

ELSB - "ENERGY DISTRIBUTION"

# S200 MT NEW Miniature Circuit Breaker

Endurance and safety for rolling stock applications



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Introducing the improved S200 MT in our wide MCB portfolio



Difference old to new S200 MT



Replacement of traditional S200 MT– with same dimensions but overall better performance

- + new toggle
- + real CPI Window
- + new material (EN45545-2 and NFPA-130 compliant)
- + improved clamp

**High short circuit capacity** 15 kA according to IEC/EN 60947-2 10 kA according to IEC/EN 60898

**High short circuit capacity** 15 kA according to IEC/EN 60947-2 10 kA according to IEC/EN 60898

Rated insulation voltage Ui acc. to IEC/EN 60664-1 up to 440 V AC

Made for extreme situation i.e. wider temperature range

-40°C to 70°C



S200 MT Miniature Circuit Breaker – Endurance and safety for rolling stock applications



COMPLIANCE TO TRACTION STANDARDS ROBUSTNESS & HIGH ELECTRICAL ENDURANCE

SPACE & WEIGHT SAVINGS FLEXIBILITY & EASY REPLACEMENT

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Full range compatibility With existing accessories



**Compact dimensions** (88 x 69 x 17.5 mm)



**European quality** Designed and made in Germany



COMPLIANCE TO TRACTION STANDARDS

- Fire and Smoke (NFPA-130 & EN45545-2)
- Compliant to product standards (IEC/EN 60898-1, IEC/EN 60947-2, UL 1077, CSA 22.2 No. 235)
- Vibration and Shock approved (IEC/EN 61373)
- Environmental conditions (damp heat) (IEC/EN 60068-2-30)

ROBUSTNESS & HIGH ELECTRICAL ENDURANCE

- Electrical endurance with 20.000 cycles up to 32 A
- Wide temperature span from -40°C to 70°C
- Strong resistance to extreme humidity and dryness



SPACE & WEIGHT SAVINGS

- Compact dimensions: 88 x 69 x 17.5 mm
- Ensure high protection with a smaller cable cross-section diameter than conventional solutions, saving cable costs, space and weight



- Flexible range compatible with System pro M compact<sup>®</sup> standard and ring lugs accessories
- Fast and intuitive ordering thanks to self-speaking codes
- 1:1 dimension with the old version

Introducing the improved S200 MT in our wide MCB portfolio



		S200 MT new	S200MT (current Version)
General Data			
Standards		IEC/EN 60898-1, IEC/EN 60947-2 UL 1077, CSA 22.2 No. 235	IEC/EN 60898-1, IEC/EN 60947-2
Poles		1P, 2P, 3P, 4P, 1P+N, 3P+N	1P, 2P, 3P, 4P, 1P+N, 3P+N
Tripping characteristics		B, C, D, K, Z	B, C, D, K, Z
Rated current In	А	from 0.2 63 A	0.5 63 A
Rated frequency f	Hz	50 / 60 Hz	50 / 60 Hz
Rated insulation voltage U <sub>i</sub> acc. to IEC/EN 60664-1	V	440 V AC	250 V AC (phase to ground), 440 V AC (phase to phase)
Overvoltage category		Ш	III
Pollution degree		3	3
Electrical endurance	ops.	In < 32A: 20,000 ops (AC), In ≥ 32A: 10,000 ops. (AC); 1,000 ops. (DC); 1 cycle (2s - ON, 13s - OFF, In ≤ 32A), 1 cyle (2s - ON, 28s - OFF, In > 32A)	In < 32A: 20,000 ops. (AC), In ≥ 32A: 10,000 ops. (AC); 1,000 ops. (DC); 1 cycle (2s - ON, 13s - OFF, In ≤ 32A), 1 cycle (2s - ON, 28s - OFF, In > 32A)

