Technical Data

Industrial Miniature Circuit-Breakers S 220 series

System pro *M*

ABB

When connecting aluminum conductors, ensure that the contact surfaces of the conductors are cleaned, brushed and greased.

For finely stranded conductors, use a connector sleeve for best results.

Standard Terms for Delivery and Sale
For domestic business, the Standard Terms for the Supply of Products and Services of the Electrical Industry (ABB Form 2292) shall apply in connection with the Standard Sale Terms (ABB Form 2327) in their then applicable version.
For foreign business, the Standard Terms for the Supply of Products and Services of the Electrical Industry (ABB Form 2293 German/English, or ABB Form 2294 German/French) shall apply in connection with the Standard Sales Terms (ABB Form 2381 English) in their then applicable version.

Warranty
We assume warranty in accordance with the standard sale and delivery terms. Complaints shall be made in writing within eight days following receipt of the goods.

Technical information is not binding and subject to change without notice.

Industrial Miniature Circuit-Breakers S 220 series

Contents page

Special features

- **for operating voltage up to 690 V~**
- **disconnector abilities according to DIN VDE 0660 Part 107, IEC 60947-3**
  surge withstand capability Uimp (1.2/50): 4 kV
- **can be used as main circuit breaker according to DIN VDE 0660, IEC 60947-2 through**
  individual position indication for each pole, red = ON, green = OFF according to IEC 73
- **comprehensive protection against electric shock**
- **locking device available as accessory**

General

1. Description

The S 220 industrial miniature circuit-breaker has a current-limiting effect. Each pole contains two different trip releases acting on the joint contact mechanism:

1. the delayed, thermal trip release for overcurrent protection,
2. the electro-magnetic instantaneous release for short-circuit protection.

2. Task

Protection against excessive temperature rises of electric items in the case of overcurrents, caused by overload, short circuit or earth-fault current.
Resistance against electric shock in the case of excessive touch voltage caused by insulation fault if assigned and installed according to DIN VDE 0100, IEC 60364.

3. Application

In installation, switch, controlling and measuring units for commerical and industrial apparatus up to 690 V~
(UL/CSA approval up to 600 V~).

4. K-type characteristic for line and device protection

Tripping characteristics according standard IEC 157-1, DIN VDE 0660/8.69 has been inactive, but is still referred to due to its complete statement on the tripping characteristics. Operating current 0.2 to 63 A, in 19 grades. Motor protection is reached selecting the operating current appropriate for the individual motor data. The electromagnetic trip releases are calibrated to avoid nuisance tripping caused by starting currents.
In circuits with groups of filament lamps, mains shunt compensated fluorescent lamps or other discharge lamps, the conductor cross section to be protected can be used more efficiently as compared to miniature circuit-breakers with the same operating current, trip characteristics type B and C, considering the starting current.
By reason of the smaller thermal threshold current value, the operating current can be assigned directly to the admissible current-carrying capacity according to DIN VDE 0298 Part 4, IEC 60364-5-52. As a result, it is usually possible to select a higher current-intensity grade than in the case of miniature circuit-breakers with B-type characteristics.

5. Additional devices

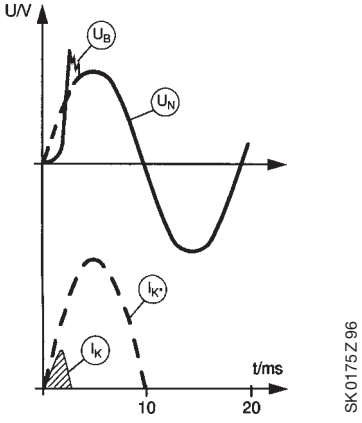
Auxiliary switch 1NO + 1 NC (= H 11) for retrofitting, convertable to 2 NO or 2NC.
For switching auxiliary current circuits, depending on the switching position of the miniature circuit-breaker;
with 2 galvanically separated devices. Through coupling the device with the contact mechanism, the auxiliary switch remains trip-free.

The STOTZ miniature circuit-breaker has a current-limiting effect.

Compared to zero-point self-extinguishing miniature circuit-breakers, S 220 offers three main advantages:

- **higher short-circuit capacity**
- **improved back-up selectivity**
- **lines and defective sectors are subject to a significantly smaller let-through value $\int i2\,dt$.**

Current-limiting circuit-breaker by STOTZ



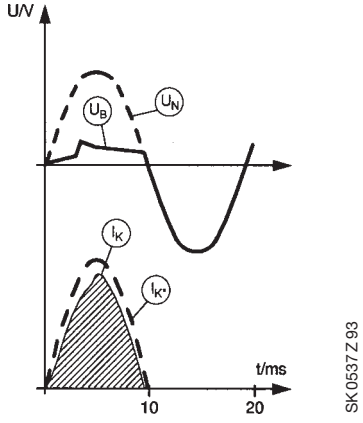
U_N = mains voltage

U_B = arc voltage

I_K = let-through short-circuit current

$I_{K''}$ = prospective short-circuit current

Zero-point extinguishing miniature circuit-breaker



Technical data

No. of poles:	1-, 2- and 3-pole
specifications:	IEC 60947-2, EN 60898-1, VDE 0641 T11
rated current I_n:	0.2 to 63 A

internal resistance:

nominal current I_n/A	internal resistance per pole mΩ	power loss per pole W
0.2	32000	1.3
0.3	13500	1.2
0.5	6400	1.6
0.75	2900	1.6
1	1400	1.4
1.6	630	1.6
2	420	1.7
3	160	1.4
4	120	1.9
6	47	1.7
8	34	2.2
10	9.6	1
16	7.6	2.0
20	5.1	2.1
25	4.4	2.8
32	3.3	3.4
40	2.6	4.2
50	1.7	4.3
63	1.6	6.4

operating voltage U_n: 1-pole 400/690 V ~ 60 V ⎓
multi-pole 690 V ~ 110 V ⎓
The tripping values for electromagnetic trip releases are valid for AC values from 16 ⅔ to 60 Hz. Deviating frequencies or DC current will cause the tripping characteristics to change as is indicated in the table on page 6.

min. rated voltage U_{Bmin}:	12 V ~, 12 V ⎓ (with respect to contact stability)
insulation group acc. to former VDE 0110: pollution degree 2	C at 500 V ~ } compareable to B at 750 V ~ } overvoltage category III
trip-free mechanism:	miniature circuit-breaker and auxiliary switch
housing:	plastic, gray RAL 7035
operating lever:	black, in ON and OFF position sealable; lockable with lock adapter (see Accessories)
connection:	individual or busbar
terminals:	combined box terminal with M5 screw
connection capacity (Cu):	1 x 25 mm² or 2 x 10 mm² for finely stranded to massive conductors min. cross section 1 mm²
protection according to IEC 60529, EN 60529, VDE 0470:	IP 20
size:	DIN 43 880, frame size 1
depth of device:	83 mm
dimensions:	see illustrations on page 15
mounting position:	optional
fixing:	snap-on onto DIN rails-EN 60 715, 35 mm width, screw fixing by means of mounting plate(see Accessories)
climatic resistance: according to DIN 40 046 or, as applicable, IEC 60068:	constant climate 23/83, 40/93, 55/20 (°C/Rh) alternating climate (24 h cycle) 25/95 – 40/93 (°C/Rh)
ambient temperature:	T_{max} + 55 °C, T_{min} – 25 °C
shock resistance:	10 g at least 20 impacts shock duration 13 ms
vibration resistance:	5 g, at least 30 minutes
mechanical service life:	20,000 operations
service life at rated load and operating voltage:	20,000 operations, I_n 0,2 ... 32 A 4,000 operations, I_n 40 ... 63 A
specifications:	VDE 0660, IEC 60 947-2

Auxiliary switch S 220-H 11

terminal:	M 3.5 screw with captive clamping washer
connection capacity (Cu):	2 x 0.75 ... 2.5 mm² ... 1.5 mm² with connector sleeve
permanent current I_{th2}:	5 A
rated current I_n at:	220 V ~: 5 A 400 V ~: 2 A 60 V ⎓: 2 A 110 V ⎓: 1.5 A 250 V ⎓: 1 A
min. switching capacity:	5 VA

Tripping characteristics

standard	tripping characteristic and rated current range (ref. reference range)	thermal trip tripping currents: conv.non-trip. current I_1	conventional trip. current I_2	tripping time	electromagnetic trip ③ tripping currents: hold impacts from	trips at the latest at	tripping time
VDE 0660/8.69 Part 1 ② IEC 157-1, VDE 0660/8.69 Part1	K 0.2 to 63 A	1.05 • I_n	1.2 • I_n	> 2 h	8 • I_n		> 0.2 s
			1.5 • I_n	< 2 h ①			
		6.0 • I_n	> 2 s (T_I)	< 2 min ①	14 • I_n	< 0.2 s	

① as from operating temperature(after I_1 > 2 h).

