



1-CHANNEL CIRCUIT BREAKERS





CIRCUIT BREAKERS

AREAS OF APPLICATION

Electronic circuit breakers are used for selective protection of DC circuits.

They protect circuits against overcurrents and short circuits with a much higher degree of precision than classic circuit breakers.

PHYSICAL LIMITS FOR CIRCUIT BREAKER USE



GENERAL ADVANTAGES OF BLOCK ELECTRONIC CIRCUIT BREAKERS

- Reliable tripping also for high cable impedances
- Universally suitable due to individually adjustable current per channel

- Remote restart of tripped channels possible
- Inrush current of system is distributed through sequential power-up of the channels

FUNCTION

Electronic circuit breakers are designed for the special behaviour of switched mode power supplies and the DC 24 V loads they supply. They distribute the load current to several circuits and protect loads and wiring even for long cable lengths and small cross-sections.

TRIPPING FUNCTION

The BLOCK electronic circuit breakers are designed for a variety of requirements in machines and devices. Available are two different tripping options.

THE ECONOMICAL OVERCURRENT AND POWER PROTECTION

Electronic circuit breakers with thermomagnetic characteristics provide an economical alternative to conventional circuit breakers. The shutdown function ensures safe tripping even with high line impedance.

ACTIVE CURRENT LIMITING FOR SENSIBLE LOADS

This module actively limits the overcurrent of each circuit to a maximum of 1.7 times the adjusted current. In case of an overcurrent, a selective shutdown occurs for affected circuits only. For non-affected circuits a drop in voltage is reliably avoided.

COMPARISON OF THE TRIPPING CURVES

6 A Economy Smart (Thermomagnetic characteristic)

6 A Circuit breaker (B-characteristic) to 24 V DC

6 A Basic Smart (Active current limiting)





SUBJECT TO CHANGE





Please note

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For classic circuit breakers as well as electronic circuit breakers with thermomagnetic characteristics, a short circuit can cause the DC supply voltage to drop for a few milliseconds until the faulty path shuts down. The severity of the voltage drop is dependent on the line resistance and the overcurrent capability of the feeding power supply. A drop in voltage can be reliably avoided only through active current limiting.



ELECTRONIC 1-CHANNEL CIRCUIT BREAKERS



1-CHANNEL CIRCUIT BREAKER MODULES

Circuit breakers

A range of versions with thermomagnetic or current limiting characteristics. Optionally available with data transfer to other modules for external evaluation and control.

ADDITIONAL MODULES



Communication module

Modbus RTU interface for left-sided arrangement on circuit breakers incl. potential-free signal contacts.



Output distribution module

For right-sided arrangement on circuit breakers. Provides eight further outlets for the channel to be contacted.



Potential collective terminal

Potential collective terminal to feed back the 0 V signal to the power supply as a replacement for the series terminal.

GENERAL ADVANTAGES OF 1-CHANNEL CIRCUIT BREAKERS

- 24Vdc 1-Channel circuit breaker system
- Optional bus connection via communication module
- Optionally with current limiting or thermomagnetic characteristic
- Up to 40 circuit breakers mountable side by side

- Automatic feedthrough of all signal levels
- Optional undervoltage shutdown in combined network
- Additional load outlets through output distribution modules mountable side by side

COMMUNICATION WITH THE CENTRAL CONTROL SYSTEM USING THE COMMUNICATION MODULE



The individual channels can exchange important information and forward this to a connected communication module. The communication module provides this information to a higher-level controller. Information such as the current channel status, including the current presently flowing and the input voltage applied, is therefore easy and quick to access.

SELECTIVE LOAD-DEPENDENT SWITCH-ON

The output channels of the communicating circuit breaker are time-delayed and have a load-dependent connection. As soon as the variable disconnection current of the output channel falls below the required level, the next channel is connected within the shortest possible time. The starting current of the whole device is levelled off, as the power supply must never be overdimensioned.



CIRCUIT BREAKERS

SETTING THE TRIPPING CURRENT

As the first 1-channel circuit breaker, EasyB also offers the option of setting the tripping current via the communication bus. Warehousing facilities can be greatly simplified and a potential error source eliminated during system startup. For series production of machines in particular, the automatic setting of the tripping current also enables a high level of potential savings during system start-up. The digital setting of the tripping current is nonetheless not a necessity. Versions with preset tripping currents or rotary switch are also available.



