

Safety Limit Thermostats

RAK-ST..M



Safety temperature thermostat, electromechanical STB per DIN EN 14597

- Safety temperature limiter with single-pole changeover microswitch
- Switch capacity: Contact 11-12...16 (2.5) A, AC 250 V
- Alarm connection: Contact 11-13: 2 (0.4) A, AC 250 V
- Time constant to DIN EN 14597
- Three mounting options: Pipe, pocket, or wall mounting
- View the switching value through the viewing window in the housing
- Ambient temperature compensation at switching mechanism and capillary tube
- Fail-safe design, rupture of the capillary tube switches contact connection 11-12 to open
- Internal reset facility covered by removable threaded nipple
- IP43 and IP54 protection class available
- Push-in terminals for fast installation
- UV protected, flame retardant housing made of PC plastic

Application

Typical applications:

- Air duct systems to prevent overheating
- Heat generation
- For general use in heating, ventilation and air conditioning plants

Functions

The STB switches the contacts upon reaching the setpoint temperature and remains locked in this position:

- 11-12 opens (normally the system connection)
- 11-13 closes (normally alarm)

Manually reset the safety limiter by opening the protective cap as soon as the temperature drops below the setpoint temperature, minus the switching differential.

In the event that the expansion liquid escapes through a leak in the sensing system, the pressure in the diaphragm drops and mechanically switches off the microswitch.

- 11-12 opens
- 11-13 opens

The control current circuit opens when cooling the sensor to a negative temperature (typically ca. -20°C).

However, it closes automatically as the temperature increases.

Technical design

Housing

- The base of the thermostat is made of PC (reinforced) and is designed for pipe, pocket, or wall mounting; the electromechanical safety temperature limiter STB uses a capillary type sensing element.
- The cover is made of PC and has a viewing window and a removable threaded nipple for resetting the thermostat.
- Cable gland M16 x 1.5 mm
- PC plastic has the following properties:
 - Flame retardant
 - UV protected and aging resistant
 - Suited for higher temperatures
 - High resistance against chemical and biological influences

Type summary

Order number	Type	Degree of protection	Switch-off temperature	Capillary tube length	Pocket length ¹⁾	Clamping band ³⁾
BPZ:RAK-ST.1385M	RAK-ST.1385M ²⁾	IP54	40...70 °C	700 mm	Not included	Not included
BPZ:RAK-ST.1600MP	RAK-ST.1600MP ²⁾	IP54	95...130 °C		100 mm	Not included
S55700-P100	RAK-ST.010FP-M ²⁾	IP43	95 °C		100 mm	Not included

Order number	Type	Degree of protection	Switch-off temperature	Capillary tube length	Pocket length ¹⁾	Clamping band ³⁾
S55700-P101	RAK-ST.020FP-M ²⁾	IP43	100 °C		100 mm	Not included
S55700-P102	RAK-ST.030FP-M ²⁾	IP43	110 °C		100 mm	Not included
S55700-P103	RAK-ST.1310P-M ²⁾	IP43	90...110 °C		100 mm	Not included
S55700-P104	RAK-ST.1300P-M ²⁾	IP43	110...130 °C		100 mm	Not included
S55700-P106	RAK-ST.1430S-M ²⁾	IP43	80...100 °C	1600 mm	Not included	Yes

¹⁾ Pocket, brass, PN10

²⁾ To DIN EN 14597

³⁾ Clamping band for piping, max. Ø 100 mm

Ordering

Specify quantity, product name and type when ordering.

Accessories not included in the standard set can be ordered separately by the type references listed in data sheets N1193 and N1194.

Delivery

- Mounting instructions
- Cable gland 16x1 x 1.5 mm

Accessories

See Accessories data sheets N1193 and N1194.

The perforated pocket ALT-AB200 or another pocket (standard pocket for liquids ALT-SB100) must be ordered as a separate item (refer to data sheets N1193 and N1194).