② Standard IEC 157-1, DIN VDE 0660/8.69 has been ineffective, but is still referred to due to its complete statement on the tripping characteristics.

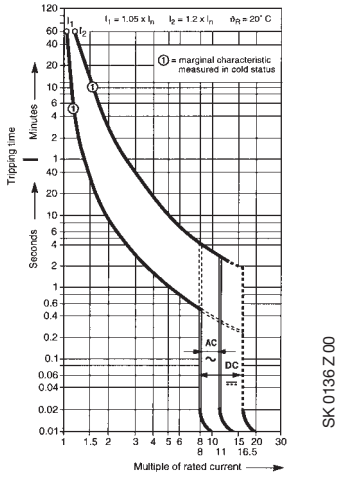
③ **Frequency influence of electromagnetic trips**

The tripping values indicated for electromagnetic trips apply to a frequency of 16 $^2/_3$ ... 60 Hz. Deviating frequencies or DC current will cause the tripping characteristics to change by the factor indicated in the following table.

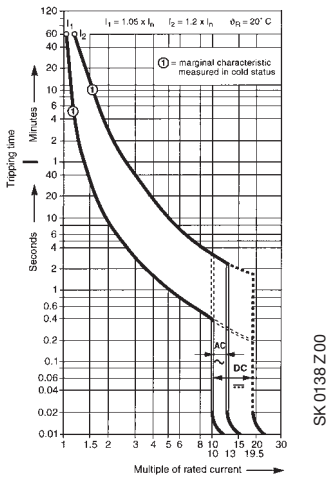
	AC 100 Hz	200 Hz	400 Hz	DC
factor ca.	1.1	1.2	1.5	1.5

tripping values of thermal trips are frequency-independent.

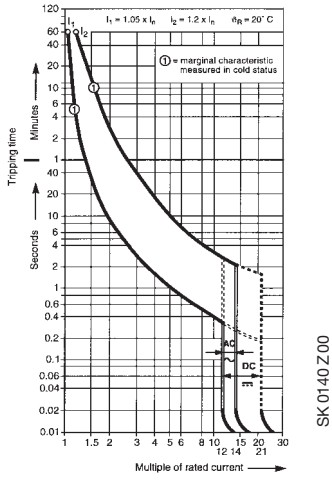
Characteristics



S 220-K 0,2 ... 8 A
K 40 ... 63 A



S 220-K 10 ... 16 A



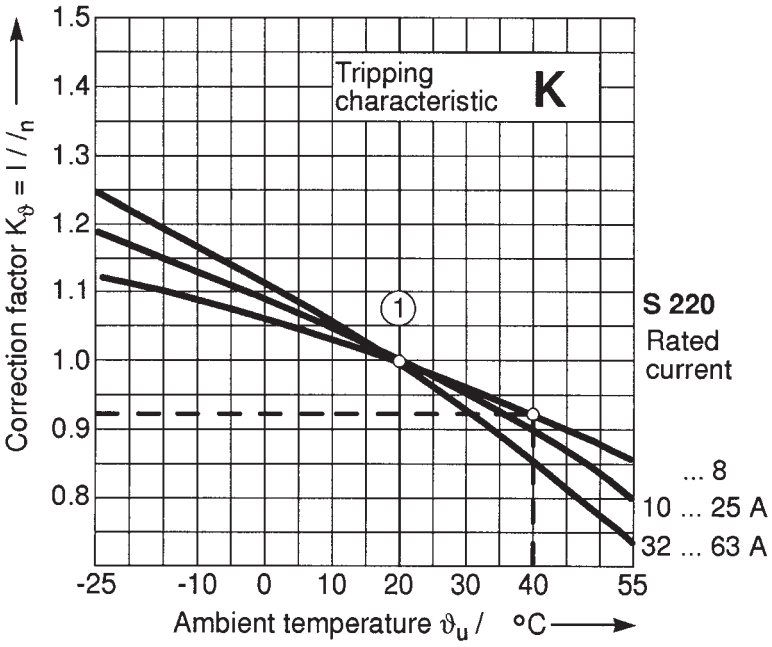
S 220-K 20 ... 32 A

Short circuit capacity according to IEC-157-1/P-2, VDE 0660/8.69 Part 1 or, as applicable, VDE Part 101/P-2, VDE 0660/8.69 Part 1

nominal current-range	AC							DC
	1-phase			2/3-phase				1-pole
	up to 133 V ~	230 V ~	400 V ~	133/230 V ~	230/400 V ~	290/500 V ~	400/690 V ~	up to 60 V – ⑤
0.2 up to 1 A	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited	unlimited
1.6 and 2 A	unlimited	unlimited	1.5 kA cos φ = 0.95	unlimited	unlimited	6 kA cos φ = 0.7	1.5 kA cos φ = 0.95	unlimited
3 and 4 A	15 kA cos φ = 0.3	4.5 kA cos φ = 0.8	1.5 kA cos φ = 0.95	15 kA cos φ = 0.3	4.5 kA cos φ = 0.8	3 kA cos φ = 0.9	1.5 kA cos φ = 0.95	8 kA T ≤ 13 ms
6 and 8 A	15 kA cos φ = 0.3	6 kA cos φ = 0.7	1.5 kA cos φ = 0.95	15 kA cos φ = 0.3	6 kA cos φ = 0.7	4.5 kA cos φ = 0.8	1.5 kA cos φ = 0.95	8 kA T ≤ 13 ms
10 up to 32 A	30 kA cos φ = 0.25	10 kA cos φ = 0.5	6 kA cos φ = 0.7	30 kA cos φ = 0.25	10 kA cos φ = 0.5	10 kA cos φ = 0.5	6 kA cos φ = 0.7	8 kA T ≤ 13 ms
40 up to 63 A	6 kA cos φ = 0.7	4.5 kA cos φ = 0.8	3 kA cos φ = 0.9	6 kA cos φ = 0.7	4.5 kA cos φ = 0.8	4.5 kA cos φ = 0.9	3 kA cos φ = 0.9	6 kA T ≤ 13 ms

⑤ In symmetrically earthed DC circuits, S 222 two-pole devices (two poles connected in series) can be used up to 110 V DC. In this case, the short-circuit capacity is one grade above the 1-pole version (10 kA instead of 8 kA).
Any connection is possible, polarity does not need to be taken into account.

Current-carrying capacity I/In depending on ambient temperature ϑ_R



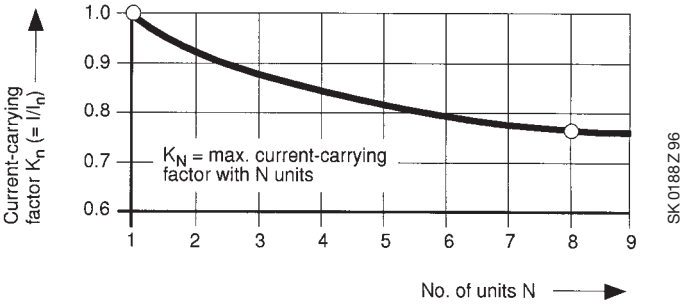
① possible load with a given ambient temperature of + 20 °C.

Example:
A K6 miniature circuit-breaker is used in an ambient temperature of + 40 °C. What maximum current is possible?
From the chart, you can see:
$I/I_n = 0.93$
$I = 0.93 \cdot 6 = 5.58$ A

Mutual thermal influence

of miniature circuit-breakers connected in series
device spacing = 0.

