

# MOUNTING AND OPERATING INSTRUCTIONS



## EB 5207 EN

Translation of original instructions



## Type 5312-2 Frost Protection Thermostat

Edition September 2008



## Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices. The images shown in these instructions are for illustration purposes only. The actual product may vary.

- For the safe and proper use of these instructions, read them carefully and keep them for later reference.
- If you have any questions about these instructions, contact SAMSON's After-sales Service (aftersaleservice@samsongroup.com).



The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at [www.samsongroup.com](http://www.samsongroup.com) > **Service & Support** > **Downloads** > **Documentation**.

## Definition of signal words

### **DANGER**

*Hazardous situations which, if not avoided, will result in death or serious injury*

### **WARNING**

*Hazardous situations which, if not avoided, could result in death or serious injury*

### **NOTICE**

*Property damage message or malfunction*

### **Note**

*Additional information*

### **Tip**

*Recommended action*

<b>1</b>	<b>Safety instructions and measures</b> .....	<b>1-1</b>
1.1	Notes on possible severe personal injury .....	1-4
1.2	Notes on possible personal injury .....	1-5
1.3	Notes on possible property damage .....	1-6
<b>2</b>	<b>Markings on the device</b> .....	<b>2-1</b>
2.1	Nameplate .....	2-1
<b>3</b>	<b>Design and principle of operation</b> .....	<b>3-1</b>
3.1	Technical data .....	3-1
3.2	Dimensions .....	3-2
<b>4</b>	<b>Shipment and on-site transport</b> .....	<b>4-1</b>
4.1	Accepting the delivered goods .....	4-1
4.2	Removing the packaging from the frost protection thermostat .....	4-1
4.3	Lifting the frost protection thermostat .....	4-1
4.4	Storing the frost protection thermostat .....	4-1
<b>5</b>	<b>Installation</b> .....	<b>5-1</b>
5.1	Installation conditions .....	5-1
5.2	Preparation for installation .....	5-1
5.3	Mounting the frost protection thermostat .....	5-1
5.4	Electrical connection .....	5-2
<b>6</b>	<b>Operation</b> .....	<b>6-1</b>
<b>7</b>	<b>Start-up</b> .....	<b>7-1</b>
<b>8</b>	<b>Operation</b> .....	<b>8-1</b>
<b>9</b>	<b>Malfunctions</b> .....	<b>9-1</b>
9.1	Emergency action .....	9-1
<b>10</b>	<b>Servicing</b> .....	<b>10-1</b>
<b>11</b>	<b>Decommissioning</b> .....	<b>11-1</b>
<b>12</b>	<b>Removal</b> .....	<b>12-1</b>
<b>13</b>	<b>Repairs</b> .....	<b>13-1</b>
13.1	Returning the frost protection thermostat to SAMSON .....	13-1
<b>14</b>	<b>Disposal</b> .....	<b>14-1</b>
<b>15</b>	<b>Certificates</b> .....	<b>15-1</b>
<b>16</b>	<b>Annex</b> .....	<b>16-1</b>
16.1	Accessories .....	16-1
16.2	After-sales service .....	16-1



# 1 Safety instructions and measures

## Intended use

The Type 5312-2 Frost Protection Thermostat is designed as a switching device to open or close a circuit based on the temperature in heating, ventilation and air-conditioning systems as well as in process engineering and industrial energy transfer systems. The frost protection thermostat is designed to operate under exactly defined conditions (e.g. switching point and voltage). Therefore, operators must ensure that a frost protection thermostat is only used in operating conditions that meet the specifications at the ordering stage. In case operators intend to use the frost protection thermostat in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

➔ Refer to the technical data for limits and fields of application as well as possible uses. See the 'Design and principle of operation' section.

## Reasonably foreseeable misuse

The frost protection thermostat is not suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing service and repair work not described

## Qualifications of operating personnel

The frost protection thermostat must be mounted, started up, serviced and repaired by fully trained and qualified personnel only; the accepted industry codes and practices must be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

## **Safety instructions and measures**

### **Personal protective equipment**

No personal protective equipment is required for the direct handling of the frost protection thermostat. Work on the control valve may be necessary when mounting or removing the device.

- Observe the requirements for personal protective equipment specified in the valve documentation.
- Check with the plant operator for details on further protective equipment.

### **Revisions and other modifications**

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

### **Safety features**

No special safety features exist.

