



Electronic circuit breaker ESS30-Sxxx-DC24V

Description

The electronic circuit breaker ESS30-S with physical isolation is the globally unique electronic overcurrent protection for DC 24 V applications as a "low energy breaker". For the use in decentralised and centralised power supply units, it meets the requirements to DIN EN 60934, to UL1077 as a Supplementary Protector and to UL 1310 as "Class2 power unit" (NEC class2). The compact device can be plugged into the terminal blocks 17plus and 18plus and into the SVS power distribution systems and ensures quick and easy installation.

The ESS30-S is only 12.5 mm wide and selectively protects all DC 24 V load circuits. This is achieved by a combination of active electronic current limitation in the event of a short circuit and overload disconnection at typically 1.2 times rated current. DC 24 V switch-mode power supplies are widely used in automation today. In the event of an overload, however, they turn down the output voltage which is intended to power all connected loads. So if there is a failure in a single load of the system, the supply voltage will break down also in all other load circuits. Not only does this frequently cause undefined fault conditions, but it can even lead to machine stoppages or system downtimes.

The max. possible overcurrent is limited to typically 1.2 times rated current (see table 1). Switching capacitive loads up to 40,000 μ F is possible without any problems. For adjustment to the load conditions the current rating can be selected in fixed values from 0.5 A to 10A and adjustable versions 1A/2A or 3A/6A are also available. Visual status indication is by means of a multicoloured LED and by integral signal outputs. The manual ON/OFF switch on the device itself allows start-up of certain individual load circuits and reset after disconnection on grounds of overcurrent.



ESS30-S...

Features

- Plug-in mounting on power distribution modules 17plus, 18plus and SVSxx
- Physical isolation in the event of a failure
- Active linear current limitation
- Capacitive loads up to 40,000 μ F
- Fixed current ratings 0.5 A...10 A (0.5A...3.6A NEC Class 2)
- 2 steps (1A/2A or 3A/6A) can be adjusted on the device by means of a switch
- Approvals: UL, NEC Class 2, VDE

Your Benefits

- Inventory costs are cut, because one model covers two current ratings
- Flexibility is enhanced through plug-in design and ease of current rating adjustment
- Cost-savings because the breakers up to 3.6A approved to UL12310 (NEC Class 2) replace the previously used expensive switch mode power supplies
- Saves energy costs through 1/3 lower power loss compared to competitive solutions.
- Increases system availability through clear failure detection and signalling

Preferred types – for more details on all configurations please see order numbering code

Preferred types are E-T-A products most frequently used by E-T-A customers. We manufacture E-T-A preferred types in particularly high

volumes. Our preferred types are supplied at shorter lead times than non-standard versions.

Preferred types	Preferred ratings (A)											
ESS30-S	0.5	1	2	3.6	3	4	6	8	10	2 (CL2)	3 (CL2)	3.6 (CL2)
ESS30-S003-DC24V	x	x	x		x	x	x	x	x			x

Approvals

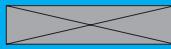


Information online

For access to the latest documents please follow: www.e-t-a.de/e353

Compliances





Electronic circuit breaker ESS30-Sxxx-DC24V

Technical data ($T_{amb} = 25^\circ\text{C}$, $U_B = \text{DC } 24\text{ V}$)

For further details please see: www.e-t-a.de/ti_e

Operating data

Operating voltage U_B DC 24 V (18...30 V)

Current ratings I_N

fixed ratings:

0.5 A; 1 A; 2 A; 2 A CL2; 3 A; 3 A CL2; 3,6 A; 3,6 CL2 4 A; 6 A; 8 A; 10 A;

Adjustable current ratings:

1 A/2 A; 3 A/6 A

Standby current I_0

in ON condition: typically 4 mA with adjustable versions typically 5.5 mA

Trip current (bimetal)

typically 0.4 A (only under fault condition, till physical isolation)

Visual status indication

- multicoloured LED:

green:

- device is ON ($S1 = \text{ON}$)
load circuit connected

orange:

- overload or short circuit until electronic disconnection

red:

- device switched OFF electronically
load circuit OFF
- undervoltage ($U_B < 14\text{ V}$)

OFF:

- manually OFF ($S1 = \text{OFF}$)
load circuit physically isolated or device is dead-voltage

- Potential-free signal contact
- On/off position of the switch $S1$

Load circuit

Load output

power MOSFET switching output (plus switching)

