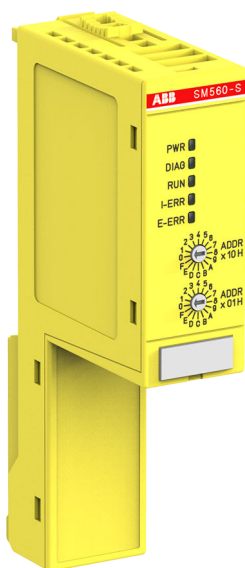


DATA SHEET

# SM560-S, SM560-S-FD-1, SM560-S-FD-4

## Safety CPU



### 1 Ordering data

Type	Description	Part no.
SM560-S	Safety module - CPU, safety related module up to SIL 3	1SAP 280 000 R0001
SM560-S-XC	Safety module - CPU, safety related module up to SIL 3, extreme conditions	1SAP 380 000 R0001
SM560-S-FD-1	Safety module - CPU, safety related module up to SIL 3 with F-Device functionality for 1 PROFIsafe network	1SAP 286 000 R0001
SM560-S-FD-1-XC	Safety module - CPU, safety related module up to SIL 3 with F-Device functionality for 1 PROFIsafe network, extreme conditions	1SAP 386 000 R0001
SM560-S-FD-4	Safety module - CPU, safety related module up to SIL 3 with F-Device functionality for up to 4 PROFIsafe networks	1SAP 286 100 R0001
SM560-S-FD-4-XC	Safety module - CPU, safety related module up to SIL 3 with F-Device functionality for up to 4 PROFIsafe networks, extreme conditions	1SAP 386 100 R0001

## 2 Dimensions

### Dimensions of the safety CPU

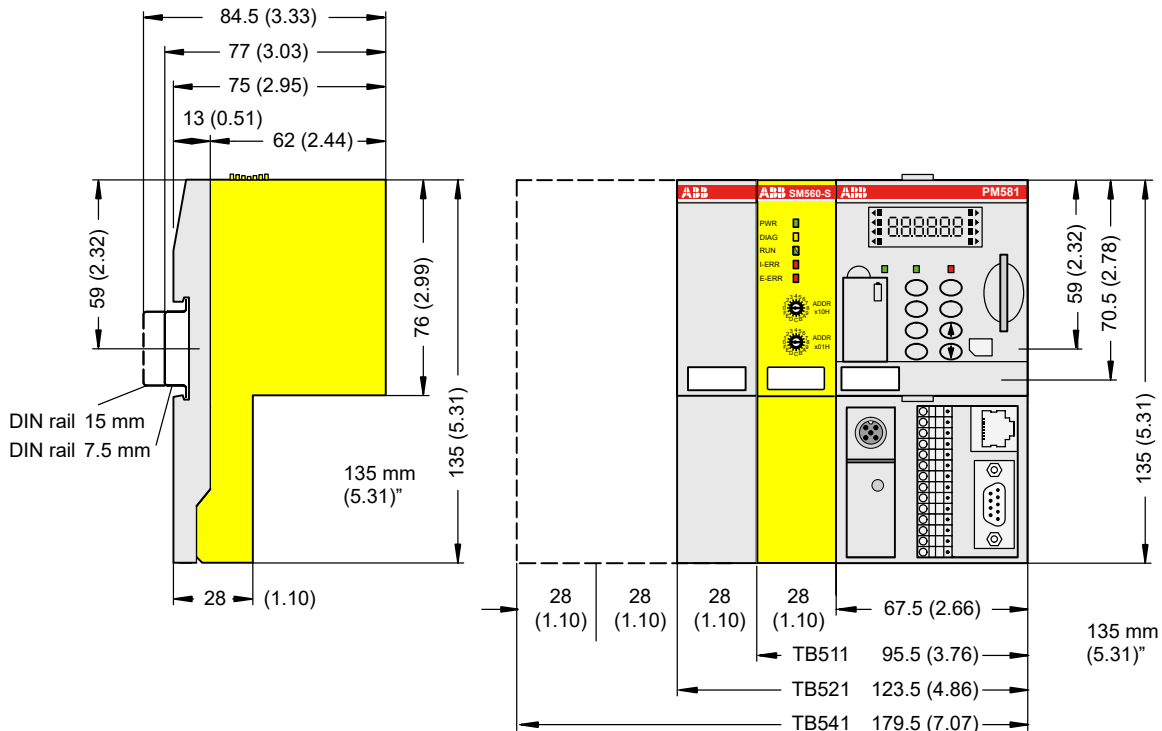


Fig. 1: Dimensions of the safety CPU

## 3 Technical data

Additional technical data is available in ABB PLC catalog at [www.abb.com/plc](http://www.abb.com/plc).



### NOTICE!

Safety CPU -XC version is available for usage in extreme environmental conditions  
 ↳ Appendix A "System data for AC500-S-XC" on page 6.

