3 A at 250 VAC
- UL-approved

Function

The ROBA®-switch is used for operation at an input voltage of between 100 and 500 VAC, depending on the size. It can switch internally from bridge rectification output voltage to half-wave rectification output voltage. The bridge rectification time can be modified from 0.05 to 2 seconds by exchanging the external resistor (R_{ext}).

Electrical Connection (Terminals)

1 + 2 Input voltage (fitted protective varistor)
3 + 4 Connection for external contact for DC-side switch-off
5 + 6 Output voltage (fitted protective varistor)
7 + 8 R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP10 R_{ext}
Terminal nom. cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

ROBA®-switch Sizes, Table 1

	Size			
	Type 017.000.2		Type 017.100.2	
	10	20	10	20
Input voltage VAC ± 10 %	100 - 250	200 - 500	100 - 250	200 - 500
Output voltage VDC, U_{bridge}	90 - 225	180 - 450	90 - 225	180 - 450
Output voltage VDC, $U_{half\text{-}wave}$	45 - 113	90 - 225	45 - 113	90 - 225
Output current I_{RMS} at ≤ 45 °C, (A)	2.0	1.8	3.0	2.0
Output current I_{RMS} at max. 70 °C, (A)	1.0	0.9	1.5	1.0
Conformity markings	c UL us, CE	c UL us up to 300 V, CE	c UL us, CE	c UL us, CE

Order Number

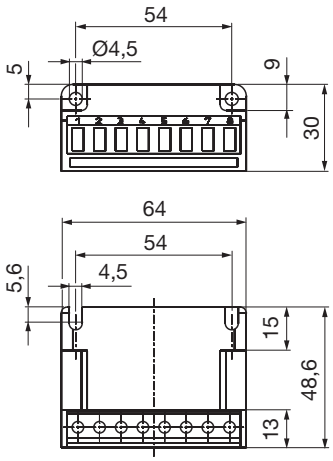
__ / 0 1 7 . __ 0 0 . 2

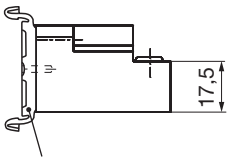
Size		UL-approved	
10		0	up to 300 V
20		1	up to 500 V

c UL us E189728 CE

Dimensions (mm)

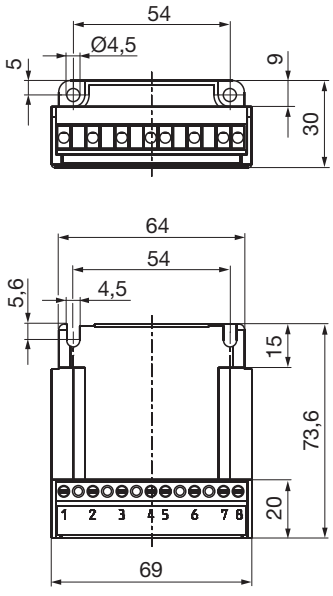
Type 017.000.2

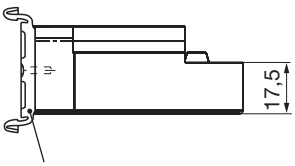




Accessories:
Mounting bracket set for
35 mm mounting rail acc. EN 60715
Article No. 1802911

Type 017.100.2





Accessories:
Mounting bracket set for
35 mm mounting rail acc. EN 60715
Article No. 1802911

ROBA®-switch / Type 017.110.2

Application

ROBA®-switch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-switch 017.110.2

- Integrated automatic DC-side disconnection (shorter connection time)
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 - 500 VAC
- Maximum output current: 1.5 A
- UL-approved

E189728

The ROBA®-switch with integrated automatic DC-side disconnection is not suitable for being the only safety disconnection in applications!

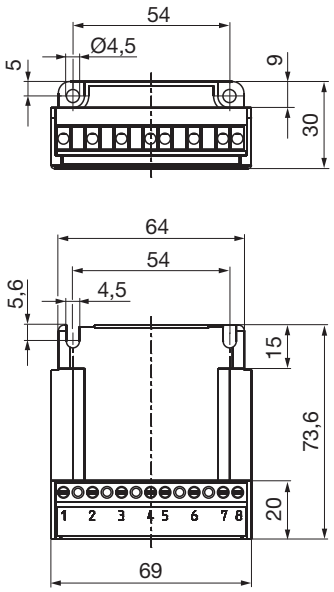
Function

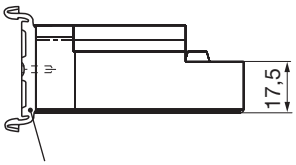
The ROBA®-switch is used for operation at an input voltage of between 100 and 500 VAC, depending on the size. It can switch internally from bridge rectification output voltage to half-wave rectification output voltage. The bridge rectification time can be modified from 0.05 to 2 seconds by exchanging the external resistor.

In addition, the ROBA®-switch features integrated automatic DC-side disconnection. In contrast to the usual DC-side disconnection, no further protective measures or external components are required. The DC-side disconnection is activated as a standard measure (terminals 3 and 4 are not wired) and causes short switching times on the electromagnetic consumer.

The integrated automatic DC-side disconnection is deactivated by fitting a bridge between the terminals 3 and 4, and the coil is deenergised via the freewheeling diode. This has the advantages of gentler braking actions and quieter switching noise. However, this substantially lengthens the switching times (approx. 6 – 10 times).