#### Data acc. to IEC/EN 60898-1

Rated operational voltage U <sub>n</sub>	v	1P: 230/400 V AC; 1P+N: 230 V AC ; 24P: 400 V AC; 3P+N: 400 V AC	1P: 230/400 V AC; 1P+N: 230 V AC; 24P: 400 V AC; 3P+N: 400 V AC AC
Max. power frequency recovery voltage (U <sub>max</sub> )	v	1P: 253 V AC; 1P+N: 253 V AC; 2P: 440 V AC; 34P: 440 V AC; 3P+N: 440 V AC;	1P: 253 V AC; 1P+N: 253 V AC; 24P: 440 V AC; 3P+N: 440 V AC 1P: 66 V DC; 2P: 125 V DC
Min. operating voltage	V	12 V AC - 12 V DC	12 V AC - 12 V DC
Rated short-circuit capacity I <sub>cn</sub>	kA	10 kA	10 kA
Energy limiting class (B, C up to 40 A)		3	3
Rated impulse withstand voltage U <sub>imp.</sub> (1.2/50µs)	kV	4 kV (test voltage 6.2kV at sea level, 5kV at 2,000m)	4 kV (test voltage 6.2 kV at sea level; 5 kV bei 2,000 m)
Dielectric test voltage	kV	2 kV (50 / 60Hz, 1 min.)	2 kV (50 / 60 Hz, 1 min.)
Reference temperature for tripping characteristics	°C	B, C, D: 30°C	B, C, D: 30 °C



		S200 MT new	S200MT (current Version)
Data acc. to IEC/EN 60947-2			
Rated operational voltage U <sub>e</sub>	v	1P: 230 V AC; 1P+N: 230 V AC; 24P: 440 V AC; 3P+N: 440 V AC	1P: 230 V AC; 1P+N: 230 V AC; 24P: 400 V AC; 3P+N: 400 V AC
Max. power frequency recovery voltage (U <sub>max</sub> )	v	1P: 253 V AC; 1P+N: 253 V AC; 2P4P: 462 V AC; 3P+N: 462 V AC; 1P: 72 V DC; 2P: 125 V DC	1P: 253 V AC; 1P+N: 253 V AC; 24P: 440 V AC; 3P+N: 440 V AC 1P: 66 V DC; 2P: 125 V DC
Min. operating voltage	V	12 V AC - 12 V DC	12 V AC - 12 V DC
Rated ultimate short-circuit breaking capacity I <sub>cu</sub>	kA	15 kA	≤ 40 A: 15 kA 50, 63 A: 10 kA
Rated service short-circuit breaking capacity $I_{cs}$	kA	≤ 40 A: 11.2 kA 50, 63 A: 7.5 kA	≤ 40 A: 11.2 kA 50, 63 A: 7,5 kA
Rated impulse withstand voltage U <sub>imp.</sub> (1.2/50µs)	kV	4 kV (test voltage 6.2kV at sea level, 5kV at 2,000m)	4 kV (test voltage 6.2 kV at sea level; 5 kV bei 2,000 m)
Dielectric test voltage	kV	2 kV (50 / 60Hz, 1 min.)	2 kV
Reference temperature for tripping characteristics	°C	B, C, D: 55°C; K, Z: 30°C	В, С, D: 55 °С; К, Z: 20 °С

#### Data acc. to UL / CSA

Rated voltage	v	480Y / 277 V AC; 1P: 60 V DC; 2P4P: 125 V DC	
Rated interrupting capacity acc. to UL 1077	kA	6 kA AC; 10 kA DC	
Short-circuit current rating acc. to UL 489			
Application		Suppl. prot. for general use. Application Codes: TC2, OL0, SC: U1	
Reference temperature for tripping characteristics	°C	B, C, D, K, Z: 25°C	
Electrical endurance	ops.	6,000 ops (AC), 6,000 ops. (DC); 1 cycle (1s - ON, 9s - OFF)	