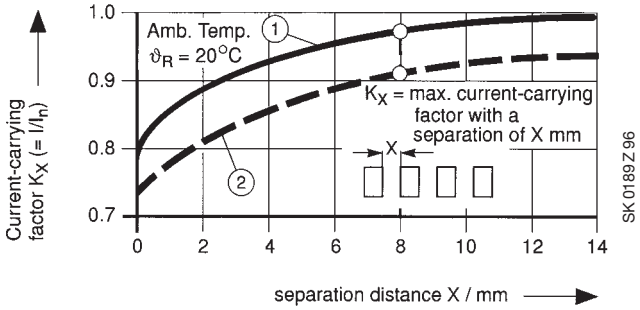
trip characteristic K



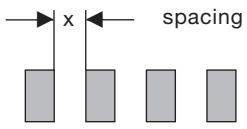
Example: If 8 devices are connected in series, the max. possible permanent current is reduced to 0.77 x I_n.

of miniature circuit-breakers depending on device spacing
(at least 7 devices in a row)

trip characteristic K



① measured in open air
② measured in flush-mounted consumer unit



Example: When connecting several devices in series with a spacing of 6 mm, the max. possible permanent current is reduced to
0.95 = I_n (installed in open air)
0.9 = I_n (installed in consumer unit)

Maximum back-up protection

Maximum back-up protection is necessary only if the solid short-circuit current to be expected at the place of installation may exceed the short-circuit capacity.

nominal current circuit-breaker S 220 I_n A	maximum back-up protection MCBs S 220-K 230/400 V ~ to main c.b.s S 700 E and K[1] A	230/400 V ~ max. back-up prot. gL A	400/690 V ~ max. back-up prot. gL A
0.5	63	optional	optional
0.75	63	optional	optional
1.0	63	optional	optional
1.6	63	optional	20
2	63	optional	25
3	63	35	25
4	63	35	35
6	100	63	50
8	100	63	63
10	100	100	80
16	100	100	100
20	100	100	100
25 ... 32	100	100	100
40 ... 63	100	125	125

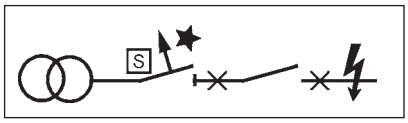
1) Back-up protection up to at least 25 kA

Short-circuit discrimination

If the short circuit current does not exceed the nominal switching capacity of the miniature circuit-breaker, selectivity exists up to the values indicated. At $U_n \geq 133/230$ V, selectivity exists up to the short circuit current indicated. See also page 4.

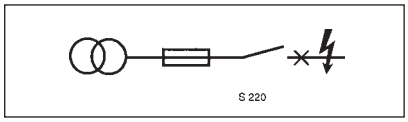
For cases where the max. back-up protection exceeds the nominal switching capacity, see above

Short circuit discrimination in kA



to main miniature circuit-breakers S 700 E_{sel} and K

Short circuit discrimination in kA



to fuse gL/gG (DIN VDE 0636, IEC 269/3)

		to main miniature circuit-breaker S 700-E/-K 230/400 V ~									to fuse charact. gL/gG								
S 220 K	**In/A**	**16**	**20**	**25**	**35**	**40**	**50**	**63**	**80**	**100**	**16**	**20**	**25**	**35**	**50**	**63**	**80**	**100**	**125**
	≤ 2	> 15	> 15	> 15	> 15	> 15	> 15	> 15	> 15	> 15	1	1.2	4	> 15	> 15	> 15	> 15	> 15	> 15
	3	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	0.3	0.8	1.5	4.5	4.5	4.5	4.5	4.5	4.5
	4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		0.6	1	3.3	4.5	4.5	4.5	4.5	4.5
	6	10	10	10	10	10	10	10	8	8			0.6	1.3	3	5.5	6	6	6
	8	10	10	10	10	10	10	10	8	8				1.1	2.5	3.5	6	6	6
	10	15	15	15	15	15	15	15	12.5	12.5				1	1.7	2.5	4	7	10
	16	15	15	15	15	15	15	15	12.5	12.5					1.5	2	3	5	6
	20		15	15	15	15	15	15	12.5	12.5						1.6	2.6	3.6	5.5
	25			15	15	15	15	15	12.5	12.5							2.4	3.3	5
	32		**		15	15	15	15	12.5	12.5								3.1	3
	40					4.5	4.5	4.5	4.5	4.5									3
	50/63						4.5	4.5	4.5	4.5									2.5

** limited or no selectivity possible in overload range (therm. tripping)

K

according to DIN VDE 0660 Part 101 for power circuits, motors, transformers, lamps and for line protection

10 000

SK0191B91

S 221

SK0192B91

S 222

SK0193B91

S 223

SK0194B91

S 220-H 11

Selection table

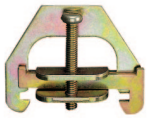
No. of poles	rated current In A	order details type code	order code	bbn 40 16779 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc.
1	0.2	**S 221-K 0.2**	GHS 221 0001 R0087	**31610 6**			0.18	10
	0.3	**S 221-K 0.3**	GHS 221 0001 R0117	**31620 5**				
	0.5	**S 221-K 0.5**	GHS 221 0001 R0157	**31630 4**				
	0.75	**S 221-K 0.75**	GHS 221 0001 R0187	**31640 3**				
	1	**S 221-K 1**	GHS 221 0001 R0217	**31650 2**				
	1.6	**S 221-K 1.6**	GHS 221 0001 R0257	**31660 1**				
	2	**S 221-K 2**	GHS 221 0001 R0277	**31670 0**				
	3	**S 221-K 3**	GHS 221 0001 R0317	**31680 9**				
	4	**S 221-K 4**	GHS 221 0001 R0337	**31690 8**				
	6	**S 221-K 6**	GHS 221 0001 R0377	**31700 4**				
	8	**S 221-K 8**	GHS 221 0001 R0407	**31710 3**				
	10	**S 221-K 10**	GHS 221 0001 R0427	**31720 2**				
	16	**S 221-K 16**	GHS 221 0001 R0467	**31730 1**				
	20	**S 221-K 20**	GHS 221 0001 R0487	**31740 0**				
	25	**S 221-K 25**	GHS 221 0001 R0517	**31750 9**				
	32	**S 221-K 32**	GHS 221 0001 R0537	**31760 8**				
U_n	40	**S 221-K 40**	GHS 221 0001 R0557	**31770 7**				
690 V ~	50	**S 221-K 50**	GHS 221 0001 R0577	**31780 6**				
60 V ⎓	63	**S 221-K 63**	GHS 221 0001 R0607	**31790 5**				
2	0.2	**S 222-K 0.2**	GHS 222 0001 R0087	**31800 1**			0.36	5
	0.3	**S 222-K 0.3**	GHS 222 0001 R0117	**31810 0**				
	0.5	**S 222-K 0.5**	GHS 222 0001 R0157	**31820 9**				
	0.75	**S 222-K 0.75**	GHS 222 0001 R0187	**31830 8**				
	1	**S 222-K 1**	GHS 222 0001 R0217	**31840 7**				
	1.6	**S 222-K 1.6**	GHS 222 0001 R0257	**31850 6**				
	2	**S 222-K 2**	GHS 222 0001 R0277	**31860 5**				
	3	**S 222-K 3**	GHS 222 0001 R0317	**31870 4**				
	4	**S 222-K 4**	GHS 222 0001 R0337	**31880 3**				
	6	**S 222-K 6**	GHS 222 0001 R0377	**31890 2**				
	8	**S 222-K 8**	GHS 222 0001 R0407	**31900 8**				
	10	**S 222-K 10**	GHS 222 0001 R0427	**31910 7**				
	16	**S 222-K 16**	GHS 222 0001 R0467	**31920 6**				
	20	**S 222-K 20**	GHS 222 0001 R0487	**31930 5**				
	25	**S 222-K 25**	GHS 222 0001 R0517	**31940 4**				
U_n	32	**S 222-K 32**	GHS 222 0001 R0537	**31950 3**				
690 V ~	40	**S 222-K 40**	GHS 222 0001 R0557	**31960 2**				
125 V ⎓ ①	50	**S 222-K 50**	GHS 222 0001 R0577	**31970 1**				
	63	**S 222-K 63**	GHS 222 0001 R0607	**31980 0**				
3	0.2	**S 223-K 0.2**	GHS 223 0001 R0087	**31990 9**			0.54	3
	0.3	**S 223-K 0.3**	GHS 223 0001 R0117	**32000 4**				
	0.5	**S 223-K 0.5**	GHS 223 0001 R0157	**32010 3**				
	0.75	**S 223-K 0.75**	GHS 223 0001 R0187	**32020 2**				
	1	**S 223-K 1**	GHS 223 0001 R0217	**32030 1**				
	1.6	**S 223-K 1.6**	GHS 223 0001 R0257	**32040 0**				
	2	**S 223-K 2**	GHS 223 0001 R0277	**32050 9**				
	3	**S 223-K 3**	GHS 223 0001 R0317	**32060 8**				
	4	**S 223-K 4**	GHS 223 0001 R0337	**32070 7**				
	6	**S 223-K 6**	GHS 223 0001 R0377	**32080 6**				
	8	**S 223-K 8**	GHS 223 0001 R0407	**32090 5**				
	10	**S 223-K 10**	GHS 223 0001 R0427	**32100 1**				
	16	**S 223-K 16**	GHS 223 0001 R0467	**32110 0**				
	20	**S 223-K 20**	GHS 223 0001 R0487	**32120 9**				
	25	**S 223-K 25**	GHS 223 0001 R0517	**32130 8**				
	32	**S 223-K 32**	GHS 223 0001 R0537	**32140 7**				
	40	**S 223-K 40**	GHS 223 0001 R0557	**32150 6**				
U_n	50	**S 223-K 50**	GHS 223 0001 R0577	**32160 5**				
690 V ~	63	**S 223-K 63**	GHS 223 0001 R0607	**32170 4**				