Dimensions (mm)





Accessories:
Mounting bracket set for
35 mm mounting rail acc. EN 60715
Article No. 1802911

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Switching between DC and AC-side disconnection
5 + 6	Output voltage (fitted protective varistor)
7 + 8	R_{ext} for bridge rectification time adjustment

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminal, IP10 R_{ext}
Terminal nom. cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

ROBA®-switch Sizes, Table 1

	Size	
	10	20
Input voltage VAC ± 10 %	100 - 250	200 - 500
Output voltage VDC, U_{bridge}	90 - 225	180 - 450
Output voltage VDC, $U_{half\text{-}wave}$	45 - 113	90 - 225
Output current I_{RMS} at ≤ 45 °C, (A)	1.5	1.5
Output current I_{RMS} at max. 70 °C, (A)	0.75	0.75
Conformity markings	cULus CE	cULus CE

Order number

__	/	0	1	7	.	1	1	0	.	2

△

Size
10
20

ROBA®-switch 24V / Type 018.100.2

Application

ROBA®-switch 24V fast switching modules are used to operate DC consumers with overexcitation or power reduction, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®), electromagnets, electrovalves, etc.

Fast switching module ROBA®-switch 24V 018.100.2

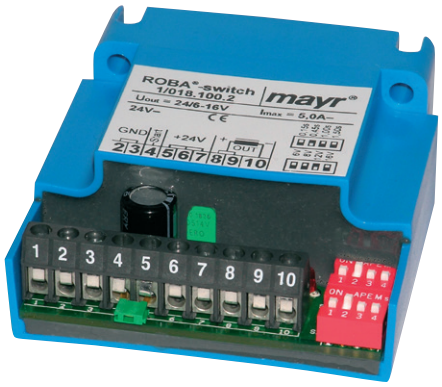
- Consumer operation with overexcitation or power reduction
- integrated automatic DC-side disconnection (shorter connection time t_1)
- Input voltage: 24 VDC
- maximum output current: 5 A

The ROBA®-switch 24V with integrated automatic DC-side disconnection is not suitable for being the only safety disconnection in applications!

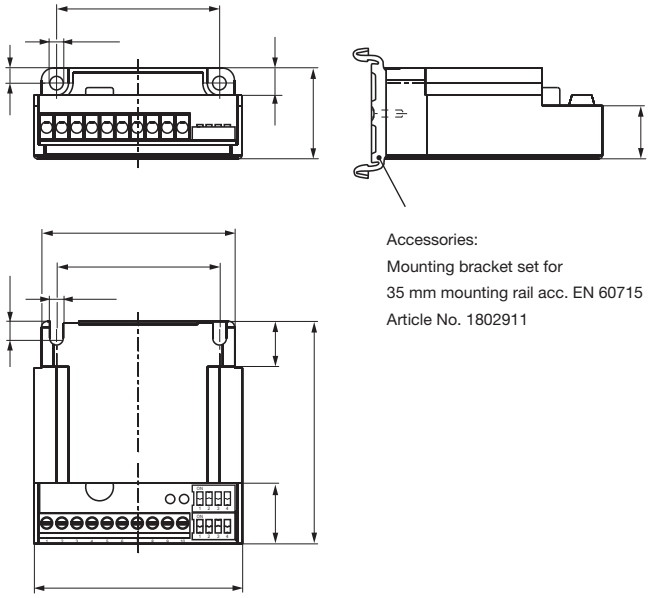
The ROBA®-switch 24V units are used for an input voltage of 24 VDC. They can switch internally, meaning that the output voltage switches to holding voltage from the input voltage (=overexcitation voltage) via pulse-width modulation using 20 kHz. The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2.15 s. The holding voltage can be adjusted via a further DIP switch to ¼, ⅓, ½ and ⅔ of the input voltage (equals 6 V, 8 V, 12 V and 16 V at an input voltage of 24 V).

In addition, the ROBA®-switch 24V features integrated automatic DC-side disconnection. In contrast to the usual DC-side disconnection, no further protective measures or external components are required. The DC-side disconnection is activated in standard mode and causes short switching times on the electromagnetic consumer. This can, however, be deactivated by installing a bridge between terminals 7 and 8 in order to produce soft brakings and quieter switching noises. However, this substantially lengthens the switching times (approx. 6 – 10 times).

c UL us E189728 CE



Dimensions (mm)



Accessories:
Mounting bracket set for
35 mm mounting rail acc. EN 60715
Article No. 1802911

Electrical Connection (Terminals)

2 + 3	Input voltage, ground
4	Control input
5 – 7	Input voltage +24 VDC
8 + 9	Output voltage +
10	Output voltage -

Technical Data

Input voltage U_I	24 VDC +20 % / -10 % SELV/PELV
Output voltage U_O	Input voltage U_I
Output voltage U_H	¼, ⅓, ½, ⅔ x U_I ± 20 %
Output current I_{RMS} at ≤ 45 °C	5.0 A
Output current I_{RMS} at max. 70 °C	2.5 A
Protection	IP00
Terminal nominal cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

Order number

__	/	0	1	8	.	1	0	0	.	2

△

Size
1

ROBA®-multiswitch / Type 019.100.2

Application

ROBA®-multiswitch fast acting rectifiers are used to connect DC consumers to alternating voltage supplies, for example electromagnetic brakes and clutches (ROBA-stop®, ROBA®-quick, ROBATIC®) as well as electromagnets, electrovalves, etc.

Fast acting rectifier ROBA®-multiswitch 019.100.2

- Consistently controlled output voltage in the entire input voltage range
- Consumer operation with overexcitation or power reduction
- Input voltage: 100 - 500 VAC
- Maximum output current: 2 A

ROBA®-multiswitch units are not suitable for all applications, e.g. use of the ROBA®-multiswitch when operating noise-damped brakes is not possible without taking additional measures. The product's suitability should be checked before use.

