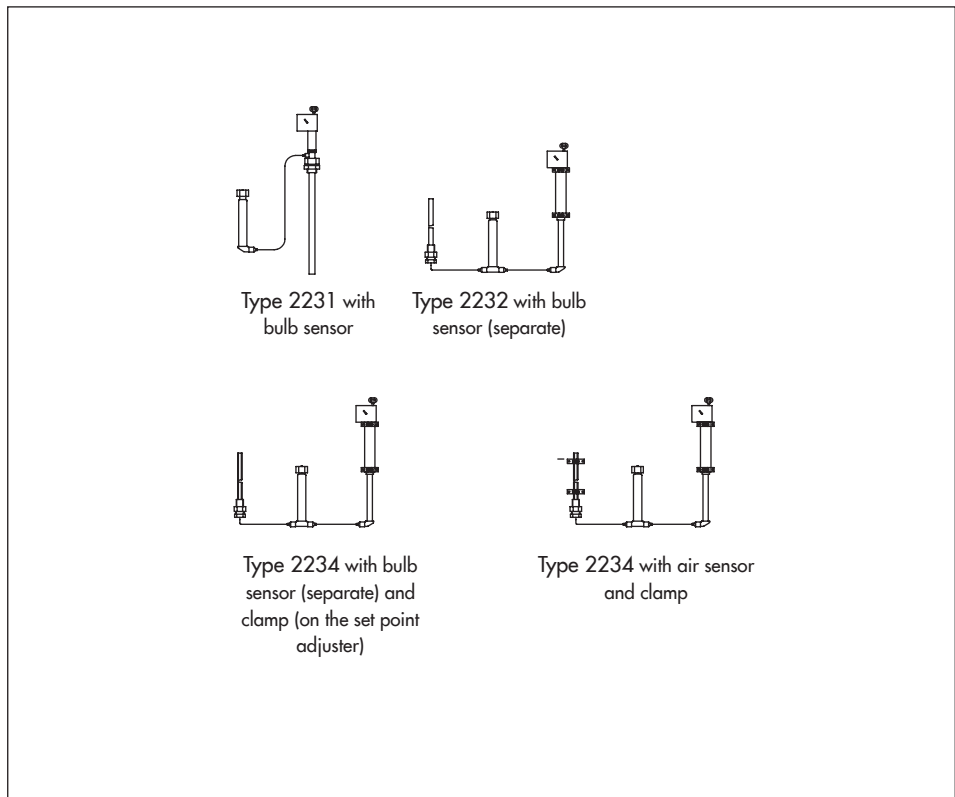


# MOUNTING AND OPERATING INSTRUCTIONS



## EB 2231 EN

### Translation of original instructions



## Type 2231 and Type 2232 Control Thermostats (bulb sensors) Type 2234 Control Thermostat (air sensor)

Self-operated Regulators

Edition July 2024



## 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 (aftersalesservice@samsongroup.com).



Documents relating to the device, such as the mounting and operating instructions, are available on our website at [www.samsongroup.com](http://www.samsongroup.com) > **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*

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### 1 Design and principle of operation

The control thermostat is used in combination with a control valve to regulate the temperature.

The control thermostat can be fastened directly to the control valve or using a double adapter. A double adapter with or without locking facility allows a further control thermostat to be connected to achieve additional temperature regulation or limitation.

The control thermostat comprises the temperature sensor, set point adjuster, capillary tube and operating element.

Depending on the field of application, the versions shown on the front cover can be selected.

The control thermostats operate according to the liquid expansion principle. When, for example the temperature at the temperature sensor (19) increases, the liquid contained in the sensor expands, causing the pin (9) of the operating element to be pushed upward by the bellows (10). This travel motion acts on the plug stem of the connected valve and moves the valve plug until the temperature reaches the adjusted set point.

The temperature set point can be adjusted using a key (12). By turning the key, a spindle moves the piston (18) up or down. The resulting change in volume in the sensor (19) causes the valve plug to travel according to the adjusted set point within a higher or lower temperature range measured by the sensor.

### Typetesting

The Types 2231 to 2234 Control Thermostats have been tested together with control valves by the German technical surveillance association TÜV in accordance with DIN EN 14597. The register number is available on request.