① 125 V ⎓ with 2 contact decks connected in series

Auxiliary switch 1 NO + 1 NC, to be fitted by user (convertable in 2 NO or 2 NC)

Auxiliary switch	**S 220-H 11**	GHS 220 1904 R0003	**31600 7**			0.05	10

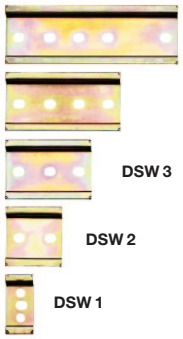
Industrial Miniature Circuit-Breakers
S 220 series
Accessories



END SK0090B00

SZ-FDT 2 2CDC 061 183 F0004

SZ-FST 2CDC 061 184 F0004



SK0100B00

ST + STE

SK0187B91

ST

SK0120B91

SK0010B95

description	order details type code	order code	bbn 40 12233 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc.
Filler plate							
material thickness 1 mm, light gray, compensates for mounting tolerances of modules of different heights							
	SZ-FW	GH L530 1901 R0001	**06030 6**			0.001	25
End brackets							
prevents lateral shifting of modular devices in DIN rails EN 50 022, 35 x 75 mm							
	END	GJ I100 1814 R0001	**59090 2**			0.02	50
Filling piece							
width 8.75 mm, as spacer, breakable to different heights, for DIN rails EN 50 022, 35 x 7.5 mm for miniature circuit-breakers S 220 (3 different heights)							
	SZ-FST	GJ I148 0003 R0001	**59410 8**			0.01	25
Spring piece							
holder for device covers, various heights available in connection with filling piece SZ-FST							
	SZ-FDT 2	GH L530 1908 R0005	**06080 1**			0.002	25
Device rails							
DIN rails (EN 50 022 – 35 x 7,5) for individual installations of miniature circuit-breakers and residual-current devices on an even surface (1 module = 17.5 mm)							
for 1 module	**DSW 1**	GH S210 1926 R0001	**13580 6**			0.006	10
for 2 modules	**DSW 2**	GH S210 1926 R0002	**13590 5**			0.012	10
for 3 modules	**DSW 3**	GH S210 1926 R0003	**13600 1**			0.018	10
for 4 modules	**DSW 4**	GH S210 1926 R0004	**13610 0**			0.024	10
for 6 modules	**DSW 6**	GH S210 1926 R0006	**13620 9**			0.036	10
Individual identification labels							
include transparent label carriers for slide-in paper labels (blank or marked). Can be used for switches, pushbuttons, indicators lights, latching relays, installations relays as well as MCBs, RCDs and ABB i-bus® EIB components.							
label carrier snap-on*	**ST**	GH S210 1945 R0002	**13820 3**				100
label (1 set = 300 pieces)	**ST-E**	GH S210 1946 R0002	**13830 2**				1 set
identification labels numbered 1 – 100	**ST-EN**	GH S210 1946 R0003	**64530 5**				1

*** for devices with label carrier**

Locking device for miniature circuit-breakers and switches

for the protection against unauthorised or unsafe operation of the operating lever. An adaptor makes it possible to block the operating lever whether switched ON or OFF. The lever is blocked with a padlock having a bar cross section of 3 or 6 mm max. For multipole devices, one lock may be fitted per pole.

Type of use

block against switching on	● block to prevent unwanted closing during maintenance work ● block and initialization notice ● block in the case of power cut-offs
block against switching off	● to prevent unwanted manual opening e.g. in alarm devices, ● air condition, It systems, etc.. ● re-initialization after tripping only possible by authorised personnel

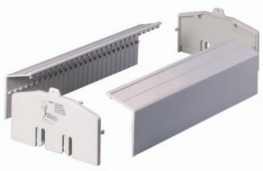
Industrial Miniature Circuit-Breakers
S 220 series
Accessories


SK0010B95


SA1
SK0108B91


SA2
SK0109B91


SA3
SK0110B91


KA 27 H + KA 27 S
2CDC 061194F0004


PCD 4 N
SK0077B96


PCD 8 N
SK0079B96


QES 4/3 N
SK0019B98

description	order details type code	order code	bbn 40 16779 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc
The lock adapter can be used for all miniature circuit-breakers of series S 200, S 270, S 280, switches of series E 220 and 270 as well as residual-current-operated miniature circuit-breaker F 370, multiSTOTZ, F 270 and people protector P 270.							
locking device 3 mm	**SA 1**	GJ F110 1903 R0001	**58760 5**			0.004	10
locking device 6 mm	**SA 1E**	GJ F110 1903 R0004	**58790 2**			0.004	10
padlock with two keys	**SA 2**	GJ F110 1903 R0002	**58770 4**			0.02	10
padlock, identical locking with two keys	**SA 2 i**	GJ F110 9999 R0001	**96940 1**			0.02	10
lock adapter incl. padlock with 3 keys in transparent box	**SA 3**	GJ F110 1903 R0003	**58780 3**			0.05	10

Terminal cover KA 27

for complete protection against electric shock. Suitable for switchgear installations according to DIN VDE 0106, Part 100 and VBG 4.

End parts can be snapped onto mounting rails EN 50 022, 35 mm. The hoods are 486 mm = 27 modules (each 18 mm) long, parts can be cut to length at a half-module's length with the help of inside knockouts.

Hood, 1 piece	**KA 27 H**	GH S210 1933 R0001	**13630 8**			0.104	10
end piece, 1 piece	**KA 27 S**	GH S210 1934 R0001	**13640 7**			0.027	10

Terminal cover with base plate, IP 40 protection

Material: high-impact and flame-retardant color: white (RAL 9001)

The base plate has an integrated top-hat mounting plate profile and can be fitted with snpp-on devices, e.g. miniature circuit-breakers, rcd, modular installation devices, installation motor switches, etc.

for 2 modules	**PCD 2 N ①**	GH S270 1921 R0002	**11869 8***			0.08	1
for 4 modules	**PCD 4 N ①**	GH S270 1921 R0004	**11872 8***			0.14	1
for 6 modules	**PCD 6 N ①**	GH S270 1921 R0006	**11877 3***			0.175	1
for 8 modules	**PCD 8 N ①**	GH S270 1921 R0008	**14222 8***			0.63	1
Accessories							
blanking plate, white, RAL 9001, 1 module = 17.5 mm with half pitch	**BP ①**	GH S270 1913 R0001	**12629 7***			0.005	10

① for retrofitting in terminal covers PCD...
* **bbn-No. 80 00126**

Plastic housing, IP 55* protection

complete with mounting rail EN 50 022 cable entry grommet **without** N + PE bus terminals (see SMO) Material: high-impact & flame-retardant (UL 94 V-0), color gray (RAL 7035), glow-wire test 960 °C according to EC 695-2-1

knock-outs ø in mm	sleeves-included	order details type code	order code	bbn 80 00126 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc
Housing for 4 modules								
2 x ø 27	2	**QES 4/3 N**	GH L111 2304 R0013	**11925 1**			0.330	1
Housing for 6 modules								
2 x ø 27	2	**QES 6/3 N**	GH L111 2306 R0013	**11931 2**			0.420	1

* sealable

Description

The busbar systems are included in a complete program that makes installations in consumer unit built-in devices safe and efficient e.g. of line protection devices (MCB), residual-current devices with or without overcurrent release (RCCB, RCBO) and modular installation devices (MDRC).