Function

The ROBA®-multiswitch is (dependent on size) used for operation at an input voltage of between 100 and 500 VAC, depending on the size. After switch-on, it emits the rectified bridge voltage for 50 ms and then control the 90 or 180 VDC overexcitation voltages. After the overexcitation time, they control the 52 or 104 VDC holding voltages. The overexcitation time can be adjusted via a DIP switch to 150 ms, 450 ms, 1 s, 1.5 s and 2 s.

Electrical Connection (Terminals)

1 + 2	Input voltage (fitted protective varistor)
3 + 4	Connection for external contact for DC-side switch-off
5 + 6	Output voltage (fitted protective varistor)

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals
Terminal nom. cross-section	1.5 mm² (AWG 22-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

Order number

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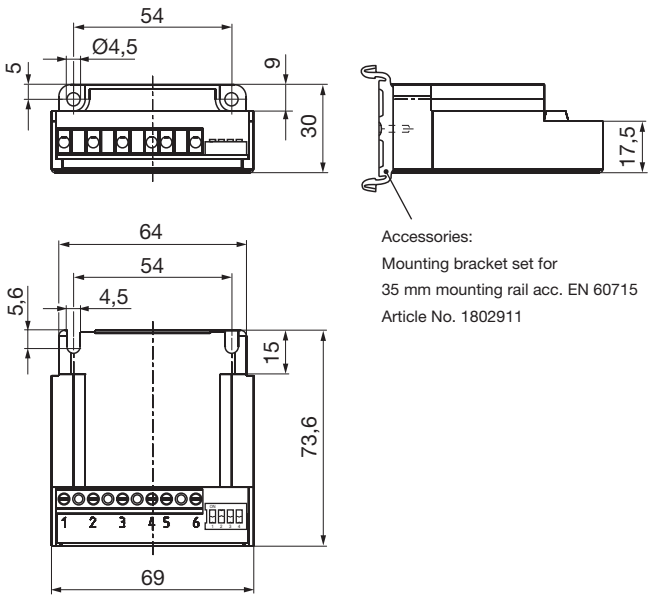
△

Size
10
20

Dimensions (mm)



Accessories:
Mounting bracket set for
35 mm mounting rail acc. EN 60715
Article No. 1802911

ROBA®-multiswitch Sizes, Table 1

	Size	
	10	20
Input voltage VAC ± 10 % acc. EN 50160	100 - 275	200 - 500
Frequency input voltage Hz	50 - 60	50 - 60
Output voltage U_O VDC ± 10 %	90	180
Output voltage U_H VDC ± 10 %	52	104
Output current I_{RMS} at ≤ 45 °C ADC	2.0	2.0
Output current I_{RMS} at max. 70 °C ADC	1.0	1.0
Conformity markings	c UL us E189728 CE	

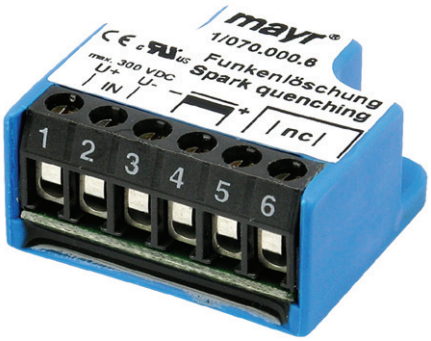
Spark Quenching Unit / Type 070.000.6

Application

Reduces spark production on the switching contacts occurring during DC-side switch-off of inductive loads.

- Voltage limitation according to VDE0580 2000-07, Item 4.6.
- Reduction of EMC-disturbance by voltage rise limitation, suppression of switching flanks.
- Reduction of brake engagement times by a factor of 2-4 compared to freewheeling diodes.

E189728



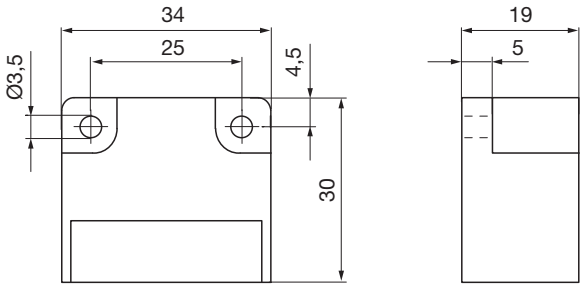
Function

The spark quenching unit will absorb voltage peaks resulting from inductive load switching, which can cause damage to insulation and contacts. It limits these to 70 V and reduces the contact load. Switching products with a contact opening distance of >3 mm are suitable for this purpose.

Electrical Connection (Terminals)

1 (+) Input voltage
2 (–) Input voltage
3 (–) Coil
4 (+) Coil
5 Free nc terminal
6 Free nc terminal

Dimensions (mm)



Technical Data

Input voltage	max. 300 VDC, max. 615 V_{peak} (rectified voltage 400 VAC, 50/60 Hz)
Switch-off energy	max. 9J/2 ms
Power dissipation	max. 0.1 Watt
Rated voltage	
nc terminal	250 V
Protection	IP65 / IP20 terminals
Ambient temperature	-25 °C up to +85 °C
Storage temperature	-25 °C up to +105 °C
Max. conductor cross-section	2.5 mm² / AWG 26-12
Max. terminal tightening torque	0.5 Nm

Accessories

Mounting bracket set for 35 mm mounting rail acc. EN60715: Article No. 1803201

Order number

__ / 0 7 0 . 0 0 0 . 6
▲
Size 1

ROBA®-brake-checker DC / Type 058.600.2

Application

ROBA®-brake-checker DC monitoring modules are used to supply permitted ROBA®-stop safety brakes.
Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible.