Overload and short circuit disconnection

typically $1.2 \times I_N$ with active current limitation

Trip times for electronic disconnection

see time/current characteristic
overload trip time typically 500 ms
short circuit trip time depending on current rating (see table 1)

typically 5 s (3 ... 9 s)

for physical isolation

Temperature disconnection

internal temperature monitoring with physical isolation

Undervoltage monitoring of load output

with hysteresis, no reset required:
»OFF« at $U_B < 14\text{ V}$
»ON« at $U_B > 17\text{ V}$

Switch-on delay t_{Start}

typically 2 ms after each ON operation, reset and after applying of U_B

Capacitive loads

up to 40,000 μF

Free-wheeling diode

external free-wheeling diode recommended for inductive load

Parallel connection of several load outputs

not allowed

Error message:

Signal output F

potential-free signal contact switches simultaneously with physical isolation, max. DC 30 V / 2 A, min. DC 12 V / 10 mA

Technical data ($T_{amb} = 25^\circ\text{C}$, $U_B = \text{DC } 24\text{ V}$)

Signal output ESS30-S001
changeover aux. contact

blue push button is in ON position:
aux. contact 13/14-12 is closed

blue push button is in OFF position:
aux. contact 13/14-12 is open

Signal output ESS30-S002
changeover aux. contact

blue push button is in ON position:
aux. contact 13/14-12 is open

blue push button is in OFF position:
aux. contact 13/14-12 is closed

Signal output ESS30-S003
changeover aux. contact

blue push button is in ON position:
aux. contact 13-14 is closed, 13-12 is open

blue push button is in OFF position:
aux. contact 13-14 is open, 13-12 is closed

Visual status indication

LED green

U_B is applied and switch $S1$ is ON and no overload, no short circuit

OFF condition LED off

- device switched off (switch $S1$ is OFF)
- load circuit physically isolated
- no operating voltage U_B

LED orange

overload conditions > 1.2 times rated current until, electronic disconnection

LED red

electronic disconnection upon overload, short circuit or undervoltage

General data

Fail-safe element

back-up fuse for ESS30-S.. not required due to integral redundant fail-safe element (protective element)

Blade terminals

6.3 mm to EN 60934-6.3-0.8

Housing material

moulded

Mounting

pluggable into power distribution systems for side-by-side mounting (module 17plus or 18plus by E-T-A)

Ambient temperature

0...+60 $^\circ\text{C}$ (without condensation, cf. EN 60204-1)

Storage temperature

-40...+70 $^\circ\text{C}$

Humidity

96 hours at 95 % RH, 40 $^\circ\text{C}$ to IEC 60068-2-78,-Cab climate class 3K3 to EN60721

Vibration

3 g test to IEC 60068-2-6, test Fc

Degree of protection

operating area IP30 EN 60529
installation area IP00 EN 60529

EMC requirements (EMC directive, CE logo)

noise emission: EN 61000-6-3
susceptibility: EN 61000-6-2

Insulation co-ordination (IEC 60934)

0.5 kV / pollution degree 2
reinforced insulation in operating area

Dielectric strength

(see also dimensions)
operating area
test voltage AC 1000 V

installation area

test voltage AC 500 V

load circuit

auxiliary contact

test voltage AC 500 V

Insulation resistance (OFF condition)

> 100 M Ω (DC 500 V) between

LINE (+)

and LOAD (+)

CE-marking

Dimensions (w x h x d)

12.5 x 78.5 x 60 mm (tolerances to

DIN ISO 286 part 1 IT13)

Operating force

test voltage AC 500 V

ON

5...8 N

OFF

7...10 N

Mass

approx. 39 g



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ESS30-S003-DC24V	x	x	x		x	x	x	x	x			x

Order numbering code

Type	ESS30	Electronic circuit breaker with current limitation
Mounting	S	plug-in type
Version	0	with physical isolation in the event of a failure
Signal input	0	without signal input
Signal output:		
1	signal make contact (min. 12 V/10 mA; max. 30 V/2 A)	
2	signal break contact (min 12 V/10 mA; max. 30 V/2 A)	
3	signal change over contact (min. 12 V/10 mA; max. 30 V/2 A)	
Operating voltage	DC 24 V	voltage rating DC 24 V
Current ratings		
0.5 A (Class 2)		
1 A (Class 2)		
2 A		
3 A		
3.6 A		
4 A		
6 A		
8 A		
10 A		
1 A/2 A adjustable		
3 A/6 A adjustable		
Approvals		
CL2	Class2 (only for 2, 3 and 3.6 A versions)	
ESS30 - S 0 0 3 - DC 24 V - 3,6 A-CL2	ordering example	
ESS30 - S 0 0 3 - DC 24 V - 10 A	ordering example	

Application note

- The user has to ensure that the cable cross section of the load circuit in question complies with the current rating of the ESS31-T used.
- In addition special precautions must be taken in the system or machine (e.g. use of a safety PLC) which reliably prevent an automatic re-start of parts of the system (cf. Machinery Directive 2006/42/EG and EN 60204-1, Safety of Machinery). In the event of a failure (short circuit/overload) the load circuit will be disconnected electronically with physical isolation of the contacts by the ESS31-T.