When choosing the right busbar, consider the following:

- **type of terminal**(e.g. combined box, box or screw-type terminals)[1)]
- **No. of poles of the devices (**e.g. 1-, 2-, 3-, 4-pole, 1-pole+ neutral NA, 3-pole+ neutral NA)
- **type of device:** line protection **(**MCB), residual current device (RCCB, RCBO) or modular installation devices (MDRC)
- **device mix**(e.g. MCD and MDRC on one rail)
- **use of additional devices** (e.g. MCB plus auxiliary switch)
- **busbar connection capacity** (current-carrying capacity)
- **No. of modules** (busbars supplied at various lengths)

[1)] box and screw-type terminals are no longer used in the current ABB product range.

Technical data

specifications	DIN EN 60439 Part 1 (VDE 0660 Part 500): 2000-08 IEC 60 439 Part 1	test surge voltage: (1.2/50)	6.2 kV
rail materials:	SF-Cu F 24	conditional operating current-short circuit current I_{cc}:	25 kA
housing materials:	plastic, Cycoloy 3600 temperature-resistant ≥ 90° C flame-retardant, self-extinguishing dioxin and halogen-free	climatic resistance:	constant climate: 23/83; 40/92; 55/20 acc. to DIN 50015, damp heat, cyclic 28 cycles (= IEC 68 Part 2 – 30)
busbar capacities:	6 mm² – 36 mm²	insulation coordination:	according to VDE 0110 Part 1 April 1997 (IEC 664)
rated current operating voltage U_c:	400 V AC	overvoltage category:	III
operating current I_n:	63 A (10 mm²) 80 A (16 mm²)	pollution degree:	2
rated surge withstand-capability U_{imp}:	4 kV		

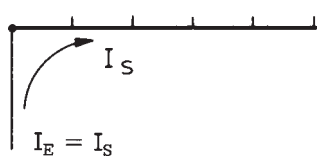
All busbars of type PSB and KS are UL/CSA approved.

Loads depending on the supply point and the required connection capacity

end feeding	**comb-and oblong-hole busbars (type KS)**					**busbar blocks (type PS/PSB)**	
cross section / mm²	10	12	20	24	36	10	16
maximum busbar current I_S/phase A	63	65	90	100	130*	63	80
non-end feeding (center or elsewhere)							
maximum current in branch I_E/phase [1)] A	100	110	150*	170*	220*	100	130*
maximum supply current I_E/phase A	depends on connection capacity						

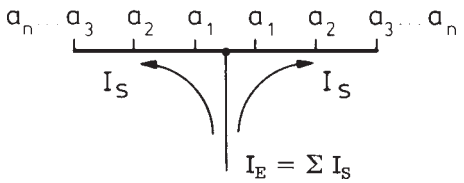
* If fed via the device terminals, always ensure that the following values are not exceeded, irrespective of the current carrying capacity (IS) of the busbar:
For series S 260, S 270, S 200 and S 200 M max. 110 A; for series S 280 max. 140 A
If the combined values of all individual currents exceed the value assigned to the terminal, a feeder terminal can be used.

feeding at end of busbar



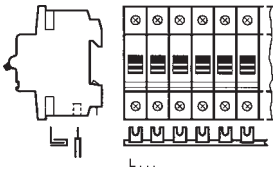
SK 0063 Z 91

non-end or center-fed

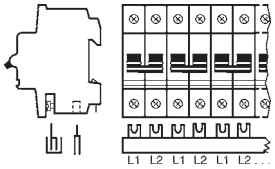


SK 0063 Z 91

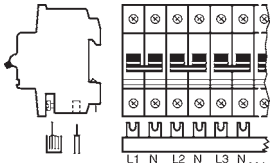
In the case of center-fed installations (see right picture) ensure that the sum of outgoing currents a_1...a_n per rail branch does not exceed the maximum the max. busbar current I_S/phase referred to above.



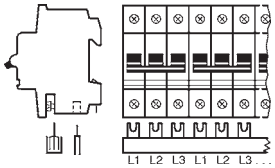
SZ-KS 18/12 N SK 0202 Z 99
SZ-KS 18/56 N
1-pole with 1 phase



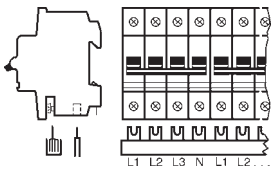
SK 0098 Z 96
SZ-PSB 53 N, SZ-PSB 54 N
SZ-PSB 55 N, SZ-PSB 56 N
1-pole + NA or
2-pole with 2 phases or
1 phase + N



SZ-PSB 58 N SK 0100 Z 96
SZ-PSB 60 N
1-pole + NA with 4 phases or
3 phases + N



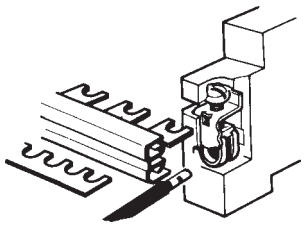
SK 0139 Z 96
SZ-PSB 3 N, SZ-PSB 4 N
SZ-PSB 11 N, SZ-PSB 12 N
1- or 3-pole with 3 phases



SK 0101 Z 96
SZ-PSB 61 N, SZ-PSB 62 N
SZ-PSB 63 N, SZ-PSB 64 N
3-pole + NA or
4-pole with 4 phases or
3 phase + N

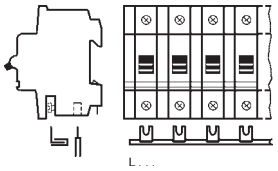
Insulated busbar blocks and comb busbars for miniature circuit-breakers with combined box terminals

(no terminals required)