### Memory


Data	Value	Unit
User program memory of SM560-S	1	MB
User program memory of SM560-S-FD-1 and SM560-S-FD-4	1.3	MB
User data memory (thereof 120 kB saved)	1	MB

### Performance

Data	Value	Unit
Cycle time - binary	0.05	µs/instruction
Cycle time - word	0.06	µs/instruction
Cycle time - floating-point	0.50	µs/instruction

**Voltages,  
according to EN  
61131-2**

Data	Value	Unit
Process and supply voltage (without ripple)	24 (-15 %, +20 %)	V DC
Absolute limits (including ripple)	19.2 ... 30	V DC
Ripple	< 5	%
Protection against reverse polarity	10	s



**DANGER!**  
Exceeding the permitted process or supply voltage range (< -35 V DC or > +35 V DC) could lead to unrecoverable damage of the system.

**Allowed inter-  
ruptions of  
power supply,  
according to EN  
61131-2**

Data	Value	Unit
DC supply interruptions	< 10	ms
Time between 2 DC supply interruptions, PS2	> 1	s

**Environmental  
conditions**

Data	Value	Unit
Operating temperature*	0 ... +60	°C
Storage temperature	-40 ... +85	°C
Transport temperature	-40 ... +85	°C
Humidity without condensation	max. 95	%
Operating air pressure	> 800	hPa
Storage air pressure	> 660	hPa
Operating altitude	< 2000	m above sea level
Storage altitude	< 3500	m above sea level

\* Extended temperature ranges (below 0 °C and above +60 °C) can be supported in special versions of the safety CPU ↪ *Appendix A "System data for AC500-S-XC" on page 6.*

**Creepage dis-  
tances and  
clearances**

The creepage distances and clearances meet the overvoltage category II, pollution degree 2.

**Power supply  
units**

For the supply of modules, power supply units according to PELV/SELV specifications must be used.

**Electromagnetic  
compatibility**

For information on electromagnetic compatibility refer to the latest TÜV SÜD Report.

**Mechanical  
properties**

Data	Value	Unit
Mounting	horizontal (or vertical with derating (maximal operating temperature reduced to +40 °C))	
Degree of protection	IP 20	

Data	Value	Unit
Housing	according to UL 94	
Vibration resistance acc. to EN 61131-2 (all three axes), continuous 3.5 mm	2 ... 15	Hz
Vibration resistance acc. to EN 61131-2 (all three axes), continuous 1 g *	15 ... 150	Hz
Shock test (all three axes), 11 ms half-sinusoidal	15	g
MTBF	168	years

\* Higher values on request

#### Self-test and diagnostic functions

Start-up and runtime tests: Program flow control, RAM, CPU, etc.

#### Dimensions, weight

Data	Value	Unit
W x H x D	28 x 135 x 75	mm
Weight	~ 100	g

#### Certifications

CE, cUL (further certifications at [www.abb.com/plc](http://www.abb.com/plc))

# Appendix

# A System data for AC500-S-XC

## A.1 Environmental conditions

### Process and supply voltages

Data	Value	Unit
Process and supply voltage (-25 %, +30 % inclusive ripple)	24	V DC
Absolute limits inclusive ripple	18 ... 31.2	V
Ripple	< 10	%
Protection against reverse polarity	yes	
Allowed interruptions of DC power supply	< 10	ms
Time between 2 interruptions, PS2	> 1	s



#### DANGER!

Exceeding the permitted process or supply voltage range (< -35 V DC or > +35 V DC) could lead to unrecoverable damage of the system.



#### DANGER!

For the supply of the modules, power supply units according to PELV or SELV specifications must be used.



#### NOTICE!

The creepage distances and clearances meet the requirements of the overvoltage category II, pollution degree 2.

### Temperature

Data	Value	Unit
Operating temperature*	-40 ... +70	°C
Operating temperature (vertical mounting of module output load limited to 50 % per group)	-40 ... +40	°C
Storage temperature	-40 ... +85	°C
Transport temperature	-40 ... +85	°C

\* +60 ... +70 °C with the following deratings:

- Terminal bases: Maximum 2 communication modules allowed
- Digital inputs: Maximum number of simultaneously switched on input channels limited to 50 % per group (e.g. 8 channels => 4 channels)
- Digital outputs: Output current maximum value (all channels together) limited to 50 % per group (e.g. 4 A => 2 A)
- Analog inputs: No limitations



#### DANGER!

The average temperature (MTBF calculation base) for both the extended temperature range (-40 ... +70 °C) as well as for normal temperature range (0 ... +60 °C) is defined to +40 °C.

Ensure that average operating temperature for used AC500-S-XC modules does not exceed +40 °C.