### **Warning against residual hazards**

To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the control valve by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in these mounting and operating instructions, especially for installation, start-up and service work.

### **Responsibilities of the operator**

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

### **Responsibilities of operating personnel**

Operating personnel must read and understand these mounting and operating instructions as well as the specified hazard statements, warning and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

### Referenced standards, directives and regulations

The Type 5312-2 Frost Protection Thermostat fulfills the requirements of the Directives 2014/30/EU and 2014/65/EU. The declaration of conformity includes information about the applied conformity assessment procedure. The 'Certificates' section contains this declaration of conformity.

The Type 5312-2 Frost Protection Thermostat is designed for use in low voltage installations.

➔ For wiring, maintenance and repair, observe the relevant safety regulations.

### Referenced documentation

The following documents apply in addition to these mounting and operating instructions:

- ▶ T 5200 (Information Sheet: Temperature Sensors and Thermostats)
- ▶ T 5207 Type 5312-2 Frost Protection Thermostat

## 1.1 Notes on possible severe personal injury

### DANGER

#### **Risk of fatal injury due to electric shock.**

- Before connecting wiring, performing any work on the device or opening the device, disconnect the supply voltage and protect it against unintentional reconnection.
- Only use power interruption devices that can be protected against unintentional reconnection of the power supply.
- Do not remove any covers to perform adjustment work on live parts.

The frost protection thermostat is protected to prevent solid particles larger than 1 mm from entering. However, it is not protected against moisture (IP 40).

#### **Risk of bursting in pressure equipment.**

Valves and pipelines are pressure equipment. Improper opening can lead to valve components bursting.

- Before starting any work on the control valve, depressurize all plant sections affected as well as the valve.
- Drain the process medium from all the plant sections affected and from the valve.
- Wear recommended personal protective equipment. See associated valve documentation.



## 1.2 Notes on possible personal injury

### WARNING

#### **Risk of burn injuries as a result of touching hot components.**

Thermostats installed in pipelines as well as the surrounding pipes, valves and other components may be hot or cold.

- Before performing any work on the device, shut off the medium flow.
- Allow devices to cool down or warm up to the ambient temperature.
- Wear personal protective equipment that is suitable for the purpose.

### WARNING

#### **Risk of personal injury through incorrect operation, use or installation as a result of information on the thermostat being illegible.**

Over time, markings, labels and nameplates on the frost protection thermostat may become covered with dirt or become illegible in some other way. As a result, hazards may go unnoticed and the necessary instructions not followed. There is a risk of personal injury.

- Keep all relevant markings and inscriptions on the device in a constantly legible state.
- Immediately renew damaged, missing or incorrect nameplates or labels.

## 1.3 Notes on possible property damage

### NOTICE

**Risk of damage to the frost protection thermostat due to the supply voltage exceeding the permissible tolerances.**

The Type 5312-2 Thermostat is designed for use according to regulations for low-voltage installations.

→ Observe the permissible tolerances of the supply voltage.

**Risk of thermostat damage due to incorrect mounting.**

The Type 5312-2 Thermostat must be mounted properly and depending on the type of mounting.

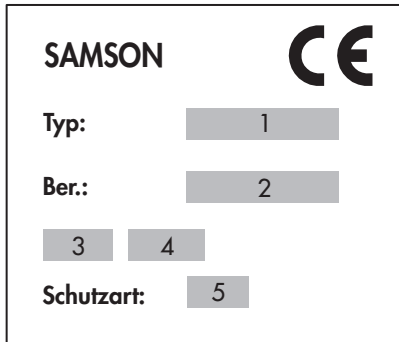
**Incorrect connection of the electrical power supply will damage the frost protection thermostat.**

The frost protection thermostat has terminals that are integrated in a circuit.

→ Observe the tolerances of the technical data.

## 2 Markings on the device

### 2.1 Nameplate



- 1 Type
- 2 Set point range
- 3 Max. current
- 4 Supply voltage
- 5 Degree of protection



### 3 Design and principle of operation

#### Function

The Type 5312-2 Frost Protection Thermostat is a temperature monitor:

The changeover contact switches when the temperature at the temperature sensor rises above the adjusted set point. When the temperature falls below the set point, the changeover contact automatically switches back.