Approvals of ESS30-S

Approval authority	Standard	File-Certificate Nr.	Rated voltage	Current ratings
UL	UL 2367	E306740	24 V DC	0.5 A...10 A
UL	UL 1310 NEC Class 2	E306740	24 V DC	0.5 A, 1 A, 2 A, 3 A, 3.6 A
UL	UL 2367	E306740	24 V DC	0.5 A...10 A
UL	UL 1077 C22.2 No. 235-04	E67320	24 V DC	0.5 A...10 A, 1 A/2 A, 3 A/6 A
VDE	IEC/EN 60934 (VDE 0642)	40039681	24 V DC	0.5 A...10 A

Please be informed that we have minimum ordering quantities to be observed.

Class 2

Meets requirement for Class 2 current limitation
(ESS30-S...-0.5 A/1 A/2 A/3 A/3.6 A)

Custom designed versions

Looking for a version you cannot find in our ordering number code?
Please get in touch. We will be pleased to find a solution for you.



Electronic circuit breaker ESS30-Sxxx-DC24V

Table 1: Voltage drop, current limitation, trip times, fail-safe element, max. load current

current rating I_N	typical voltage drop U_{ON} at I_N	active current limitation typically	trip time I_{KS} typically 1)	trip time I_{OL} typically 2)	fail-safe element	max. load current at 100 % ON duty		
						$T_{Amb} = 40^\circ C$	$T_{Amb} = 50^\circ C$	$T_{Amb} = 60^\circ C$
0.5 A	90 mV	1.2 x rated current	500 ms	500 ms	2 A	0.5 A	0.5 A	0.5 A
1 A	100 mV	1.2 x rated current	500 ms	500 ms	2 A	1 A	1 A	1 A
2 A	110 mV	1.2 x rated current	500 ms	500 ms	4 A	2 A	2 A	2 A
2 A CL2	130 mV	1.2 x rated current	500 ms	500 ms	4 A	2 A	2 A	2 A
3 A	150 mV	1.2 x rated current	500 ms	500 ms	6.3 A	3 A	3 A	3 A
3 A CL2	200 mV	1.2 x rated current	500 ms	500 ms	4 A	3 A	3 A	3 A
3.6 A	155 mV	1.2 x rated current	350 ms	500 ms	6.3 A	3.6 A	3.6 A	3.6 A
3.6 A CL2	220 mV	1.05 x rated current	450 ms	500 ms	4 A	3.6 A	3.6 A	3.6 A
4 A	160 mV	1.2 x rated current	280 ms	500 ms	6.3 A	4 A	4 A	4 A
6 A	170 mV	1.2 x rated current	150 ms	500 ms	10 A	6 A	6 A	6 A
8 A	190 mV	1.2 x rated current	280 ms	500 ms	15 A	8 A	7.5 A	7 A
10 A	210 mV	1.2 x rated current	200 ms	500 ms	15 A	9.5 A	9 A	8.5 A
1 A/2 A	45 mV/90 mV	1.2 x rated current	500 ms	500 ms	4 A	1 A/2 A	1 A/2 A	1 A/2 A
3 A/6 A	80 mV/160 mV	1.2 x rated current	500 ms/150 ms	500 ms	10 A	3 A/6 A	3 A/6 A	3 A/6 A

Note: When mounted side-by-side without convection the devices can only carry max. 80 % of their rated current continuously (100 % ON duty) due to thermal effect.