Monitoring module ROBA®-brake-checker DC

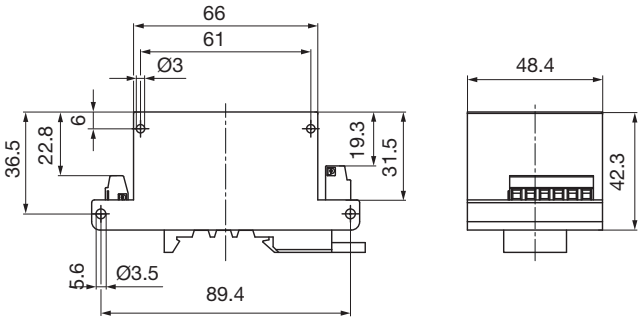
- Fast or slow disconnection
- Preventative function monitoring (wear recognition and error recognition, functional reserve)
- Armature disk motion recognition (release and drop-out recognition)
- Continuous drop-out recognition
- Maximum output current I_{RMS} = 10 A
- Safe monitoring of the switching times (optional)
- Electrical isolation on the output channels

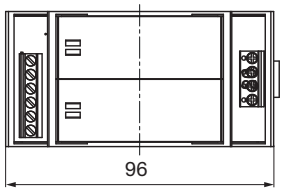
c UL us E189728 CE

Function

The ROBA®-brake-checker DC monitoring module is intended for use with an input voltage of 24/48 VDC. The monitoring module monitors the movement of the armature disk and emits the determined switching condition via control terminal (signal output).
Critical conditions (line breakages, wear, excess temperature) can be recognised and the respective signal can be emitted via control terminal (error output).

Dimensions (mm)





Technical Data				Size 2
Supply voltage Control terminal		U_I	[VDC]	24 (SELV/PELV) (18 – 32)
Coil current	maximum	I_{max}	[A]	15
	at ≤45 °C	I_{RMS}	[A]	10
	at ≤60 °C	I_{RMS}	[A]	8 c UL us E189728
	at ≤70 °C	I_{RMS}	[A]	8 CE
Coil voltage maximum		U_{max}	[VDC]	50
Conformity markings				c UL us CE
Protection				IP20

Order Number

__	/	0	5	8	.	6	0	0	.	2
△										
2										

ROBA®-brake-checker AC / Type 059.500.2

Application

ROBA®-brake-checker plus AC monitoring modules are used to supply permitted ROBA®-stop safety brakes.
Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible.

Monitoring module ROBA®-brake-checker AC

- Sensorless and contactless detection of switching statuses
- Preventative function monitoring (wear recognition and error recognition, functional reserve)
- Brake condition recognition (release and drop-out recognition of the armature disk)
- Continuous drop-out recognition
- Simple installation or retrofitting
- Electrical isolation on the output channels
- Maximum current I_{max} = 3.5 A

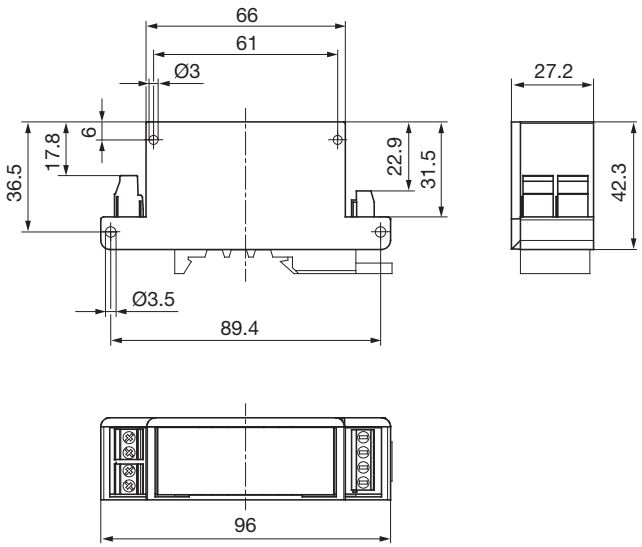
c UL us E189728 CE

Function

The ROBA®-brake-checker AC monitoring module is designed for the connection to half-wave or bridge rectifiers or to fast acting rectifiers based on half-wave or bridge rectification which are supplied with alternating voltage (50/60 Hz).

The module is switched between the rectifier and the brake and it monitors the movement of the armature disk. The determined switching condition is emitted via control terminal 3 (output signal). Critical conditions (line breakages, wear) can be recognised and the respective signal can be emitted via control terminal 4 (output error).

Dimensions (mm)



Technical data				Size 20
Supply voltage Control terminal		U_i	[VDC]	24 (SELV/PELV) (19 – 28)
Coil current	max.	I_{max}	[A]	3.5
	at ≤ 45 °C	I_{RMS}	[A]	3.5
	at ≤ 70 °C	I_{RMS}	[A]	3
Conformity markings				c UL us CE
Protection				IP20

Order Number

__	/	0	5	9	.	5	0	0	.	2
▲										
Size 20										

ROBA®-brake-checker plus DC / Type 028.100.2

Application

ROBA®-brake-checker monitoring and supply modules are used to operate DC consumers.
Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible.