#### **i** Note

*The changeover contact responds to a capillary breakage in the same way as when the temperature falls below the set point.*

#### Temperature

The frost protection thermostat is calibrated for an ambient temperature of +22 °C.

The switching point falls by 0.08 %/K at higher ambient temperatures.

The switching point rises at lower ambient temperatures.

### 3.1 Technical data

Type	5312-2	
Function	Temperature monitor (TM)	
Set point range	-10 to +12 °C	
Sensor		
Length	Approx. 6 m in length, already sensitive in partial ranges of approx. 0.3 m	
Material	Copper capillary	
Switching differential	Approx. 1 K	
Switching point accuracy	±0.12 K	
Temperature		
Medium	Max. +200 °C	
Housing	-15 to +55 °C	
Switching element	Microswitches with changeover contact	
Contact rating		
At 24 to 250 V AC	15 (8) A with resistive load, 2 A with $\cos \varphi = 0.6$	
At 24 V AC	Min. 150 mA	
Connecting cable diameter	5 to 10 mm	
Max. wire cross-section	2.5 mm <sup>2</sup>	
Degree of protection	IP 40 according to EN 60529	
Housing material	Sheet steel	
Weight	0.67 kg	

### 3.2 Dimensions

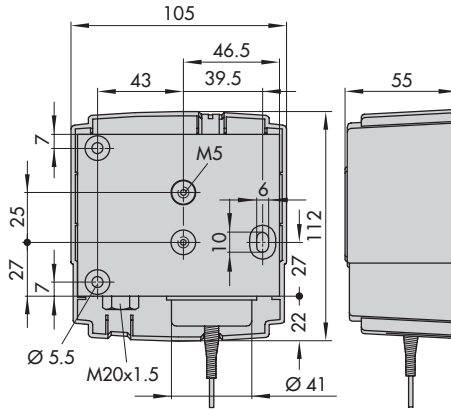


Fig. 3-1: Dimensions in mm · Type 5312-2

## 4 Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

### 4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Compare the shipment received with the delivery note.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

### 4.2 Removing the packaging from the frost protection thermostat

#### **i** Note

*Do not remove the packaging until immediately before mounting and start-up.*

1. Remove the packaging from the frost protection thermostat.
2. Check scope of delivery (see Fig. 4-1).
3. Dispose and recycle the packaging in accordance with the local regulations.

- 1x Type 5312-2 Frost Protection Thermostat
- 1x Document IP 5207  
(Important Product Information)  
Alternatively:  
Document EB 5207  
Mounting and operating instructions

**Fig. 4-1:** *Scope of delivery*

Transporting the frost protection thermostat

- Protect the frost protection thermostat against external influences (e.g. impact).
- Protect the frost protection thermostat against moisture and dirt.
- Observe the permissible transportation temperature of  $-30$  to  $+80$  °C.

### 4.3 Lifting the frost protection thermostat

Due to the low service weight, lifting equipment is not required to lift the frost protection thermostat.

### 4.4 Storing the frost protection thermostat

#### **!** NOTICE

**Risk of thermostat damage due to improper storage.**

- *Observe the storage instructions.*
- *Avoid long storage times.*
- *Contact SAMSON in case of different storage conditions or longer storage times.*

### **i Note**

*We recommend regularly checking the frost protection thermostat and the prevailing storage conditions during long storage periods.*

---

### **Storage instructions**

- Protect the frost protection thermostat against external influences (e.g. impact).
- Protect the frost protection thermostat against moisture and dirt.
- Make sure that the ambient air is free of acids or other corrosive media.
- Observe the permissible storage temperature from  $-15$  to  $+55$  °C.
- Do not place any objects on the frost protection thermostat.



## 5 Installation

### 5.1 Installation conditions

#### Work position

If not described otherwise in the valve or actuator documentation, the work position for the thermostat is the front view looking onto the operating controls.

#### Mounting position

The valve can be mounted in any desired position.

### 5.2 Preparation for installation

Before mounting, make sure the following conditions are met:

- The thermostat is not damaged.

Proceed as follows:

Lay out the necessary material and tools to have them ready during mounting.