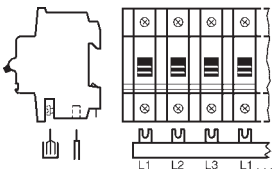


SK 0061 Z 91

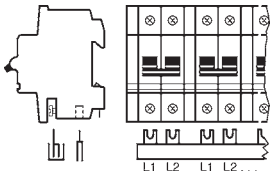
conn. capacity mm²	length supplied mm	No. of poles	order details type code	order code	bbn 40 12233 EAN	Cu-No.	price 1 pc. €	price group	weight 1 pc. kg	pack. units pc.
Universal comb busbars										
for MCBs: 1-pole										
supply: 1 phase										
12	207	12 x 1	**SZ-KS 1/12**	GJ I232 2322 R0001	**59790 1**	0.023			0.015	100
12	988	56 x 1	**SZ-KS 1/56**	GJ I232 2322 R0002	**59800 7**	0.110			0.073	50
24	207	12 x 1	**SZ-KS 2/12**	GJ I232 2322 R0003	**59810 6**	0.046			0.031	100
24	988	56 x 1	**SZ-KS 2/56**	GJ I232 2322 R0004	**59820 5**	0.220			0.138	50
36	988	56 x 1	**SZ-VB 45.32**	GJ I232 2148 R0001	**59720 8**	0.330			0.233	50
16	212	12 x 1	**SZ-KS 18/12N**	GH V036 0875 R0041	**74530 2**	0.071			0.073	50
16	1007	57 x 1	**SZ-KS 18/56N**	GH V036 0875 R0042	**74520 3**	0.320			0.300	50
Busbar blocks										
for MCBs: 1-pole+ NA or 2-pole										end caps:
supply: 1 phase + N or 2 phases										**PSB-END 3**
10	212	6 x 2	**SZ-PSB 53 N**	GH V036 0874 R0031	**54940 5**	0.070			0.078	30
10	1035	29 x 2	**SZ-PSB 54 N**	GH V036 0874 R0032	**54950 4**	0.320			0.403	10
16	212	6 x 2	**SZ-PSB 55 N**	GH V036 0874 R0033	**54960 3**	0.115			0.106	30
16	1035	29 x 2	**SZ-PSB 56 N**	GH V036 0874 R0034	**54970 2**	0.545			0.534	10
for MCBs: 1-pole+ NA										end caps:
supply: 3 phases + N										**PSB-END 4**
10	1056	29 x 2	**SZ-PSB 58 N**	GH V036 0874 R0036	**54990 0**	0.803			0.626	10
16	1056	29 x 2	**SZ-PSB 60 N**	GH V036 0874 R0038	**55010 4**	1.205			0.861	10
for MCBs: 1- or 3-pole										end caps:
supply: 3 phases										**PSB-END 6**
10	213	4 x 3	**SZ-PSB 3 N**	GH L520 1915 R0005	**29400 3**	0.085			0.082	30
10	1058	20 x 3	**SZ-PSB 4 N**	GH L520 1915 R0006	**29410 2**	0.505			0.468	10
16	213	4 x 3	**SZ-PSB 11 N**	GH L520 1916 R0005	**29420 1**	0.160			0.136	30
16	1058	20 x 3	**SZ-PSB 12 N**	GH L520 1916 R0006	**29430 0**	0.720			0.700	10
for MCBs: 3-pole+ NA or 4-pole										end caps:
supply: 3 phases + N										**PSB-END 4**
10	212	3 x 4	**SZ-PSB 61 N**	GH V036 0874 R0039	**55020 3**	0.120			0.112	30
10	1056	15 x 4	**SZ-PSB 62 N**	GH V036 0874 R0040	**55030 2**	0.803			0.650	10
16	212	3 x 4	**SZ-PSB 63 N**	GH V036 0874 R0041	**55040 1**	0.241			0.156	30
16	1056	15 x 4	**SZ-PSB 64 N**	GH V036 0874 R0042	**55050 0**	1.205			0.884	10



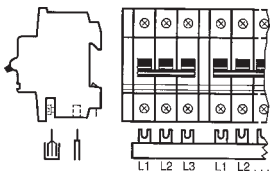
SZ-KS 3/39 N SK 0095 Z 96
SZ-KS 4/39 N
1-pole + aux.sw.. with 1 phase



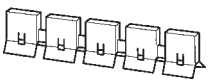
SZ-PSB 46 N SK 0096 Z 96
SZ-PSB 48 N
1-pole + aux.sw.. with 3 phases



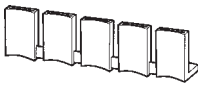
SK 0099 Z 96
SZ-PSB 92 N
2-pole + auxiliary switch with 2 phases
1-pole + NA + auxiliary switch, with 2 phases or
1 phase + N + auxiliary switch



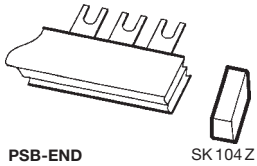
SK 0097 Z 96
SZ-PSB 49 N, SZ-PSB 50 N
SZ-PSB 51 N, SZ-PSB 52 N
3-pole + aux.sw.. with 3 phases



SZ-BSK 5 SK 0053 Z 95



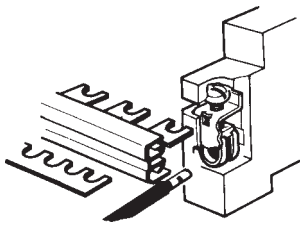
SZ-BSK SK 0186 Z 98



PSB-END SK 104 Z 97

Insulated bus bar blocks and an comb busbars for MCBS with combined box terminals

(no end caps required)



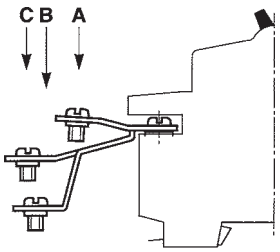
SK 0061 Z 91

conn. capacity mm²	length supplied mm	No. of poles	order details type code	order code	bbn 40 12233 EAN	Cu-No.	price 1 pc. €	price group	weight 1 pc. kg	pack. units pc.
Universal comb busbars										
for MCBs: supply:				**1-pole with auxiliary switch 1 phase**						
10	1020	39 x 1	**SZ-KS 3/39 N**	GH V036 0874 R0060	**55130 9**	0.205			0.206	10
16	1020	39 x 1	**SZ-KS 4/39 N**	GH V036 0874 R0062	**55150 7**	0.320			0.283	10
for MCBs: supply:				**1-pole with auxiliary switch 3 phases**						end caps: **PSB-END 3**
10	1018	13 x 3	**SZ-PSB 46 N**	GH V036 0874 R0024	**54870 5**	0.505			0.451	10
16	1018	13 x 3	**SZ-PSB 48 N**	GH V036 0874 R0026	**54890 3**	0.760			0.620	10
for MCBs: supply:				**2-pole with auxiliary switch 1 phase + N or 2 phases**						end caps: **PSB-END 3**
16	1044	24 x 2	**SZ-PSB 92 N**	GH V036 0875 R0010	**55380 8**	0.680			0.650	10
for MCBs: supply:				**3-pole with auxiliary switch 3 phases**						end caps: **PSB-END 3**
10	176	3 x 3	**SZ-PSB 49 N**	GH V036 0874 R0027	**54900 9**	0.105			0.076	30
10	980	16 x 3	**SZ-PSB 50 N**	GH V036 0874 R0028	**54910 8**	0.505			0.442	10
16	176	3 x 3	**SZ-PSB 51 N**	GH V036 0874 R0029	**54920 7**	0.152			0.104	30
16	980	16 x 3	**SZ-PSB 52 N**	GH V036 0874 R0030	**54930 6**	0.760			0.632	10
Insulated caps for busbar blocks										
	5pc's		**SZ-BSK 5***	GH V036 0505 R0001	**15430 7①**				0.003	10
	5pc's		**SZ-BSK**	GH V036 0505 R0002	**42000 6①**				0.003	10
End caps for insulated busbar blocks										
			PSB-END 6	GH L520 1921 R0007	**51453 8①**	–			0.001	50
			PSB-END 3	GH V036 1325 R0001	**55630 4**	–				50
			PSB-END 4	GH V036 1325 R0002	**55640 3**	–				50

* for busbar blocks SZ-PSB 3 N, 4 N, 11 N and 12 N

① bbn-Nr. 40 16779

Installation parts for the use of MCBs in busbar systems



VFK A-1 ... C 1 SK 0100 Z 98

SA 12-2 STT 121 90R

SZ-ESK2
SZ-ESK1

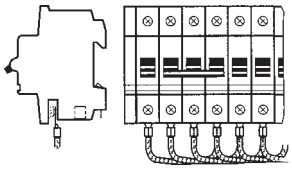
SK 0133 B 99 SK 0068 B 00

SZ-ESK

SZ-DB 121 2CDC 061 179 F0004

SZ-DB 123 2CDC 061 180 F0004

SZ-DB 125 N 2CDC 061 181 F0004



Example 1 SK 0086 Z 97
Connecting devices with different module widthswith SZ-DB 121 or 122

description	order details type code	order code	bbn 40 16779 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc.

Extended screw terminals

for busbar connections with oblong-hole or comb busbars.

For miniature circuit-breakers S 260, 270 and RCCBs F 370 and F 394

terminal A	**VFK A-1**	GH S270 1211 R0001	**36490 9**				10
terminal B	**VFK B-1**	GH S270 1212 R0001	**36500 5**				10
terminal C	**VFK C-1**	GH S270 1213 R0001	**36510 4**				10

Busbar adapter for busbar spacing 40 mm

for direct fitting of miniature circuit-breakers onto busbars 12 ... 15 x 5 mm.