AUTOMATIC ADDRESSING

The channels are automatically addressed during switch-on by a process developed by BLOCK. An additional and time-consuming working step to manually assign addresses is now a thing of the past – this is particularly an advantage in the event of system standstills and when components need to be replaced quickly.

	1	2	3	4	5		6
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						55	
			55	22			33
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RE	1 1 T	RE of X	RE HIZ	RE 11 X	२ ०		RE 112
14 18						47 - 41	-
-	-	14-	111-	-	n -	-	11.4
BLOCK	BLOCK	BLOCK	BLOCK	BLOCK	BLOCK	BLOCK	BLOCK

Addressing is performed automatically during switch-on

Counting starts to the left at 1

Simplified extension and replacement in comparison to existing solutions

Addressing possible for up to three output distribution modules per channel



TEMPERATURE RANGE

The modules operate in a wide temperature range and are suitable for exceptional loads in harsh industrial environments.

Wide temperature range from -25 to +70°C

Combination of various Circuit Breaker Versions:

The circuit breakers can be arranged as desired. When mixing channels with and without communication interfaces, the function of the group status signal is retained.



ELECTRONIC 1-CHANNEL CIRCUIT BREAKER EB-27

Electronic circuit breaker with thermomagnetic characteristic with alarm signal forwarded for triggered and disabled channels to the connected channels. Starter version for protection of 24V circuits.

FEATURES

Preset tripping currents: 1 - 10A

Thermomagnetic characteristic

Up to 40 fuse channels mountable side by side $% \left({{{\rm{D}}_{\rm{B}}}} \right)$

VERSIONS

SINGLE-C	CHANNEL		
24 Vdc	24 Vdc	24 Vdc	24 Vdc
1 A	2 A	3 A	4 A
24 Vdc	24 Vdc	24 Vdc	
6 A	8 A	10 A	

TRIPPING CHARACTERISTIC



HIGHLIGHTS

COMMON MESSAGE FOR TRIPPED/SWITCHED OFF CHANNELS

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (>40.000 µF)

AUTOMATIC FEEDTHROUGH OF ALL SIGNAL LEVELS

FLEXIBLE ADJUSTMENT TO RESPECTIVE CIRCUMSTANCES

STATUS LED

SECOND LOAD OUTPUT





ELECTRONIC 1-CHANNEL CIRCUIT BREAKER EB-28

Electronic circuit breaker with current limiting characteristic with alarm signal forwarded for triggered and disabled channels to the connected channels. Starter version for protection of 24V circuits if active current limiting is required.

FEATURES

Preset tripping currents: 1 - 10A

Active current limiting

Up to 40 fuse channels mountable side by side

VERSIONS

SINGLE-	CHANNEL		
24Vdc	24 Vdc	24 Vdc	24 Vdc
1A	2 A	3 A	4 A
24 Vdc	24 Vdc	24 Vdc	
6 A	8 A	10 A	

HIGHLIGHTS

COMMON MESSAGE FOR TRIPPED/SWITCHED OFF **CHANNELS**

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (>70.000 µF)

FLEXIBLE ADJUSTMENT TO **RESPECTIVE CIRCUMSTANCES**

STATUS LED

-^ V

SECOND LOAD OUTPUT



TRIPPING CHARACTERISTIC



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GL/UL approval pending

LISTED

PLAN



ELECTRONIC 1-CHANNEL CIRCUIT BREAKER EB-08, EB-18, EB-38

Electronic circuit breaker with current limiting characteristic and comprehensive communication with the connected modules. Suitable as advanced circuit breaker for 24V loads with option of reading more detailed current supply parameters and actively controlling the channels.