Monitoring module ROBA®-brake-checker 028.100.2

- Consumer operation with overexcitation and/or power reduction
- Controlled output voltage (on reduction)
- Simple adjustment of holding voltage and overexcitation time via a DIP switch
- Fast or slow disconnection
- Armature disk condition recognition (release and drop-out recognition)
- Wear recognition and error recognition
- Wide input voltage range
- Maximum output current I_{RMS} = 10 A / 5 A
- Maximum overexcitation current I_O = 20 A / 10 A
- Automatic reduction to holding voltage U_H
- Electrical isolation of power terminal and control terminal

CAUTION

The ROBA®-brake-checker with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

Function

The ROBA®-brake-checker plus DC monitoring and supply module is intended for use with an input voltage of 24 or 48 VDC. The module monitors the movement of the armature disk and emits the determined switching condition via control terminal 3 (signal output). Critical conditions (line breakages, wear) can be recognised and the respective signal can be emitted via control terminal 7 (error output).
After a brake-specific overexcitation time period, the integrated voltage reduction mechanism mode adjusts to the pre-set reduction voltage. The voltage reduction mechanism mode can be switched off using a DIP switch.

In case of switched-off voltage reduction mechanism mode, the overexcitation time can be adjusted manually to 150 ms, 450 ms, 1 s, 1.5 s, and 2 s using the DIP switch.

Electrical Connection (Terminals)

Power terminal

1	Supply voltage +24 VDC / +48 VDC
2	Output voltage +
3	Output voltage -
4	Supply voltage 0 VDC

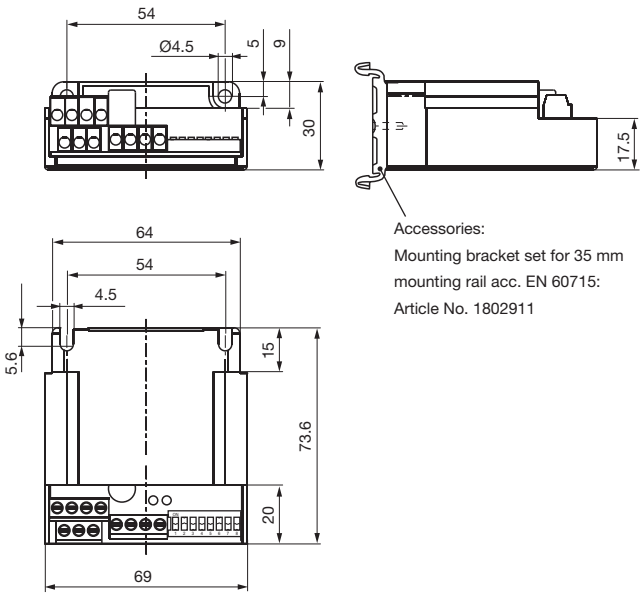
Signal Terminal

1	Supply voltage 0 VDC
2	Switch-off fast/slow (input)
3	Signal output (release monitoring)
4	24 V (auxiliary power supply for bridging)
5	Supply voltage +24 VDC
6	Start (input)
7	Error output max. 300 mA

Technical Data

Input voltage	see Table 1
Output voltage	see Table 1
Protection	IP65 components, IP20 terminals, IP20 DIP switch
Terminal nominal cross-section	
Power terminals	4 mm², (AWG 20-12)
Signal terminals	1.5 mm², (AWG 30-14)
Ambient temperature	-25 °C up to +70 °C
Storage temperature	-40 °C up to +105 °C

Dimensions (mm)



Accessories:
Mounting bracket set for 35 mm mounting rail acc. EN 60715:
Article No. 1802911

ROBA®-brake-checker Sizes, Table 1

				Size 2 24 VDC		Size 4 48 VDC	
Input voltage, power terminal	SELV/PELV	U_I	[VDC]	18 – 30		42 – 54	
Input voltage, signal terminal		U_I	[VDC]	24 (19 – 28)			
Output voltage	± 5%	U_O	[VDC]	Input voltage U_I			
	± 5%	U_H	[VDC]	6	8	12	16
				12	16	24	32
Output current	at ≤ 45 °C	I_{RMS}	[A]	10.0		5.0	
	at max. 70 °C	I_{RMS}	[A]	5.0		2.5	
Protection				IP20			
Conformity markings				CE		CE	

Order Number

__	/	0	2	8	.	1	0	0	.	2

▲

Size
2
4

ROBA®-brake-checker plus DC / Type 028.600.2

Application

ROBA®-brake-checker plus DC monitoring and supply modules are used to supply permitted ROBA®-stop safety brakes.
Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible.

Monitoring module ROBA®-brake-checker DC

- Consumer operation with overexcitation and/or power reduction
- Controlled output voltage (on reduction)
- Automatic reduction to holding voltage U_H
- Fast or slow disconnection
- Preventative function monitoring (wear recognition and error recognition, functional reserve)
- Armature disk motion recognition (release and drop-out recognition)
- Continuous drop-out recognition
- Maximum output current I_{RMS} = 5 A
- Maximum overexcitation current I_O = 16 A
- Safe monitoring of the switching times (optional)

E189728

CAUTION

The ROBA®-brake-checker with integrated DC-side disconnection is not suitable for being the only safety disconnection in applications!