		S200 MT new	S200MT (current Version)
Mechanical Data			
Housing		Insulation group I, RAL 7035	Insulation group I, RAL 7035
Toggle		Insulation group II, black, sealable	Insulation group II, black, sealable
Contact position indication		Marking on toggle (I ON / 0 OFF), Real CPI (red ON / green OFF)	Marking on toggle (I ON / 0 OFF)
Protection degree acc. to EN 60529		IP20*, IP40 in enclosure with cover	IP20*, IP40 in enclosure with cover
Mechanical endurance	ops.	20,000 ops.	20,000 ops.
Shock resistance acc. to IEC/EN 60068-2-27		25 g - 2 shocks - 13 ms	30 g - 3 shocks - 11 ms
Vibration resistance acc. to IEC/EN 60068-2-6		5g - 20 cycles at 51505 Hz with load 0.8I <sub>n</sub>	5g - 20 cycles at 51505 Hz with load 0,8I <sub>n</sub>
Environmental conditions (damp heat) acc. to IEC/EN 60068-2-30	°C/RH	28 cycles with 55°C/90-96% and 25°C/95-100%	28 cycles with 55°C/90-96% and 25°C/95-100%
Ambient temperature	°C	-40 +70°C	-25 °C+55 °C
Storage temperature	°C	-40 +70°C	-40 °C+70 °C

			S200 MT new	S200MT (current Version)	
Installation					
Terminal			Failsafe bi-directional cylinder-lift terminal	Failsafe bi-directional cylinder-lift terminal	
Cross-section of conductors (top / bottom)	Solid / Stranded	mm²	0.75 mm² 35 mm²	0.75 mm² 25 mm²	
	Flexible	mm²	0.75 mm² 25 mm²	0.75 mm² 16 mm²	
		AWG	18 - 4 AWG		
Cross-section of busbars (top / bottom)		mm²	10 mm² / 10 mm²	10 mm² / 10 mm²	
		AWG	14 - 8 AWG		
Tightening Torque		Nm	2.8 Nm	2,8 Nm	
		in-Ibs.	18 in-Ibs.		
Screwdriver			No. 2 Pozidrive	No. 2 Pozidrive	
Mounting			On DIN rail 35 mm acc. to EN 60715 by fast clip	On DIN rail 35 mm acc. to EN 60715 by fast clip	
Mounting position			any	any	
Supply			optional	optional	
Dimensions and weight					
Mounting dimensions acc. to DIN 43880			Mounting dimension 1	Mounting dimension 1	
Pole dimensions (H x D x W)		mm	88 x 69 x 17.5 mm	88 x 69 x 17.5 mm	
Pole weight		g	ca. 115 g	ca. 115 g	

#### Combination with aux. elements

Auxiliary contact	Yes	Yes
Signal contact	Yes	Yes
Shunt trip	Yes	Yes
Undervoltage release	Yes	Yes
Motor Operating Device	Yes	Yes

### **Tripping Characteristics S200 MT**<sup>NEW</sup>

Characteristics B, C, and D according to IEC-EN60898

### Better protection of cable:

- Upper limit is equal → protection of cables ensured
- lower limit respects change of tripping behavior due to load during life cycle
- In case of in-rush currents same behavior due to magnetic release

ABB Gerätetyp / ABB MCB Type ABB Gerätetyp / ABB MCB Type ABB Gerätetyp / ABB MCB Type S200MT - B S200MT - C S200MT - D Auslösekennlinie 60898-1 / Tripping Characteristic 60898-1 Auslösekennlinie 60898-1 / Tripping Characteristic 60898-1 Auslösekennlinie 60898-1 / Tripping Characteristic 60898-9<sub>R</sub>= 30°C 12= 1.45x I 1= 1 13x In 12= 1.45x I 10000 00 10000 00 = tripping curve from cold sta = tripping curve from cold sta a= thermal trippin a= thermal tripping a= thermal tripping b= magnetic tripp b= magnetic trippi 1000.000 1000,000 1000 000 100.000 100,000 100.000 S S Ig time [s] -5 10,000 g 10 000 5 10.00 n / Tripp Trip 1,000 1 000 AC: 0,100 0.100 0 10 0,010 0,010 0.010 4 5 7 10 5 7 10 15 Vielfaches des Nennstromes / Multiple of rated current [l / In] Vielfaches des Nennstromes / Multiple of rated current [I Vielfaches des Nennstromes / Multiple of rated current

Note: old curves for new devices directly after production new curves over the complete life-time with tolerances (more realistic)

### **Tripping Characteristics S200 MT**<sup>NEW</sup>

Characteristic B, C, and D according to IEC-EN60947-2

### Better protection of cable:

- Upper limit is equal → protection of cables ensured
- lower limit respects change of tripping behavior due to load during life cycle
- In case of in-rush currents same behavior due to magnetic release