I_n max. 32 A	**SA 11-2**	GJ M620 1910 R0211	**05858 5①**			0.23	1

Busbar adapter for busbar spacing 60 mm

for direct fitting onto motor starter combinations (miniature circuit-breaker and contactor) onto busbars 12 ... 30 x 5 mm.

I_n max. 32 A	**SA12-2**	GJ M620 1910 R0212	**05859 2①**			0.23	1

① bbn-Nr. 40 13614

conn. capacity mm²	length supplied mm	No. of poles	order details type code	order code	bbn 40 12233 EAN	Cu-No.	price 1 pc. €	price group	weight 1 pc. kg	pack. units pc.

Feeder terminal

Safe from touch by the back of the hand or the finger according to DIN VDE 0106 T100 (BGV A2). Single-pole terminals can be connected in series as multi-pole terminals.

6-35			**SZ-ESK**	GH V036 0501 R0021	**50661 8**				0.030	10
6-35			**SZ-ESK2**	GH V036 0501 R0001	**96920 3**				0.024	10
6-25			**SZ-ESK1**	GH V036 0501 R0020	**51841 3**				0.031	10

Wiring bridges

with fork-type cable lug (black)

6	125		**SZ-DB 121**	GH V036 1425 R0001	**55650 2**	0.006			0.01	1000/50
10	135		**SZ-DB 122 N**	GH V036 1425 R0031	**55670 0**	0.010			0.02	500/25
6	260		**SZ-DB 231 N**	GH V036 1425 R0032	**55680 9**	0.014			0.02	500/25
10			**SZ-DB 232 N**	GH V036 1425 R0033	**55690 8**	0.022			0.04	250/25
10	330		**SZ-DB 311**	GH V036 1425 R0034	**55700 4**	0.029			0.05	100/25

with fork-type cable lug and connector sleeve (black)

6	125		**SZ-DB 123**	GH V036 1425 R0006	**55660 1**	0.007			0.01	1000/50
10	135		**SZ-DB 124 N**	GH V036 1425 R0035	**55710 3**	0.012			0.02	500/25
6	260		**SZ-DB 235**	GH V036 1425 R0036	**55720 2**	0.014			0.02	500/25
10			**SZ-DB 236**	GH V036 1425 R0037	**55730 1**	0.024			0.04	250/25

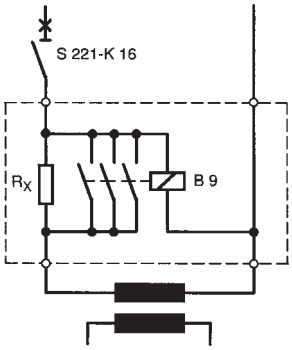
with connector sleeves (black)

6	125		**SZ-DB 125 N**	GH V036 1425 R0038	**55740 0**	0.007			0.01	1000/50
6	260		**SZ-DB 233 N**	GH V036 1425 R0039	**55750 9**	0.015			0.02	500/25
10	135		**SZ-DB 126 N**	GH V036 1425 R0040	**55760 8**	0.013			0.02	500/25
10	260		**SZ-DB 234 N**	GH V036 1425 R0041	**55770 7**	0.025			0.04	250/25
10	330		**SZ-DB 312**	GH V036 1425 R0042	**55780 6**	0.032			0.05	100/25

Practical examples

Attenuation of inrush currents

The making time of a B-type contactor is 9 … 17 ms. If the transit time is not sufficient, it is possible to snap onto the contactor e.g. a delay-on pneumatic timer (0.1 … 40 s). The resistor R_x must be designed to provide for the loads to be expected (ca. 5 W).



SK 0183 Z 96

Determination of Resistor Rx:

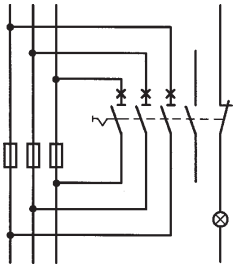
$$R_x > \frac{1.1\ U_n}{I_H}$$

U_n = voltage
I_H = electromagnetic rated peak withstand current of S 221 – K ($8 \times I_n$)
see table on page 7

Monitoring of Fuses

S 220-K 0,2 is particularly suitable for monitoring fuses because the device has an unlimited switching capacity due to its high internal resistance.

When isolating the fuses, ensure that also the miniature circuit-breaker is switched off.



at 230/400 V AC

SK 0210 Z 95

Protection of lamp circuits

1. Filament lamps and fluorescent lamps
   Miniature circuit-breakers with K-type characteristic can be operated at their full nominal current I_n when the following are adequately protected :
   filament lamps
   fluorescent lamps a) non-compensated
   b) shunt compensated (cos φ = 0.95)
2. High-pressure discharge lamps
   Starting current: ca. 1.7 x lamp's nominal current
   Recovery time : ca. 3 … 5 min.

Depending on the type of lamp, the line impedance and start/stop torque the so-called rectifier effect may occur which superimposes the starting current of the lamp for some half-waves.

In the most unfavorable circumstances, inrush currents of 15 times of the lamp nominal current may ensue

To avoid nuisance tripping, MCBs with K-type characteristic should not carry loads higher than the 0.6-fold of the lamp current. The load factor indicated refers to the least favorable case (proximity to transformer, low line impedances).

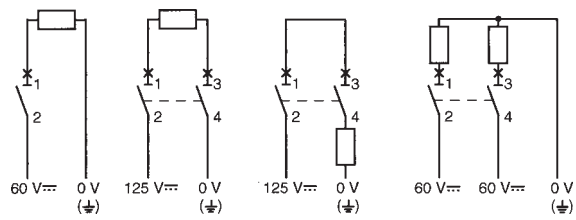
Use of S 220 miniature circuit-breakers in DC systems 60 V ⎓/110 V ⎓

In DC systems up to 60 V DC or, as the case may be, series connection of two poles up to 110 V DC, ordinary S 200/S 200 M series MCBs can be used.

Polarity does not need to be taken into consideration, the outgoing circuit may be implemented from above or below the device.

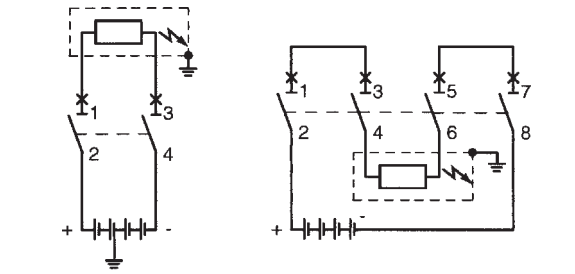
For higher direct voltage up to 440 V ⎓ DC, devices of the S 280 UC series must be used.

Examples for permissible voltages between conductors depending on the number of poles and the circuit design:

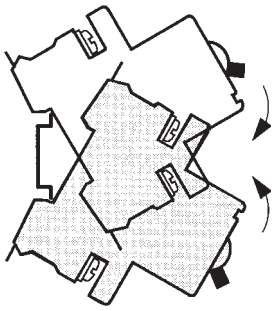


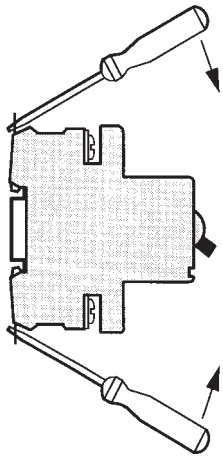
SK 0173 Z 99

Examples for various voltages between a conductor and earth when the same voltage between the conductors is the same:

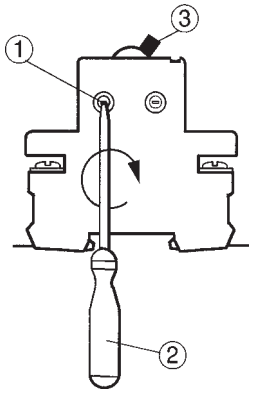


SK 0174 Z 99





SK 0191 Z 96



SK 0209 Z 93

Installation and operation instructions

1. Technical data: see page 5

2. Installation

Can be installed in any mounting position due to snap-on fixing to DIN rails EN 60 715, 35 mm width.

3. Connection

Ensure that conductors are connected correctly and firmly.
Max. tightening torque 2 Nm, and 0.5 Nm in the case of the terminals of the auxiliary switch.
Connection drawings see below.