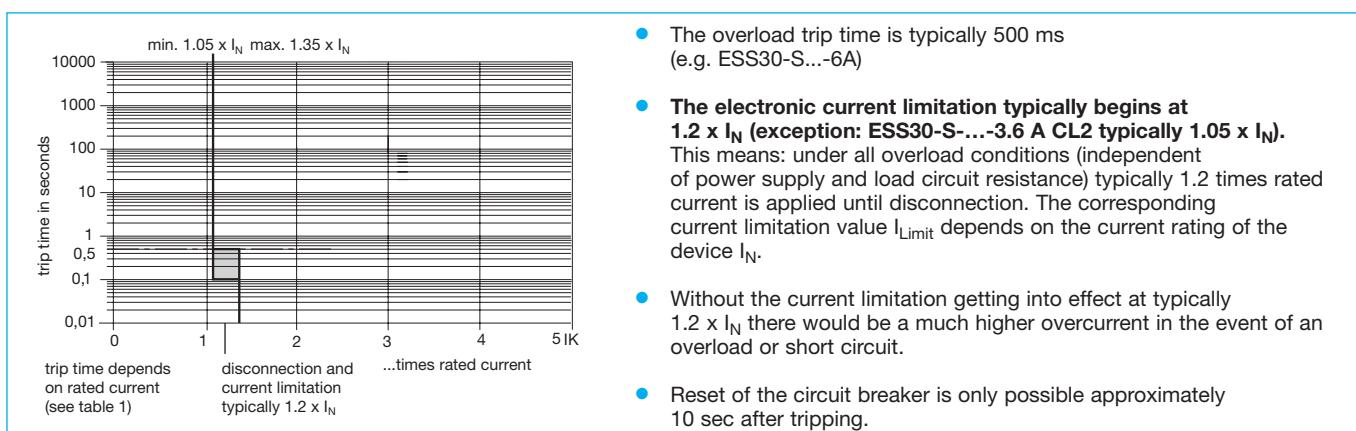
1) short circuit

2) overload

Tabelle 2: ESS30-S – Gerätevarianten

Version	Signal input			Signal output:					
				signal output F (aux. contact)			status output SF		
ESS30-S-	without	control input ON/OFF +24 V Control IN+	reset input +24 V ↓ RE	without	single signal make contact (normally open NO)	single signal break contact (normally closed NC)	double auxiliary change over contact	without	status-OUT +24V = OK status-OUT 0V = OK
001	x			x			x		
002	x				x		x		
003	x					x	x		

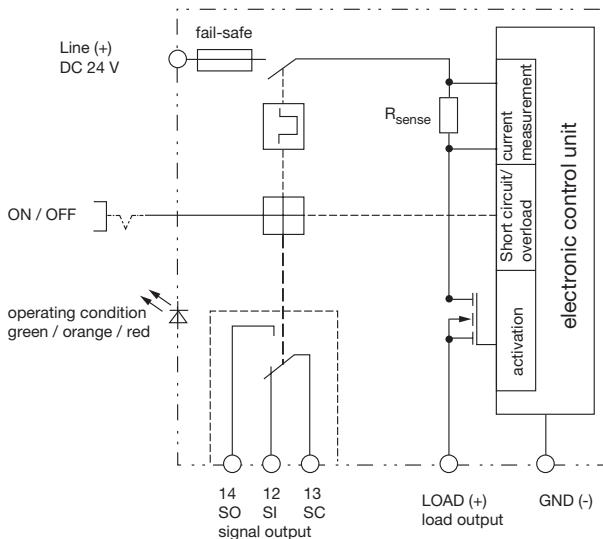
Typical time/current characteristic ($T_{amb} = 25^\circ C$)



Electronic circuit breaker ESS30-Sxxx-DC24V

Connection diagram ESS30-S003-... (Example)

Example ESS30-S003

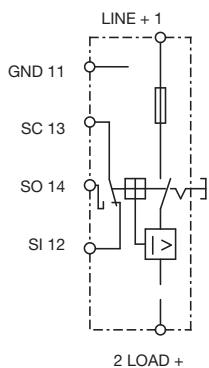


ESS30-S signal output (connection diagrams)

The auxiliary contacts are shown in OFF or fault condition

ESS30-S003

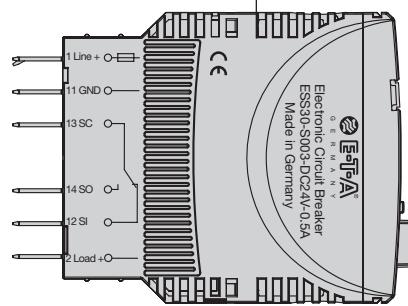
without signal input
with signal output f
single signal, change-over



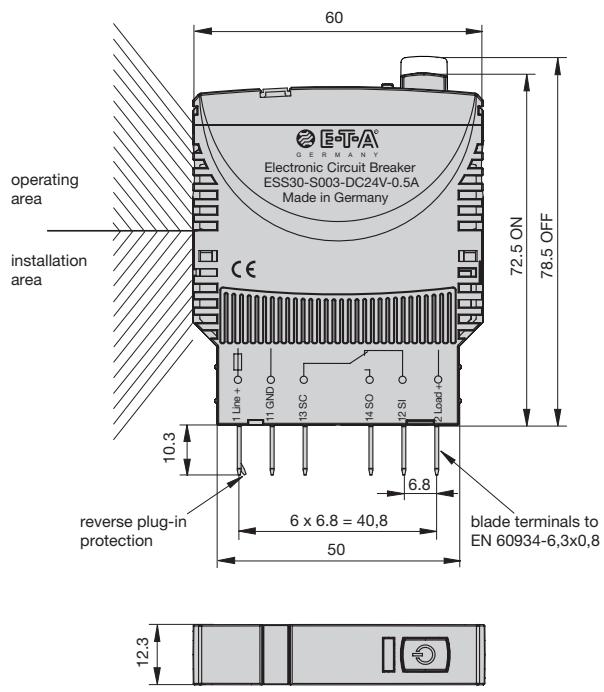
operating condition
13-14 closed; 13-12 open
fault condition
13-14 open; 13-12 closed