## 2 Installation

### 2.1 Types 2231 and 2232 (bulb sensors)

Bulb sensors are used to measure the temperature of liquids. They are designed for installation in pipelines, heat exchangers, boilers, baths, tanks etc.

---

#### **! NOTICE**

***Process medium leakage due to missing seal at the sensor.***

*The use of a thermowell is mandatory in combination with a Type 2232 Control Thermostat with clamping gland.*

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#### **Installation recommendations**

- Select the place of installation ensuring that the sensor is installed as close as possible to the heat source, but avoid exposing it to overheating.
- When mounted in a boiler, SAMSON recommends installing the sensor in the top third of the boiler.

- When mounted in a counterflow heat exchanger, SAMSON recommends installing the sensor in a pipe elbow, directly behind the pipe end socket piece.
- In plants with only temporary heat consumption, a circulation pipe must be provided when the regulator is mounted on a counterflow heat exchanger to ensure that the sensor can respond to temperature changes in the counterflow heat exchanger even when no water is tapped.

### Installation

- Weld on a pipe socket with female thread (socket-weld design) of approx. 40 mm in length at the place of installation (this also applies when a thermowell is used).
- Remove the double nipple (17) or thermowell (if used) from the sensor (19) and seal it into the welded socket.
- Adjust the highest possible set point on the set point dial (13) using the key (12). Insert the sensor with the associated seal into the double nipple or thermowell. Secure it with the coupling nut (16). The entire length of the temperature sensor (19) or thermowell must be immersed in the process medium.

**Thermowell:** when a thermowell is used, SAMSON recommends filling the free space between sensor and thermowell with oil or, when installed horizontally, with grease or any other heat transfer medium to avoid delays during heat transmission. Observe the thermal expansion of the filling medium. Do not fill the entire free space or slightly loosen sensor nut for pressure compensation.

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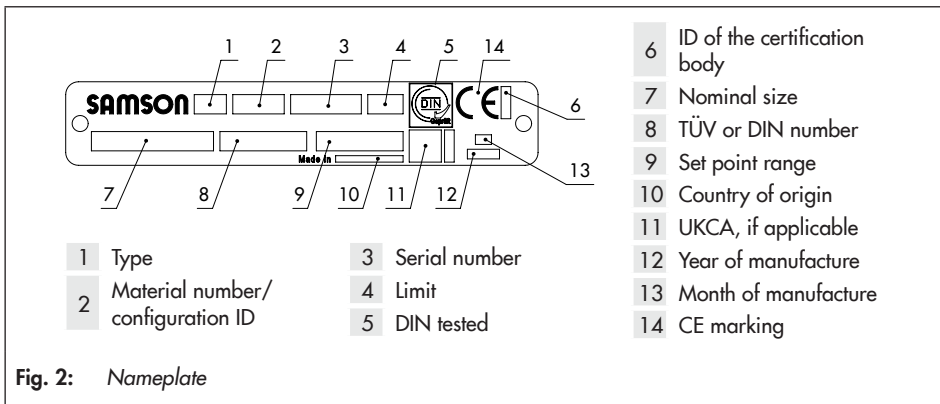
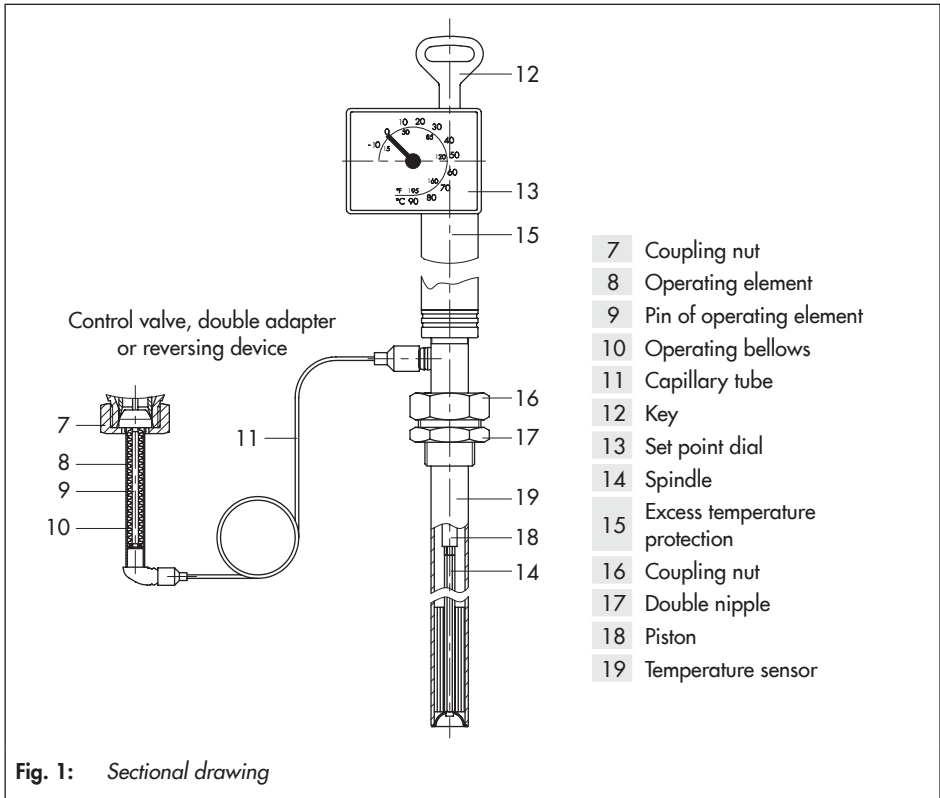
### ! NOTICE