---

#### **NOTICE**

#### ***Risk of damage and impaired functioning of the frost protection thermostat.***

- *Do not use the frost protection thermostat together with corrosive media.*
  - *Do not bend the capillary (bending radius  $\geq 5$  mm).*
  - *Mount the housing as close to the point of measurement as possible since the capillary is sensitive along its entire length.*
- 

---

#### **Note**

*The temperature at the housing must be at least as high as the adjusted temperature, but not higher than +55 °C.*

---

### 5.3 Mounting the frost protection thermostat

#### Wall mounting

1. Unscrew the enclosure cover.
  2. Fasten the bottom section of the housing onto the wall.
  3. Route and secure the capillary.
- 

#### **Note**

*Mounting clamps are required (not included in the scope of delivery) to position the capillary properly at the outlet of the heating battery.*

---

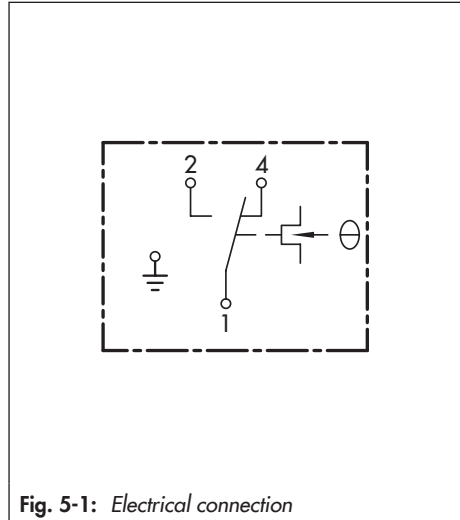
## 5.4 Electrical connection

**⚠ DANGER**

**Risk of fatal injury due to electric shock.**

- Upon installation of the electric cables, you are required to observe the regulations concerning low-voltage installations according to DIN VDE 0100 as well as the regulations of your local power supplier.
- Use a suitable voltage supply which guarantees that no dangerous voltages reach the device in normal operation or in the event of a fault in the system or any other system parts.
- Connect the grounding conductor to the PE terminal.

1. Insert the connecting cable through the cable gland into the housing.
2. Connect the wires of the connecting cable to the terminals.
3. Route the grounding conductor to the PE terminal inside the housing.
4. Close housing cover. Insert and tighten screws.



**Fig. 5-1:** Electrical connection

## 6 Operation

### Adjusting the set point

- Use a screwdriver to set the temperature set point at the adjustment screw.
- Read the adjusted value off the scale.



Fig. 6-1: *Adjustment screw*



## 7 Start-up

After correct mounting and connection of the wiring as described in the 'Installation' section, the frost protection thermostat is ready for use.



## 8 Operation

After start-up, the thermostat is ready for use.

The changeover switch switches its contact depending on the adjusted temperature.





## 9 Malfunctions

→ Troubleshooting (see Table 9-1).

### **i** Note

Contact SAMSON's After-sales Service for malfunctions not listed in the table.

**Table 9-1:** Troubleshooting

Error	Possible reasons	Recommended action
No switching in the frost protection thermostat	Thermostat not correctly attached	→ Check attachment. → Check contact to the medium.
	Thermostat not correctly connected	→ Check electrical connection.
	Capillary ruptured	→ Replace thermostat.
	Temperature above set point	→ Find reason for why the temperature is lower.

### 9.1 Emergency action

The frost protection thermostat reacts after the measured temperature in the plant falls below the adjusted set point (see the 'Design and principle of operation' section). Usually, this action causes a valve in the plant to be closed by a safety device to prevent the temperature falling below a certain temperature.

Plant operators are responsible for emergency action to be taken in the plant.

### Tip

Emergency action in the event of valve failure is described in the associated valve documentation.



## 10 Servicing

---

**i Note**

*The frost protection thermostat was checked by SAMSON before delivery.*

*– The product warranty becomes void if service or repair work not described in these instructions is performed without prior agreement by SAMSON's After-sales Service.*

---

The frost protection thermostat does not require any maintenance.



## 11 Decommissioning

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

### DANGER

**Risk of fatal injury due to electric shock.**

- Before disconnecting live wires, switch off the supply voltage at the frost protection thermostat and protect it against unintentional reconnection.

### WARNING

**Risk of personal injury due to residual process medium in the valve.**

While working on the valve, residual medium can flow out of the valve and, depending on its properties, cause personal injury, e.g. (chemical) burns.

- Wear protective clothing, safety gloves and eye protection.

### WARNING

**Risk of burn injuries due to hot or cold components and pipeline.**

Valve components and the pipeline may become very hot or cold. Risk of burn injuries.