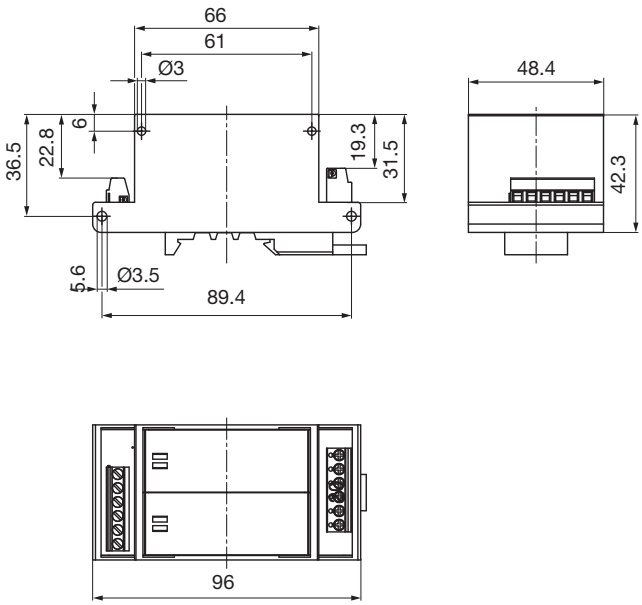
Function

The ROBA®-brake-checker plus DC monitoring and supply module is intended for use with an input voltage of 24 VDC. The monitoring module monitors the movement of the armature disk and emits the determined switching condition via control terminal (signal output). Critical conditions (line breakages, wear, excess temperature) can be recognised and the respective signal can be emitted via control terminal (error output).

It is possible to select between fast and slow disconnection via the input F/S on the control terminal.

Louder switching noises are generated on the brakes in case of fast switch-off than in case of slow switch-off.

Dimensions (mm)



Technical data

Input voltage power terminal	SELV/PELV,	U_I	[VDC]	24 (18 - 32)
Output voltage	± 5%	U_O	[VDC]	0.99 × U_I
		U_H	[VDC]	4, 6, 8, 12, 16, 20, 24
Output current	at ≤ 45 °C	I_{RMS}	[A]	5
	at max. 70 °C	I_{RMS}	[A]	2.5
Conformity markings				
Protection				IP20

Order Number

__	/	0	2	8	.	6	0	0	.	2

ROBA®-brake-checker plus AC / Type 029.700.2

Application

ROBA®-brake-checker plus AC monitoring and supply modules are used to connect permitted ROBA®-stop safety brakes to AC voltage.
Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible.

Monitoring and supply module ROBA®-brake-checker plus AC

- Consistently controlled output voltage in the entire input voltage range
- Consumer operation with overexcitation or power reduction
- Input voltage: 200 – 480 VAC
- Supply voltage with 50 or 60 Hz
- Max. output current I_{RMS}: 2 A
- Sensorless and contactless detection of switching statuses
- Motion recognition of the brake (release and drop-out recognition of the armature disk)
- Preventative function monitoring (wear recognition and error recognition, functional reserve)
- Continuous drop-out recognition
- Simple installation or retrofitting
- Electrical isolation on the output channels

CAUTION

The ROBA®-brake-checker cannot be used in all applications (e.g. when operating noise-damped brakes, it cannot be used without additional measures). The product's suitability should be checked before use.

Function

The ROBA®-brake-checker monitoring and supply module is intended for use with an input voltage from 200 up to 480 VAC. The module supplies the connected brakes and regulates to a permanently programmed overexcitation voltage. After the overexcitation time ends, it regulates to the permanently programmed holding voltage.

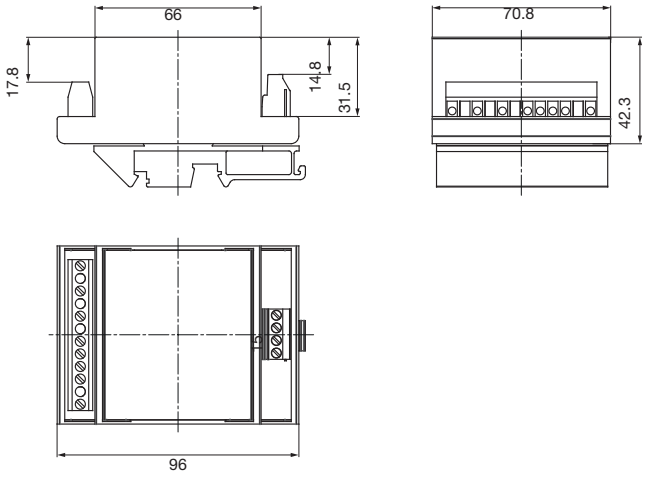
The overexcitation time is set automatically.
The module monitors the movement of the armature disk and emits the determined switching condition via control terminal 2 (signal output).
Critical conditions (line breakages, wear) can be recognised and the respective signal can be emitted via control terminal 3 (error output).

Order Number

__ / 0 2 9 . 7 0 0 . 2
△
Size 20

E189728

Dimensions (mm)



Technical Data					
Brake nominal voltage				104 VDC	180/ 207 VDC
Supply voltage, power terminal		U_I	[VAC]	200 – 480 / 320 [1]	
Input voltage, control terminal		U_I	[VDC]	24 (SELV/PELV) (7 – 30)	
Output voltage Reduction		U_O	[VDC]	104	207 [2]
		U_H	[VDC]	52	104
Output voltage Overexcitation		U_O	[VDC]	185	360 [2]
		U_H	[VDC]	104	185 [2]
Output current	at ≤ 45 °C	I_{RMS}	[A]	2	
	at ≤ 60 °C	I_{RMS}	[A]	1 c UL us	
	at ≤ 70 °C	I_{RMS}	[A]	1 CE	
Protection				IP20	
Conformity markings				CE c UL us	

1) CSA-C22.2 No. 14-18

2) Approx. 0.9 × U_I (supply voltage, power terminal)

ROBA®-torqcontrol / Type 068.200.2

Application

ROBA®-torqcontrol monitoring modules are used to supply, monitor and control released ROBA-stop® safety brakes. Motion monitoring of the armature disk for released ROBA-stop® safety brakes is possible without a sensor.