Connection diagram ESS30-S003-... (Example)

mounting area operating area



Dimensions ESS30-S

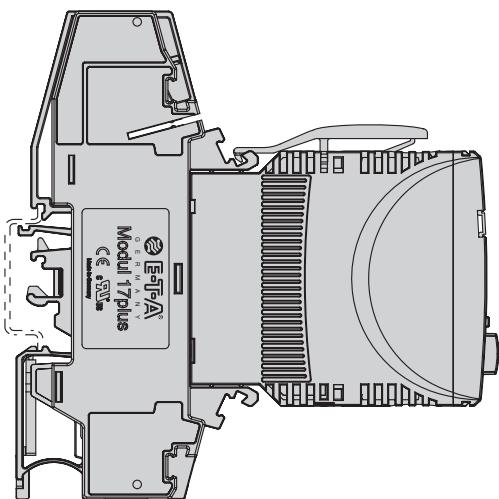




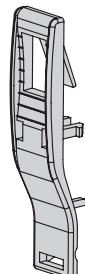
Electronic circuit breaker ESS30-Sxxx-DC24V

Mounting examples for ESS30-S

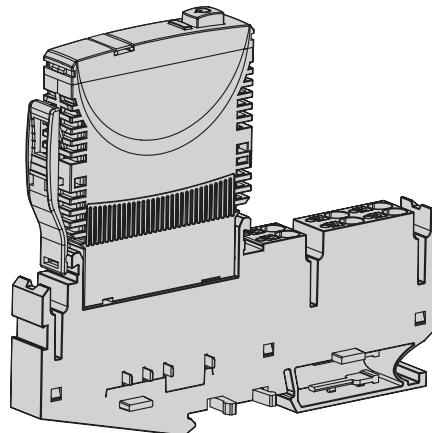
Module 17plus



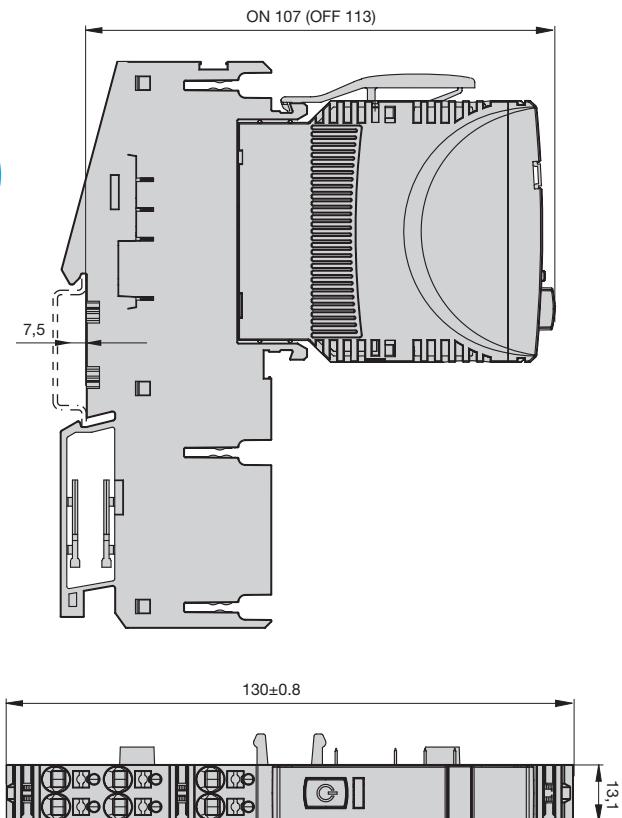
Retaining clip Y 311 978 01



Installation example with ESS30-S with optional retaining clip



Module 18plus



All dimensions without tolerances are for reference only. E-T-A reserves the right to change specifications at any time in the interest of improved design, performance and cost effectiveness, the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.

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<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибуторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ Р В 0015-002 и ЭС РД 009

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