FEATURES

EB-08: Tripping currents adjustable via rotary switch or interface: 0,5 - 10 A

EB-18: Preset tripping currents: 1 - 10 A

EB-38: Tripping currents adjustable via interface: 0,5 - 10 A

VERSIONS

SINGLE-C	CHANNEL		
24 Vdc	24 Vdc	24 Vdc	24 Vdc
0.5 A	1 A	2 A	3 A
24 Vdc	24 Vdc	24 Vdc	24 Vdc
4 A	5 A	6 A	8 A
04141			

24 Vdc 10 A



HIGHLIGHTS

COMMON MESSAGE FOR TRIPPED/SWITCHED OFF CHANNELS

COLLECTIVE RESET INPUT

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (>70.000 µF)

AUTOMATIC FEEDTHROUGH OF ALL SIGNAL LEVELS

FLEXIBLE ADJUSTMENT TO RESPECTIVE CIRCUMSTANCES

TRANSMISSION OF ACTUAL OUTPUT CURRENTS

STATUS LED

COLLECTIVE RESET INPUT

TRIPPING CHARACTERISTIC





COMMUNICATION MODU-LE FOR COMMUNICATION CONNECTION

Communication module as interface for connecting a higher-level controller. The communication module is compatible with circuit breakers EB-08, EB-18 und EB-38.

FEATURES

Interface standard: MODBUS RTU

Information gathering and forwarding from up to 40 circuit breaker channels

VERSIONS





HIGHLIGHTS

TRANSMISSION STANDARD RS 485 AND RS 422

INTERNAL TERMINATING RE-SISTORS CAN BE CONNECTED

MODBUS RTU CONFIGURATI-ON VIA DIP SWITCH

ISOLATED SIGNAL CONTACT: CHANNEL CURRENT >90 %

ISOLATED SIGNAL CONTACT: CHANNEL TRIPPED OR SWIT-CHED OFF





ACCESSOIRES



POTENTIAL COLLECTIVE TERMINAL





LABELING



CIRCUIT BREAKERS

DECISION SUPPORT 1-CHANNEL CIRCUIT BREAKER EASYB



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EB-2724-XX0-0	EB-2824-XX0-0	EB-0824-100-0	EB-1824-XX0-0	EB-3824-100-0	
					Thermomagnetic characteristic
					Current limiting 1,25 x tripping current
					Communication interface
					Automatic addressing of channels
					Common reset
					Selective switch-on at Uin > 18 V, load-dependent
					Current detection and display > 90% of tripping current
					Inrush capacity > 40 000 µF
					Inrush capacity $> 70000 \mu\text{F}$
					Preset tripping currents
					Tripping currents adjustable via rotary switch or interface
					Tripping currents adjustable via interface
					Second load output
					Undervoltage switch-off as group
					Undervoltage switch-off on individual basis
					ON/OFF button
					Labeling option
					Coloured status indicator on button
					Common message for tripped/switched off channels
					Lever orange
					Lever red
					Lever blue



MULTICHANNEL CIRCUIT BREAKERS

Communication with the central control system using only two lines



In conjunction with a higher-level control system, the circuit breakers enable any output channel to be actively switched on/off via a digital input and output, tripped circuits to be reset and, at the same time, the reading of current operating and fault states.



Short protocol:

17 bit data – minimum transmission time 1.2 seconds

- Operating states
- = on or off per channel
- Error states
 - = overcurrent or tripped per channel

Extended protocol: 89 bit data –

minimum transmission time 6.3 seconds

Actual input voltage

- Set rated currents per channel
- Actual current per channel (only applies to the BASIC SMART version)

SEQUENTIAL SWITCHING

The power on of integrated output channels is time-delayed and load-dependent. As soon as the adjusted trip current of the output channel falls below, the next channel will be switched on. The inrush current of the whole device is levelled off, as the overdimensioning of the power supply is not necessary.



SLIM DESIGN FREES UP AMPLE CABINET SPACE

The comparison of 8 protected circuits clearly demonstrates the reduced space requirement – a width of only $5.25\,\text{mm}$ per channel for the Power Compact electronic circuit breaker.



COMPARISON OF 8 PROTECTED CIRCUITS

In addition to a range of technical benefits, in many applications, switching to an electronic circuit breaker solution also has economical advantages.

Conventional circuit breakers



BLOCK circuit breakers



* Due to optimised distribution of the inrush

** Without current spikes for tripping of circuit breakers

OPERATING AND CONNECTING ELEMENTS



CIRCUIT PRINCIPLE



TEMPERATURE RANGE

The modules operate in a wide temperature range and are suitable for exceptional loads in harsh industrial environments.

- Device starts at -40°C without any problems
- Wide temperature range from -25 to +70°C
- For currents of up to 6A per channel no temperature derating necessary

PLUG-IN CONNECTION TECHNOLOGY



Some applications require plug-in connection technology. The Smart electronic circuit breakers are also available with plug-in springloaded terminals.