Monitoring module ROBA®-torqcontrol 068.200.2

- Consumer operation with overexcitation and/or power reduction
- Controlled output voltage (on reduction)
- Simple adjustment of holding voltage and overexcitation time via a DIP switch
- Fast or slow disconnection
- Armature disk condition recognition (release and drop-out recognition)
- Preventative function monitoring (wear and error detection)
  - warning is provided regarding critical conditions before it becomes impossible to operate the brake, for example due to wear
  ➲ Analogue OUT
- Control of the resulting brake rotor clamping force for adaptation of the braking torque
- Extensive input voltage range (24….48 VDC)
- Max. output current I (10….5 A)
- Maximum overexcitation current I_O (20….10 A)
- Automatic reduction to holding voltage U_H
- Electrical isolation between power terminal and control terminal

Power Terminal (7-pole)

20		+ Input voltage ($24^{\pm 20\ \%}$ - $48^{+10/-20\ \%}$ VDC)
21		+ Output voltage
22		External NO contact 1
23		not assigned
24		External NO contact 2
25		- Output voltage
26		- Input voltage (ground)

CAUTION

The ROBA®-torqcontrol with integrated DC-side disconnection, release monitoring and torque-control function is not suitable for being the only safety disconnection in applications!

Order Number

	/	0	6	8	.	2	0	0	.	2
▲										
Size 2										

Example:
Order number 2 / 068.200.2

Control terminal (13-pole)

1		Supply voltage 0 VDC
2	Start (input)	The brake is energised via the application of a 24 VDC signal. (24 VDC ➲ ON / 0 VDC ➲ OFF)
3		Supply voltage +24 VDC
4	Fast/slow disconnec-tion (input)	In normal operation, it is possible to change between fast (input = 24 VDC) and slow (input = 0 VDC) disconnection. When operating with torque-control function, however, fast disconnection is mandatory.
5	ERROR (Output)	Error output which is switched in case of problems regarding detection or wear. (24 VDC ➲ no error / 0 VDC ➲ error)
6	TC	Torque-control function ON/OFF
7	SIGNAL (output)	Output signal: Brake condition. (24 VDC ➲ released / 0 VDC ➲ closed)
8	Analogue IN	On activation of the torque-control function, this input can be used to adjust the nominal torque of the brake at an input voltage of 0 – 10 VDC using a potentiometer. **Prerequisites For assignment of signal terminals SPS1 and SPS2 please see Table 1**
9	Analogue OUT	PA (proportional attraction current) and error code
10	SPS1 (Input)	Assignment see Table 1
11	SPS3 (Dynamic Control)	Should the **Dynamic Control** be activated, the condition detection of the armature disk is deactivated when the torque control function is ON. As a result, faster control of the braking torque is possible. (Recommended for the operation of ROBA®-torqcontrol as an actuator in a closed control loop)
12	SPS2 (Input)	Assignment see Table 1
13	RESET	On activating the reset procedure, the ROBA®-torqcontrol restarts, and as a result, all pending signals (ERROR) are deleted.

ROBA®-SBCplus

The safe brake control - for use up to PLe and SIL CL3

Application

The safe brake control ROBA®-SBCplus is used to control and monitor two ROBA-stop® safety brakes, especially in applications, which have to fulfill requirements regarding personal protection according to the standards for functional reliability, such as for example ISO 13849 and IEC 62061.

Characteristics:

- c UL us LISTED
- Applicable up to PLe and SIL CL3, Type examination TÜV Süd (German Technical Inspectorate)
- Safe electronic switching of two brakes
- Input voltage power circuit 24 / 48 VDC
- Connection for up to 2 brakes up to 6.5 A / 24 VDC or 3.25 A / 48 VDC (132 W)
- Output voltage (holding voltage) can be selected as 6,8,12,24,32,48 VDC
  → Power reduction, temperature reduction, electricity costs reduction
- Overexcitation time configurable
- Feedback inputs release monitoring for proximity switch, microswitch or ROBA®-brake-checker DC / Type 058.600.2
- Monitoring for plausibility of the feedback
  → Error diagnostics of the brake
- Status and error outputs for feedback to the control
- No mechanic contacts for controlling and monitoring
  → High reliability, no wear, independent of cycle frequency and cycle rate
- Fast (“DC-side”) or slow (“AC-side”) switch off possible
- Galvanic separation between the control part and the power part
  → Prevention of EMC issues
- Four integrated functions:
  Contactor, 24 VDC fast acting rectifier, safety relay, spark quenching
- Safe holding voltage and overexcitation time
- Safety functions are programmed into the ROBA®-SBCplus and only have to be parameterised
  → Plausibility check integrated and must not be programmed and validated

Maximum switching reliability

The brake control must safely interrupt the current in the magnetic coil on switching off the brake. The ROBA® -SBCplus module works with wear-free electronic semiconductors and thus achieves almost unlimited switching frequencies and switching reliability.

Safe inner configuration

Amongst other things, the internal diagnostics inspections for short circuits, earth short-circuits and line breaks as well as safe overexcitation for releasing the brake and switching to reduced holding voltage when the brake is opened are the components required for “fail-safe” inner configuration.

Numerous safety functions

Numerous safety functions permit comprehensive error diagnostics. The brake voltage is monitored. An excessively high voltage could dangerously extend the drop-out time on switch-off, if, for example, this were to cause a vertical axis to drop to an unpermittedly low level. The monitoring of the switching times, which influence the braking distance, is therefore another component of error diagnostics.

Safe switching condition monitoring

The signal evaluation of the release monitoring with plausibility check permits a switching condition monitoring of the brake. The plausibility is controlled as follows: If voltage is applied, the brake must be opened after a defined time and vice versa. The switching condition monitoring can be used to reliably prevent the drive starting up against a closed brake. In this way, creeping errors, such as gradually increasing wear, which affects the switching times, can be detected.