Protection pocket for thermostats and sensors

Type	Order number	Designation
ALT-SB100	BPZ:ALT-SB100	ALT-SB100 Protection pocket. Std, Ms/Cu/Ni
ALT-SB150	BPZ:ALT-SB150	ALT-SB150 Protection pocket. Std, Ms/Cu/Ni
ALT-SB200	BPZ:ALT-SB200	ALT-SB200 Protection pocket Ms/Cu/Ni. Simple
ALT-SB280	BPZ:ALT-SB280	ALT-SB280 Protection pocket. Std, Ms/Cu/Ni
ALT-SS100	BPZ:ALT-SS100	ALT-SS100 Protection pocket. Stainless steel, single
ALT-SS150	BPZ:ALT-SS150	ALT-SS150 Protection pocket. Stainless steel, single
ALT-SS280	BPZ:ALT-SS280	ALT-SS280 Protection pocket. Stainless steel, single
ALT-SS450	BPZ:ALT-SS450	ALT-SS450 Protection pocket. Stainless steel, single
ALT-SSF100	BPZ:ALT-SSF100	ALT-SSF100 Protection pocket Stainless steel, single

Type	Order number	Designation
ALT-SSF150	BPZ:ALT-SSF150	ALT-SSF150 Protection pocket Stainless steel, single
ALT-SSF200	BPZ:ALT-SSF200	ALT-SSF200 Protection pocket Cr/Ni. Single, PN40
ALT-SSF280	BPZ:ALT-SSF280	ALT-SSF280 Protection pocket Stainless steel, single
ALT-SSF450	BPZ:ALT-SSF450	ALT-SSF450 Protection pocket Stainless steel, single
ALT-SSF600	BPZ:ALT-SSF600	ALT-SSF600 Protection pocket Stainless steel, single
ALT-DB100*	BPZ:ALT-DB100	---
ALT-DB150*	BPZ:ALT-DB150	---
ALT-DB280*	BPZ:ALT-DB280	---
ALT-DB450*	BPZ:ALT-DB450	---
ALT-DB100J (S55700-P142)	S55700-P142	ALT-DB100J Protection pocket for RAZ "J" type
ALT-DB150J (S55700-P143)	S55700-P143	ALT-DB150J Protection pocket for RAZ "J" type
ALT-DB280J (S55700-P144)	S55700-P144	ALT-DB280J Protection pocket for RAZ "J" type
ALT-DB450J (S55700-P145)	S55700-P145	ALT-DB450J Protection pocket for RAZ "J" type
ALT-DS100*	BPZ:ALT-DS100	---
ALT-DS150*	BPZ:ALT-DS150	---
ALT-DS280*	BPZ:ALT-DS280	---
ALT-DS450*	BPZ:ALT-DS450	---
ALT-DS100J (S55700-P146)	S55700-P146	ALT-DS100J Protection pocket for RAZ J type
ALT-DS150J (S55700-P147)	S55700-P147	ALT-DS150J Protection pocket for RAZ J type
ALT-DS280J (S55700-P148)	S55700-P148	ALT-DS280J Protection pocket for RAZ J type
ALT-DS450J (S55700-P149)	S55700-P149	ALT-DS450J Protection pocket for RAZ J type

Accessories and spare parts for RAK-..., RAZ-... thermostats and sensors

Type	Order number	Designation
ALT-AB200	BPZ:ALT-AB200	ALT-AB200 Protection pocket, perforated
ALT-C001	BPZ:ALT-C001	ALT-C001 Mounting accessories
AQM63.0	BPZ:AQM63.0	AQM63.0 MOUNTING SET

Type	Order number	Designation
AQM63.3	BPZ:AQM63.2	AQM63.2 MOUNTING SET
AQM63.2	BPZ:AQM63.3	AQM63.3 Capillary tube clamps
FK-TZ1	BPZ:ALT-SSF150	ALT-SSF150 Protection pocket Stainless steel, single

* No longer available

Product documentation

Topic	Title	Document ID
Mounting	Thermostats / Thermostate RAK-T..H., RAK-S..M.	G1202
Accessories data sheet N1193	Accessories and spare parts ALT-A., ALT-C., AQM63.2/3, FK-TZ1	9767
Accessories data sheet N1194	Protection pocket ALT-S., ALT-D..	9769

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

Notes

Security

 CAUTION	
	National safety regulations Failure to comply with national safety regulations may result in personal injury and property damage. Observe national regulations and comply with the appropriate safety regulations.