Advantages:

- Pre-wiring of connection cables possible
- Easy galvanic isolation of circuits
- Maintenance-friendly

ECONOMY SMART

ELECTRONIC CIRCUIT BREAKER WITH THERMOMAGNETIC CHARACTERISTIC

Economy Smart circuit breakers with thermomagnetic characteristic provide an economical alternative to conventional circuit breakers. They also ensure reliable tripping even in the event of a high line resistance. This makes the circuit breakers ideal for use in standard machine production.

FEATURES

Adjustable current: 1-6A and 2-10A

Number of output channels: 8/4/2 per circuit breaker

VERSIONS

2 CHANN	EL		
12 Vdc 2 x 2-10 A	24 Vdc 2 x 1-6 A	24 Vdc 2 x 2-10 A	48 Vdc 2 x 2-10 A
	-		
<u>4 CHANN</u>	<u>EL _</u>		
12 Vdc 4 x 2-10 A	24 Vdc 4 x 1-6 A	24 Vdc 4 x 2-10 A	48 Vdc 4 x 2-10 A
8 CHANN	EL		
	24 Vdc 8 x 1-6 A	24 Vdc 8 x 2-10 A	48 Vdc 8 x 2-10 A



TRIPPING CURVE



The tripping time depends on the level of overcurrent. In the event of a short circuit, the defective circuit will shut down within a few milliseconds. The level of the short circuit current depends on the current limiting of the feeding power supply as well as the line resistance.

HIGHLIGHTS

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (>50.000 µF)

DIAGNOSTIC AND REMOTE SWITCHING OF CHANNELS VIA 2 LINES

ADJUSTABLE RATED CURRENT PER CHANNEL

REMOTE RESET CONTACT

COMMON SIGNAL CONTACT FOR SIMPLE REMOTE DIAGNOSTICS

SEQUENTIAL AND LOAD-DEPENDENT SWITCHING-ON OF CHANNELS

LOW CHANNEL WIDTH



ECONOMY REMOTE

ELECTRONIC CIRCUIT BREAKER WITH THERMOMAGNETIC CHARACTERISTIC

The Economy Remote electronic circuit breaker is especially suitable for standard machine production. The start-up time of a production machine is shortened by transmitting adjustable tripping currents directly through the PLC. Thus, the circuit breaker prevents non-defined changes of current value in the equipment.

FEATURES

Adjustable rated current: 2-10A

Number of output channels: 8/4/2 per circuit breaker

VERSIONS

2 CHAN	NEL
24 Vdc	
2x2-10A	

2

4 CHANNEL 24 Vdc 4x2-10A

8 CHANNEL 24 Vdc 8x2-10A

HIGHLIGHTS

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (>50.000 µF)

COMPREHENSIVE INDIVIDUAL CHANNEL DIAGNOSTIC

STEPPED SETTING OF TRIP-PING CURRENTS VIA 2-WIRE INTERFACE

REMOTE SWITCH-ON/OFF OF ANY CHANNEL

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BASIC SMART

ELECTRONIC CIRCUIT BREAKER WITH ACTIVE CURRENT LIMITING

The Basic Smart circuit breakers guarrantee maximum system availability. In the event of circuit overload, only the faulty current paths are reliably switched off without affecting the remaining circuits due to an active current limiting of 1.7 times the rated current.

FEATURES

Adjustable rated current: 0,5-6A and 2-12A

Number of output channels: 8/4/2 per circuit breaker

VERSIONS

2 CHAN	NE		
24 Vdc		24 Vdc	
2 x 0.5-6 A		2x2-12A	

1 CHAN	INEL	
24 Vdc 4 x 0.5-6 A	24 Vdc 4 x 2-12 A	

8 CHAN	NEL
24 Vdc	
8 x 0.5-6 A	



TRIPPING CURVE



The constant current limiting of 1.7 times the rated current enables especially high-capacity loads to be switched on reliably. Two switch-off points within the tripping characteristic allow a temporary increase in current flow caused by start-ups, breaking, speed and direction changes of DC motors, etc.