4. Operation

Miniature circuit-breakers are switched on by switching the operating lever in the direction of the nameplate. The operating lever now indicates the I“ operating position.
If an MCB, after having tripped(switching position „O“visible), can be switched on again off-handedly, tripping is probably caused by overload.
If the MCB trips again immediately when trying to reclose after a short period of time, a complete short-circuit, or as the case may be, earth connection can be assumed.
Do not try and continuously re-close an existing short circuit or earth fault. The MCB trips under overload, or short-circuit or earth fault conditions, even if the operating lever is maintained in the ON position by force (trip-free mechanism).

5. Cleaning the device

MCBs soiled by installation work should be cleaned with a dry, or, if necessary, a dampy and soapy cloth.
Never use caustic agents or dissolvents

6. Maintenance

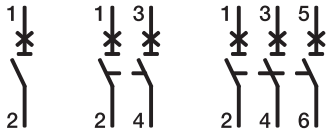
ABB MCBs are maintenance-free.

7. Fitting of auxiliary switches

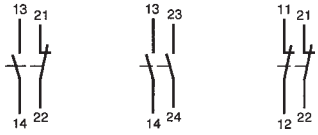
S 220 has a knockout on the upper left hand side ① to add the auxiliary switch.
Use a screwdriver ② to remove the knockout.
Switch operating lever ③ into the OFF position„O“ b. You can now see the pin of the tubular rivet.
Attach the auxiliary switch to the MCB and make sure that the outlines match the edges. When dong so, the driver pin of the auxiliary switch is inserted into the pin of the tubular rivet. Fix with the two screws supplied. Max. tightening torque 0.4 Nm.

8. Wiring diagrams

supply optional, top or bottom, terminal designation according to EN 50 005.



2CDC 022 023 F0005



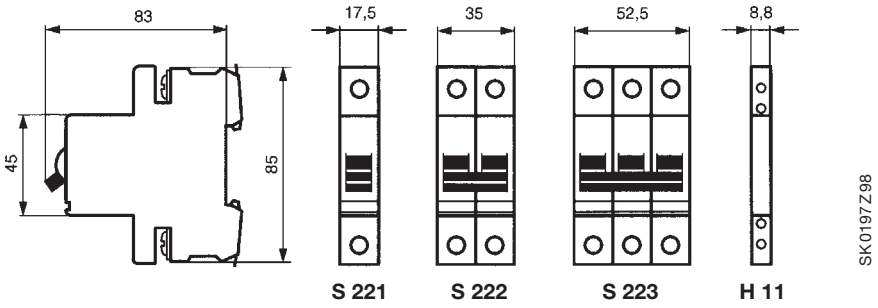
SK 0030 Z 92

9. Conversion of auxiliary switches

By reversing moving contacts, NO can be converted in NC and vice versa.
Converted auxiliary switches are fitted with self-adhesive labels showing the new wiring diagram; they are included in the initial delivery.

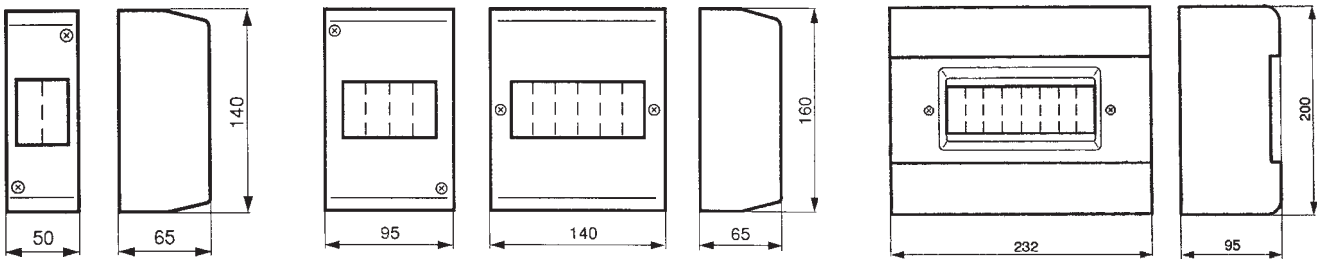
description	order details type code	order code	bbn 40 12233 EAN	price 1 piece €	price group	weight 1 pc. kg	pack. units pc
Auxiliary switch 1 NO + 1 NC, to be retrofitted by the user (convertable in 2 NO or 2 NC)							
auxiliary switch	**S 220-H 11**	GH S220 1904 R0003	**31600 7**			0.05	50

Dimensions in mm



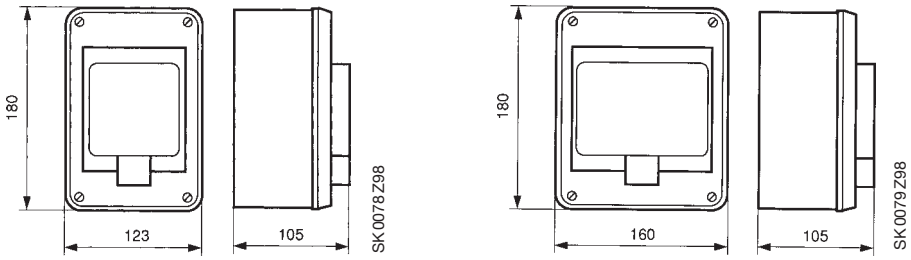
S 221 S 222 S 223 H 11

Terminal covers



PCD 2 N SK0136Z96 **PCD 4 N** **PCD 6 N** SK0137Z96 **PCD 8 N** SK0138Z96

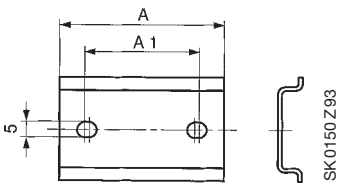
Plastic housings



QES 4/3 N **QES 6/3 N**

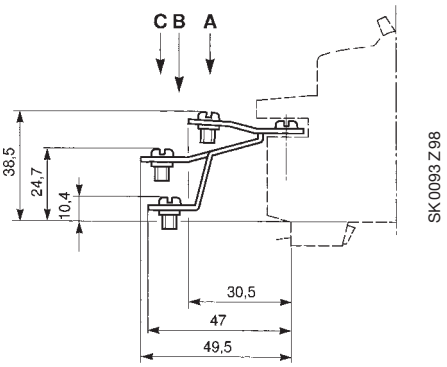
Mounting plates

① DSW 1 has vertical drill holes.



designation	A	A1
DSW 1 ①	17,5	15
DSW 2	35	20
DSW 3	52,5	37,5
DSW 4	70	55
DSW 6	105	90

Extended screw terminals



Miniature circuit-breakers for line and device protection as well as their respective areas of application

Areas of application	S 200 S 200 M	S 201 DC	S 280 S 200 P	S 220	S 500	S 610	S 700 WT 63 ①
industrial networks **690 V ~** **1000 V ~**				S 220	S 500 S 500 HV		WT 63
motor protection transformer	S 200-K		S 200-K S 280	S 220-K	S 500-K	S 610-K	S 700-K
USV photovoltaics 250 V ⎓ to 1200 V ⎓			S 280 UC		S 500 UC		
semicon-ductor control circuits 24 V DC	S 220-Z		S 200P-Z				
high discrimination							S 700
disconnector and main circuit breaker capabilities			S 200 P	S 220	S 500	S 610	S 700
USA, Canada 1077 489 **480 V AC** **500 V DC** **240 V AC** **60 V DC**	S 200	S 201 DC	S 200 P S 280 UC S 200 UP S 200 U	S 220	S 500		
nautical classifications **GL LRS** **BV DNV**	S 200		S 200 P S 280 UC	S 220	S 500	S 611 K (bis 63 K)	S 700 (GL)
rated current switching capacity (230/400 V) I_{cn}/A I_n/A	6 000 10 000 ≤ 63	14 000 ≤ 25	25 000 0.5 … 25	10 000 ≤ 32	30 000 ≤ 63	50 000 ≤ 100	25 000 ≤ 100
innovative cost reduction **System pro *M* compact®**	S 200 S 200 M	S 201 DC	S 200 P				

① as selective group or full automat

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