ROBA®-SBCplus

Type 021.100.2

Technical Data

Electrical connection	
Supply voltage logic	24 VDC -15 % / +20 %
Supply voltage power	24 VDC or 48 VDC -10 % / +20 %
Inputs:	
Safe inputs	4 (Y10 – Y23)
Standard inputs	4 (S35, S36, Y1, Y2)
Monitoring times	30 ms ... 4000 ms
Outputs:	
Supply voltage S11	24 V 0.1 A
Acknowledgement outputs	24 V 0.1 A O3 Fault message O4 Status circuit 1 O5 Status circuit 2
Test pulse outputs	T0, T1, 24 V, 0.1 A
Power outputs	O1, O2
Continuous operation	24 V / 2 x 5.5 A max.
Continuous operation	48 V / 2 x 2.75 A max.
Overexcitation	24 V / 2 x 6.5 A max.
Overexcitation	48 V / 2 x 3.25 A max.

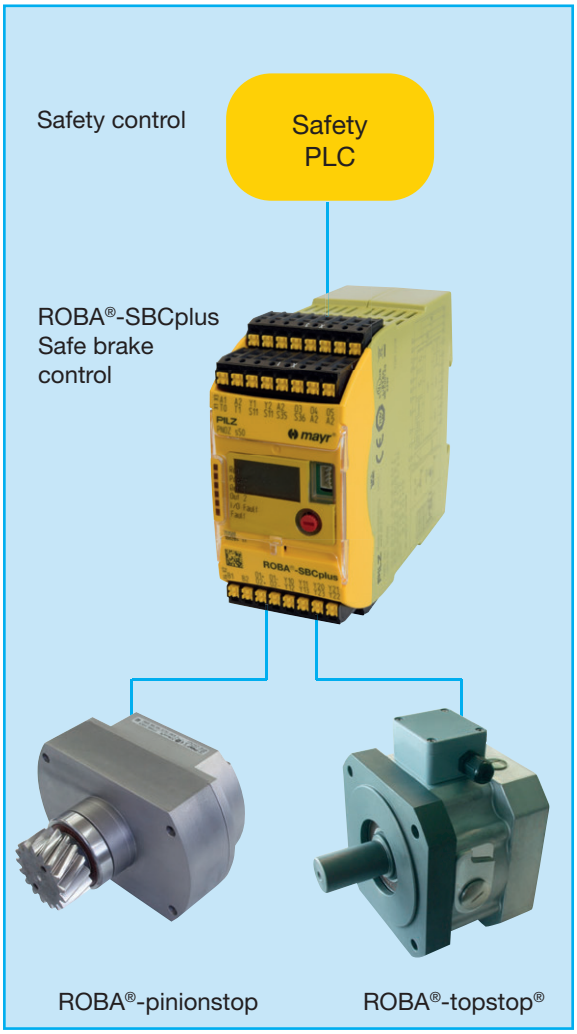
Reduced voltages	6/8/12/16/24/32 V ±10 %
Overexcitation times	100 ms ... 2500 ms
Cycle frequency	4/min max.
Ambient temperature	0 – 45 °C
Protection	IP20
Installation into control cabinet	IP54
Dimension	45×100×120 mm
Connection terminal	0.20 – 2.5 mm², 24 – 12 AWG
Clamping terminals per connection	2

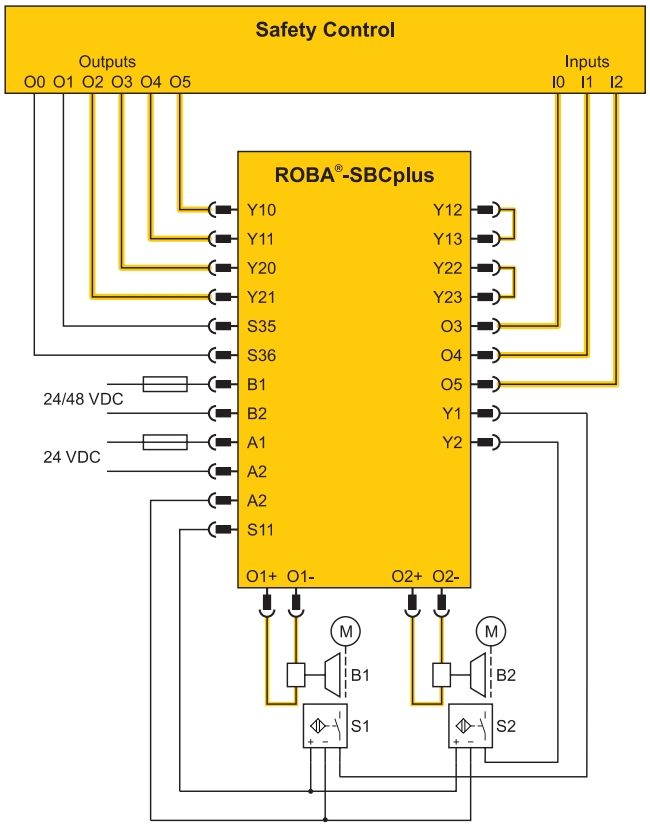
Certification:
Type examination tested by TÜV (German Technical Inspectorate), CE, UL

Parameterisation:

- On delivery, the device is completely parameterised for the respective ROBA-stop® brake
- Only due to the correct parameterisation, a diagnostic coverage DC of 60 % can be assumed for the brake without additional measures via the feedback of the release monitoring signal

Application Example





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