Mounting

Mounting aid

Mounting instructions are included in the packaging.

Mounting location

Ensure sufficient clearance above the unit for the viewing window and to set the switch-off temperature, for example, for type RAK-ST.1300P-M and for removing and replacing the thermostat, if required.

Pipe mounting

Tighten the clamping band (special accessory) so it is sufficiently tight for the entire length of the sensing element to touch the pipe.

Pocket mounting

Mount the pocket and adjust the hexagon as required. Insert the capillary sensing element in the pocket and secure the base to the pocket with the screw.

Wall mounting with sensing element in the pocket

To prepare for wall mounting, knock out the fixing holes in the housing and pull out the capillary tube until the required length is reached. Insert the capillary sensing element in the pocket and secure it with a clamp (mounting accessories).

⚠ DANGER	
	Risk due to incorrect wiring caused by unqualified personnel! Only qualified personnel may wire the unit. The cables must meet the insulation requirements for mains potential. Contact 11-12 opens in the event of a ruptured capillary tube (fail-safe function). The contact remains open in this state.

⚠ DANGER	
	Risk caused by incorrect wiring! Connect wiring as per the connection diagram in compliance with local safety regulations. Caution: Disconnect device from power before opening the device. Use Max. AC 250 V.

⚠ DANGER	
	Risk of shock due to faulty grounding! The ground wiring must be properly wired.

⚠ WARNING	
	Setting the temperature Only trained technicals may set the setpoint temperature (e.g. 40...70 °C or 95...130 °C).

Installation

⚠ WARNING	
	No internal line protection for supply lines to external consumers Risk of fire and injury due to short circuits Adapt the line diameters as per local regulations to the rated value of the installed fuse.

WARNING



Mains power to the relay outputs

Risk of electrical shock when touching the device

- Only install the device in areas where children are not present.
- Conductors with a cross-section of 0.5 mm² (AWG24) or greater must comply with the requirements of IEC 60332-1-2 and IEC 60332-1-3 or IEC TS 60695-11-21.

Maintenance

The safety temperature limiter is maintenance-free.

Disposal



This symbol or any other national label indicates that the product, its packaging, and, where applicable, any batteries may not be disposed of as domestic waste. Delete all personal data and dispose of the item(s) at separate collection and recycling facilities in accordance with local and national legislation. For additional details, refer to [Siemens information on disposal](#).

Technical design

Product data	
Housing colors	Base: RAL 7001 (dark gray) Cover: RAL 7035 (light gray)
Sensing element dimensions Capillary lengths (all types)	Ø 6.5 x 85 mm or Ø 6.5 x 76 mm 700 mm
Min. bending radius capillary tube	R min. = 5 mm
Mechanical design	- Capillary tube and sensor - Diaphragm
Weight of standard set	0.35 kg

Switching mechanism	
Switching capacity	- AC 24 to 250 V 0.1...16 (2.5) A, $\cos \varphi = 1$ (0.6) 2 (0.4) A (alarm terminal)
- Nominal voltage range - Nominal current range I (IM) Terminal 11-12 - Nominal current range I (IM) Terminal 11-13	
External fuse (terminal 11-12)	16 A
Life expectancy at nominal rating Estimated value B_{10d}	Min. 300 switching cycles $B_{10d} = 250,000$ (DIN EN ISO 13849-1)
Protection class	I Per EN 60 730
Degree of protection	IP43 or IP54 per EN 60 529
Switch-off temperature	95 °C 100 °C 110 °C
- RAK-ST.010FP-M - RAK-ST.020FP-M - RAK-ST.030FP-M	
Internally adjustable switch-off temperature	(With tool)
- RAK-ST.1300P-M - RAK-ST.1310P-M - RAK-ST.1430S-M - RAK-ST.1385M - RAK-ST.1600MP	110...130 °C 90...110 °C 80...100 °C 40...70 °C 95...130 °C
Thermal switching differential	10 K
- RAK-ST.1385M - RAK-ST.1600MP - RAK-ST.010FP-M / RAK020FP-M / - RAK030FP-M/ RAK1430S-M - RAK-ST.1300P-M / RAK1310P-M	