- Allow components and pipelines to cool down or warm up to the ambient temperature.
- Wear protective clothing and safety gloves.

To decommission the frost protection thermostat before removing it, proceed as follows:

- Shut off the process medium.
- If necessary, put the plant (sections) out of operation (see associated valve documentation).
- Allow sufficient time for any parts that can be touched to reach a safe temperature.
- Disconnect the supply voltage and protect it against unintentional reconnection.



## 12 Removal

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

---

### DANGER

***Risk of fatal injury due to electric shock.***

→ *Before disconnecting live wires, switch off the supply voltage at the frost protection thermostat and protect it against unintentional reconnection.*

---

### NOTICE

***Risk of thermostat malfunction due to measuring fluid escaping upon breakage of the capillary.***

→ *Do not bend or damage the capillary.*

---

### Wall mounting

1. Unscrew front cover.
2. Disconnect the electrical wires.
3. Remove any mounting clamps.
4. Unscrew the fastening screws.





## 13 Repairs

If the frost protection thermostat does not function properly according to how it was originally configured or does not function at all, it is defective and must be exchanged.

---

### **!** NOTICE


***Risk of thermostat damage due to incorrect service or repair work.***

- *Do not perform any repair work on your own.*
  - *Contact SAMSON's After-sales Service.*
- 

### 13.1 Returning the frost protection thermostat to SAMSON

Defective frost protection thermostats can be returned to SAMSON for examination.

Proceed as follows to return frost protection thermostats:

1. Remove the frost protection thermostat (see the 'Removal' section).
2. Continue as described on our website at  [www.samsongroup.com](http://www.samsongroup.com) > Service & Support > After-sales Service > Returning goods.



## 14 Disposal



We are registered with the German national register for waste electric equipment (stiftung ear) as a producer of electrical and electronic equipment, WEEE reg. no.: DE 62194439

- Observe local, national and international refuse regulations.
- Do not dispose of components, lubricants and hazardous substances together with your other household waste.



*On request, we can appoint a service provider to dismantle and recycle the product.*

---



## 15 Certificates

The following certificates are included on the next pages:

- EU declaration of conformity

The certificates shown were up to date at the time of publishing. The latest certificates can be found on the corresponding product page on our website:

▶ [www.samsongroup.com](http://www.samsongroup.com) > Products & Applications > Product selector > Sensors and Thermostats > 5312-2

EU declaration of conformity

SMART IN FLOW CONTROL



**EU Konformitätserklärung / EU Declaration of Conformity /  
Déclaration UE de conformité**

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/  
This declaration of conformity is issued under the sole responsibility of the manufacturer/  
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.  
Für das folgende Produkt / For the following product / Nous certifions que le produit

**Temperaturwächter / Temperature Monitor / Contrôleur de température  
Typ/Type/Type 5312**

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt/  
the conformity with the relevant Union harmonisation legislation is declared with/  
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-2:2005, EN 61000-6-3:2007 +A1:2011
LVD 2014/35/EU	EN 60730-1:2016, EN 61010-1:2010
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT  
Weismüllerstraße 3  
D-60314 Frankfurt am Main  
Deutschland/Germany/Allemagne

Frankfurt / Francfort, 2017-07-29

Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

Gert Nahler

Zentralabteilungsleiter/Head of Department/Chef du département  
Entwicklung Automation und Integrationstechnologien/  
Development Automation and Integration Technologies

Hanno Zager

Leiter Qualitätssicherung/Head of Quality Management/  
Responsable de l'assurance de la qualité

cs\_5312\_0\_6\_eu\_fra\_en07.pdf

## 16 Annex

### 16.1 Accessories

The mounting clamps to position the capillary properly at the outlet of the heating battery are available on request.

### 16.2 After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

#### **E-mail contact**

You can reach our after-sales service at  
▶ [aftersaleservice@samsongroup.com](mailto:aftersaleservice@samsongroup.com).

#### **Addresses of SAMSON AG and its subsidiaries**

The addresses of SAMSON, its subsidiaries, representatives and service facilities worldwide can be found on our website (▶ [www.samsongroup.com](http://www.samsongroup.com)) or in all SAMSON product catalogs.

#### **Required specifications**

Please submit the following details:

- Type











**EB 5207 EN**



SAMSON AKTIENGESELLSCHAFT  
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany  
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507  
samson@samsongroup.com · www.samsongroup.com