ABB Gerätetyp / ABB MCB Type ABB Gerätetyp / ABB MCB Type ABB Gerätetyp / ABB MCB Type S200MT - B S200MT - C S200MT - D Auslösekennlinie 60947-2 / Tripping Characteristic 60947-2 Auslösekennlinie 60947-2 / Tripping Characteristic 60947-2 Auslösekennlinie 60947-2 / Tripping Characteristic 60947-2 **∂**₀= 55°C ∂<sub>R</sub>= 55°C ∂₀= 55°C 11= 1.05x In 12= 1.30x I 11= 1 05x In 10000 ( 10000.0 ①= tripping curve from cold state ripping curve from cold sta a= thermal tripping a= thermal tripping a= thermal tripping b= magnetic trip b= magnetic tripr 1000,000 1000.000 1000.000 100,000 100.000 100,000 ne [s] S Ig time [s] а g tin 10.000 10 000 10.000 Tripp / Tric 1.000 1 000 1.000 AC: AC 0 100 0 100 0 100 0.010 0.010 0.010 3 4 5 7 10 5 7 10 15 Vielfaches des Nennstromes / Multiple of rated current [l / In] Vielfaches des Nennstromes / Multiple of rated current [I Vielfaches des Nennstromes / Multiple of rated current

Note: old curves for new devices directly after production new curves over the complete life-time with tolerances (more realistic)



### **Tripping Characteristics S200 MT**<sup>NEW</sup>

Characteristic K and Z according to IEC-EN60947-2

### Better protection of cable:

- Upper limit is equal → protection of cables ensured
- lower limit respects change of tripping behavior due to load during life cycle
- In case of in-rush currents same behavior due to magnetic release





Note: old curves for new devices directly after production new curves over the complete life-time with tolerances (more realistic)

ABB

# Derating of load capability S200MT

Deviating ambient temperature

### Tripping characteristics B, C, and D

Auslöse- charakteristik / Tripping	Bemessungs- strom /		Max. Betriebsströme in Abhängigkeit von der Umgebungstemperatur T (°C) /										
characteristic	Current Rating			Max. C	Operating	currents o	depending	g on the a	mbient te	mperature	e T (°C)		
	In (A)	-40	-30	-20	-10	0	10	20	30	40	50	60	70
	0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,4
	1	1,2	1,2	1,2	1,1	1,1	1,1	1,0	1,0	1,0	0,9	0,9	0,9
	1,6	1,9	1,9	1,8	1,8	1,7	1,7	1,7	1,6	1,6	1,5	1,5	1,4
	2	2,4	2,4	2,3	2,2	2,2	2,1	2,1	2,0	1,9	1,9	1,8	1,8
	3	3,6	3,5	3,5	3,4	3,3	3,2	3,1	3,0	2,9	2,8	2,7	2,6
	4	4,8	4,7	4,6	4,5	4,4	4,2	4,1	4,0	3,9	3,8	3,6	3,5
	6	7,3	7,1	6,9	6,7	6,5	6,4	6,2	6,0	5,8	5,6	5,5	5,3
	8	9,7	9,4	9,2	9,0	8,7	8,5	8,2	8,0	7,8	7,5	7,3	7,0
B, C and D	10	12,1	11,8	11,5	11,2	10,9	10,6	10,3	10,0	9,7	9,4	9,1	8,8
	13	15,5	15,5	15,0	14,5	14,0	14,0	13,5	13,0	12,5	12,0	12,0	11,5
	16	19,5	19,0	18,5	18,0	17,5	17,0	16,5	16,0	15,5	15,0	14,5	14,0
	20	24,0	23,5	23,0	22,5	22,0	21,0	20,5	20,0	19,5	19,0	18,0	17,5
	25	30,5	29,5	29,0	28,0	27,5	26,5	26,0	25,0	24,5	23,5	23,0	22,0
	32	38,5	38,0	37,0	36,0	35,0	34,0	33,0	32,0	31,0	30,0	29,0	28,0
	40	48,5	47,0	46,0	45,0	43,5	42,5	41,0	40,0	39,0	37,5	36,5	35,0
	50	60,5	59,0	57,5	56,0	54,5	53,0	51,5	50,0	48,5	47,0	45,5	44,0
	63	76,0	74,5	72,5	70,5	68,5	67,0	65,0	63,0	61,0	59,0	57,5	55,5