Environmental conditions	
Operation • Max. temperature on the sensor probe • Ambient temperature at housing – Humidity – Mechanics Storage and transport • Ambient temperature • Humidity	Class 3K23 to IEC/EN 60721-3-3 • Max. switch-off temperature +25 K • 0...80 °C (T80) – < 95 % r.h. – Class 3M11 to IEC/EN 60721-3-3 Class 2K12 / 1K22 to IEC/EN 60721-3-2 • -40...+70 °C • < 95 % r.h.
Max. temperature socket	125 °C
Degree of pollution	2 per EN 60 730
Controller media	Water, oil, air
Ambient temperature compensation for switch mechanism and capillary tube 22 °C DIN EN 14 597	

Standards and guidelines	
Product standard	EN 60730-x DIN EN 14597 (STB1196) PED ¹⁾
EU conformity (CE)	See EU declaration of conformance ¹⁾
Radio disturbance level	Click rate N ≤5 per EN 55 014

Environmental compatibility	
The product environmental declaration ¹⁾ contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	

Calibration	
Calibration temperature • RAK-ST.1385M • RAK-ST.1600MP • RAK-ST.010FP-M • RAK-ST.020FP-M • RAK-ST.030FP-M • RAK-ST.1300P-M • RAK-ST.1310P-M • RAK-ST.1430S-M	• 45 °C • 100 °C • 95 °C • 100 °C • 110 °C • 120 °C • 100 °C • 90 °C
Manufacturing deviation	+0 / -6 °C

Calibration

Deviation throughout the entire life cycle	< ±5 %
Calibrated for ambient temperature on the switching mechanism and capillary tube • RAK-ST.1385M • RAK-ST.1600MP • RAK-ST.010FP-M • RAK-ST.020FP-M • RAK-ST.030FP-M • RAK-ST.1300P-M • RAK-ST.1310P-M • RAK-ST.1430S-M	• 50 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597 • 22 °C per DIN EN 14597
Time constant in • Water • Oil • Air	• <45 s per DIN EN 14597 • <60 s per DIN EN 14597 • <120 s per DIN EN 14597

Connections

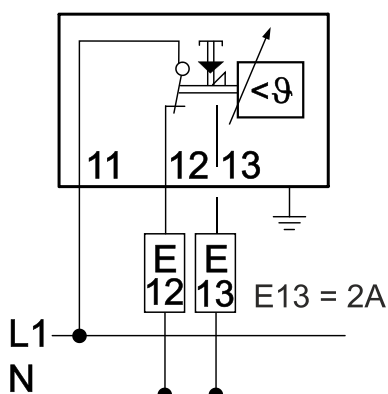
Electrical connection • Protective earth • Cable entry gland	Push In ¹⁾ terminals for wires 6 x 0.75...2.5 mm ² (single-core, fine-stranded with ferrule) • Push In¹⁾ terminals for wires 2 x 0.75...2.5 mm² (single-core, fine-stranded with ferrule) • M16 x 1.5 mm (max. 4-Core cable)
Wiring type	Wiring type M (unprepared conductors or prepared conductors, e.g. ferrules)

¹⁾ Documents can be downloaded at <http://siemens.com/bt/download>.

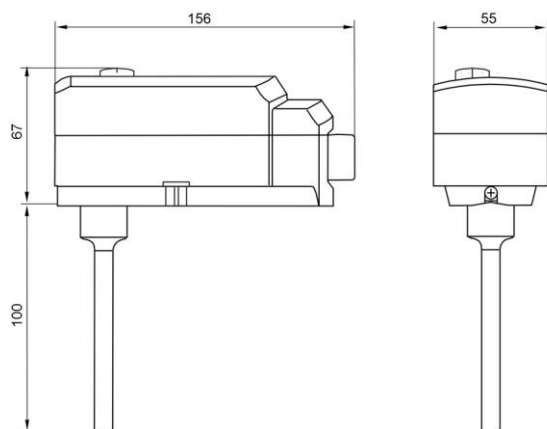
¹⁾ Push In is a patented connection technology designed by Weidmüller, Germany's leading manufacturer of electrical connection technologies

Connection diagrams

Internal diagrams



Dimensions



Compliance

European Union conformity

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