HIGHLIGHTS

ACTIVE CURRENT LIMITING TYP. 1.7 X IRATED

SHUTDOWN OF FAULTY CIRCUITS IN THE EVENT OF CRITICAL SUPPLY VOLTAGE

COMMON SIGNAL CONTACT FOR SIMPLE REMOTE DIAGNOSTIC

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (> 50,000 µF)

DIAGNOSTICS AND REMOTE SWITCHING OF CHANNELS VIA 2 LINES

REMOTE RESET CONTACT

TRANSMISSION OF ACTUAL OUTPUT CURRENTS

ADJUSTABLE RATED CURRENT PER CHANNEL



DESCRIPTION BASIC SMART

EXTENSIVE DIAGNOSTICS

The actual current per channel is transmitted in addition to the adjusted rated currents and the input voltage. The general operating status (switched on or off) and the error status (tripped or overcurrent) are also available. Through the visualisation of this data, the system alerts you before any critical system failures occur.



SELECTIVE SHUT-DOWN DURING UNDERVOLTAGE

To protect sensitive loads from a temporary overload of the power supply the input voltage is constantly monitored. In the event of a critical undervoltage of below 20V, all circuits with more than 100% of the adjusted rated current are selectively shut off immediately.



BASIC FIX

ELECTRONIC CIRCUIT BREAKER WITH ACTIVE CURRENT LIMITING

If circuits are designed with the same current values for the circuit breaker in a number of applications, the Basic Fix circuit breakers represent the most economical basis. Various combinations of rated currents enable use in a wide range of applications. Each channel features the active current limiting of 1.3 times the fixed preset rated current.

BLOCK

(NEC CLASS 2)

FEATURES

Fix preset rated current

Number of output channels: 4/2 per circuit breaker

VERSIONS

2 CHANNI			
24 Vdc 2 x 3,8 A NFC	24 Vdc 2 x 6 A		
Class 2			
4 CHANNE	L		
24 Vdc	0/1\/do	24 Vdc	
4 x 3,8 A	24 VUG	2x3A	
NEC	4x6A	2x6A	
Class 2			

TRIPPING CURVE



The NEC Class 2 circuit breaker has a selfadjusting current limiting that prevents the output power from exceeding the 100W limit.



The circuit breakers limiting overcurrents to typically 1.3 times the selected rated current and are ideal for sensitive loads.

HIGHLIGHTS

ACTIVE CURRENT LIMITING TYP. 1,3 X IRATED

SHUTDOWN OF DEFECTIVE CIRCUITS IN THE EVENT OF CRITICAL SUPPLY VOLTAGE

COMMON SIGNAL CONTACT OF SIMPLE REMOTE DIAGNOSTIC

NEC CLASS 2 OPTION

DIAGNOSTIC AND REMOTE SWITCHING OF CHANNELS VIA 2 LINES

REMOTE RESET CONTACT

RELIABLE SWITCH-ON OF HIGH-CAPACITY LOADS (> 50,000 µF)



GL approval pending

LISTED

PLAN

DECISION SUPPORT MULTICHANNEL CIRCUIT BREAKERS



FEATURES

ECONOMY SMART	ECONOMY REMOTE	BASIC SMART	BASIC FIX	
				Setting of tripping currents per channel via current selector switch
				Setting of tripping currents per channel via 2-wire interface
				Remote switch-on/off of any channels
				"On"/"off"/"tripped" status transmission per channel
				"Overcurrent" status transmission per channel
				"Actual input voltage"/"set tripping current" data transmission per channel
				"Actual output currents" data transmission per channel
				Group alarm signal for tripped channels
				Remote reset of tripped channels
				Active current limit typ. 1.7 x I _{rated}
				Active current limit typ. 1.3 x I _{rated}
				Active current limit according to NEC Class 2 (100W)

TYPES ACCORDING TO SERIES

Cross connection link

NEW

Labeling field

NEW

Order no.

EB-BAR 2...41



ip EARYB Order no. EB-MARK21

EB-GND8

Order no.

EB-MARK20

Labeling strip

NEW

Labeling bracket

NEW

Order no.

EB-MARK1

SUBJECT TO CHANGE

TYPES ACCORDING TO SERIES



Potential free signal output

With plug-in spring-loaded terminal (depth increased by 25.5 mm)



TYPES ACCORDING TO SERIES



With plug-in spring-loaded terminal (depth increased by 25.5 mm)





CIRCUIT BREAKERS