**Humidity**

Data	Value	Unit
Relative humidity with condensation (operating/storage)	100	%

**Air pressure**

Data	Value	Unit
Operating air pressure	1080 ... 620	hPa
Operating altitude	-1000 ... 4000	m
Reduction of operating temperature at an air pressure of < 795 hPa (or > 2000 m above sea level)	10 (e.g. +70 °C to +60 °C)	K

**Immunity to corrosive gases**

Data	Value
Operating: according to ISA S71.04.1985 harsh group A, G3/GX IEC 60721-3-3 3C2 / 3C3	yes

**Immunity to salt mist**

Data	Value
Operating: horizontal mounting only, according to IEC 60068-2-52 severity level 1	yes

**Electromagnetic compatibility**

Data	Value
Radiated emission (radio disturbance) according to CISPR 16-2-3	yes
Conducted emission (radio disturbance) according to CISPR 16-2-1, CISPR 16-1-2	yes
Electrostatic discharge (ESD) according to IEC 61000-4-2, zone B, criterion B	yes
Fast transient interference voltages (burst) according to IEC 61000-4-4, zone B, criterion B	yes
High energy transient interference voltages (surge) according to IEC 61000-4-5, zone B, criterion B	yes
Influence of radiated disturbances according to IEC 61000-4-3, zone B, criterion A	yes
Influence of line-conducted interferences according to IEC 61000-4-6, zone B, criterion A	yes
Influence of power frequency magnetic fields according to IEC 61000-4-8, zone B, criterion A	yes

**NOTICE!**

In order to prevent malfunctions, it is recommended that the operating personnel discharge themselves prior to touching communication connectors or perform other suitable measures to reduce effects of electrostatic discharges.

**NOTICE!**

Unused sockets for communication modules on terminal bases must be covered with TA524 dummy communication module. I/O bus connectors must not be touched during operation.

**Radiation**

<b>Data</b>	<b>Value</b>
Radio disturbance according to IEC 55011, group 1, class A	yes



## A.2 Mechanical data

Data	Value
Wiring method	spring terminals
Degree of protection	IP 20
Vibration resistance according to IEC 61131-2, IEC 60068-2-6, IEC 60068-2-64	yes
Shock resistance according to IEC 60068-2-27	yes
Horizontal assembly position	yes
Vertical assembly position (no application in salt mist environment)	yes

### Assembly on DIN rail according to IEC 60715

Data	Value	Unit
DIN rail type	35	mm
DIN rail type depth	7.5 or 15	mm

### Assembly with screws

Data	Value	Unit
Screw diameter	4	mm
Fastening torque	1.2	Nm

### A.3 Environmental tests

Storage	IEC 60068-2-1 test Ab: cold withstand test -40 °C / 16 h IEC 60068-2-2 test Bb: dry heat withstand test +85 °C / 16 h
Humidity	IEC 60068-2-30 test Dd: Cyclic (12 h / 12 h) damp-heat test +55 °C, 93 % relative humidity / +25 °C, 95 % relative humidity, 6 cycles IEC 60068-2-78, stationary humidity test: +40 °C, 93 % relative humidity, 240 h
Insulation test	IEC 61131-2
Vibration resistance	IEC 61131-2 / IEC 60068-2-6: 5 Hz ... 500 Hz, 2 g (with SD memory card inserted in non-safety CPU) IEC 60068-2-64: 5 Hz ... 500 Hz, 4 g rms
Shock resistance	IEC 60068-2-27: all 3 axes 15 g, 11 ms, half-sinusoidal

#### EMC immunity

Electrostatic discharge (ESD)

Data	Value	Unit
Electrostatic voltage in case of air discharge	8	kV
Electrostatic voltage in case of contact discharge	6	kV

Fast transient interference voltages (burst)

Data	Value	Unit
Supply voltage units (DC)	4	kV
Digital inputs/outputs (24 V DC)	2	kV
Analog inputs/outputs	2	kV
Communication lines, shielded	2	kV
I/O supply (DC-out)	2	kV

High energy transient interference voltages (surge) - common mode (CM)

Data	Value	Unit
Supply voltage units (DC)	1	kV
Digital inputs/outputs (24 V DC)	1	kV
Analog inputs/outputs	1	kV
Communication lines, shielded	1	kV
I/O supply (DC-out)	0.5	kV

High energy transient interference voltages (surge) - differential mode (DM)

Data	Value	Unit
Supply voltage units (DC)	0.5	kV
Digital inputs/outputs (24 V DC)	0.5	kV
Analog inputs/outputs	0.5	kV
I/O supply (DC-out)	0.5	kV

Data	Value	Unit
Influence of radiated disturbances: test field strength	10	V/m
Influence of line-conducted interferences: test voltage	10	V

Data	Value	Unit
Power frequency magnetic fields at 30 A/m	50 and 60	Hz



**NOTICE!**

Extreme environmental conditions and relevant requirements for used non-safety CPUs and I/O modules from AC500-XC family shall be taken into account.