### Tripping characteristics K and Z

Auslöse- charakteristik	Bemessungs- strom		Max. Betriebsströme in Abhängigkeit von der Umgebungstemperatur T (°C)										
/ Tripping characteristic	/ Current Rating		, Max. Operating currents depending on the ambient temperature T (°C)										
	In (A)	-40	-30	-20	-10	0	10	20	30	40	50	60	70
	0,2	0,3	0,3	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2
	0,3	0,4	0,4	0,4	0,4	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
	0,5	0,6	0,6	0,6	0,6	0,6	0,5	0,5	0,5	0,5	0,5	0,5	0,4
	0,75	1,0	1,0	0,9	0,9	0,9	0,8	0,8	0,75	0,7	0,7	0,7	0,7
	1	1,2	1,2	1,2	1,1	1,1	1,1	1,0	1,0	1,0	0,9	0,9	0,9
	1,6	1,9	1,9	1,8	1,8	1,7	1,7	1,7	1,6	1,6	1,5	1,5	1,4
	2	2,4	2,4	2,3	2,2	2,2	2,1	2,1	2,0	1,9	1,9	1,8	1,8
	3	3,6	3,5	3,5	3,4	3,3	3,2	3,1	3,0	2,9	2,8	2,7	2,6
	4	4,8	4,7	4,6	4,5	4,4	4,2	4,1	4,0	3,9	3,8	3,6	3,5
K and 7	6	7,3	7,1	6,9	6,7	6,5	6,4	6,2	6,0	5,8	5,6	5,5	5,3
	8	9,7	9,4	9,2	9,0	8,7	8,5	8,2	8,0	7,8	7,5	7,3	7,0
	10	12,1	11,8	11,5	11,2	10,9	10,6	10,3	10,0	9,7	9,4	9,1	8,8
	13	15,5	15,5	15,0	14,5	14,0	14,0	13,5	13,0	12,5	12,0	12,0	11,5
	16	19,5	19,0	18,5	18,0	17,5	17,0	16,5	16,0	15,5	15,0	14,5	14,0
	20	24,0	23,5	23,0	22,5	22,0	21,0	20,5	20,0	19,5	19,0	18,0	17,5
	25	30,5	29,5	29,0	28,0	27,5	26,5	26,0	25,0	24,5	23,5	23,0	22,0
	32	38,5	38,0	37,0	36,0	35,0	34,0	33,0	32,0	31,0	30,0	29,0	28,0
	40	48,5	47,0	46,0	45,0	43,5	42,5	41,0	40,0	39,0	37,5	36,5	35,0
	50	60,5	59,0	57,5	56,0	54,5	53,0	51,5	50,0	48,5	47,0	45,5	44,0
	63	76,0	74,5	72,5	70,5	68,5	67,0	65,0	63,0	61,0	59,0	57,5	55,5

The circuit-breaker is mounted individually in free air according to the test conditions of the standards!

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# Derating of load capability S200 MT NEW

In case of presence of several devices installed alongside each other

Influence	e of adjacent devices	
S200, DS200, DDA200+S200 I adjacent devices Correction	nfluence of factor Fm	
No. of adjacent devices	Fm	
1	1	
2	0.95	
3	0.9	
4	0.86	
5	0.82	
6	0.8	
7	0.78	
8	0.77	
9	0.76	
>9	0.76	

Compatibility with existing accessories



All over a train S200 MT can be combined with a complete range of accessories to lock, remotely control and visualize the device status.



Standards and declarations



### ABB Declaration of Conformity This declaration of conformity is issued under the sole responsibility of the manufacturer The object of the declaration described above is in conformity with the relevant statutory Electrical Equipment (Safety) Regulations 2016 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic and are in conformity with the following designated standards or other normative documents Notified Body and number of type examination certificate 2/1 i.V. Rafael Avila LPG Quality Manager ABB AB

+ Vibration and shock declaration + Material declaration