**Galvanic corrosion due to incorrectly selected materials of the mounting parts.**

*On installing the sensor or thermowell, only combine the same kind of materials (e.g. stainless steel with stainless steel or copper together with other copper materials).*

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## Installation



## 2.2 Type 2234 (air sensor)

Type 2234 is designed for installation in air heaters, air ducts, drying cabinets etc. Install the sensor from the outside into the room and secure it with a special flange (accessories). The entire length of the sensor must be immersed in the air flow to be regulated. For Type 2234, install the set point adjustment in an easily accessible location. Avoid locations with considerable ambient temperature fluctuations.

### Installation recommendations

- Mount the sensor protected by a perforated cover to a suitable location, if possible in the middle of the wall (mounting position of sensor: tip of sensor pointing down).
- **Type 2234 with clamps** <sup>1)</sup> (or perforated cover) <sup>1)</sup> is suitable for installation in drying chambers, dryers, air heaters, incubators etc. In case of forced air circulation, install the sensor near the supply air inlet. Mount the set point adjustment outside the room to be controlled in an easily accessible location. The set point adjustment must be exposed to a temperature that is as constant as possible.
- When regulating the temperature in greenhouses, make sure that the control thermostat and set point adjuster are not exposed to direct sunlight. When the temperature regulating system is shut

<sup>1)</sup> Max. tightening torque of locking screw for the clamp (sensor): 2.5 Nm

down during the summer, adjust a high set point to protect the control thermostat.

The following double nipples must be additionally used when the Type 2234 Control Thermostat is used to replace the Type 2233 Control Thermostat:

Material number	Connection	Material
100166586	G to NPT	Stainless steel
100166585	G to G	
100174309	G to NPT	Brass
100174360	G to G	

## 2.3 Capillary tube

- ➔ Carefully run the capillary tube (11) without bending or twisting it and do not expose to any temperature fluctuations, if possible.

### ! NOTICE

#### **Risk of malfunction due to capillary tube damage.**

- Do not damage or shorten the capillary tube.
- Roll up excess tube to form a ring (smallest bending radius = 50 mm).

## 2.4 Operating element

- ➔ Attach the operating element (8) to the valve body or double adapter using the coupling nut (7).

### 3 Operation

#### 3.1 Adjusting the set point

Only use the key (12) to adjust the required temperature set point at the set point dial (13).

- Slowly turn the key clockwise to increase the temperature and counterclockwise to reduce it.
- Read off the temperature at the reference thermometer of the plant and readjust with key, if necessary.

**i Note**

Higher set point temperatures can be adjusted in increments as required. However, to lower the set point temperature, proceed in steps of 10 to 20 °C. When doing so, wait for the process medium to cool down before continuing (watch the thermometer).

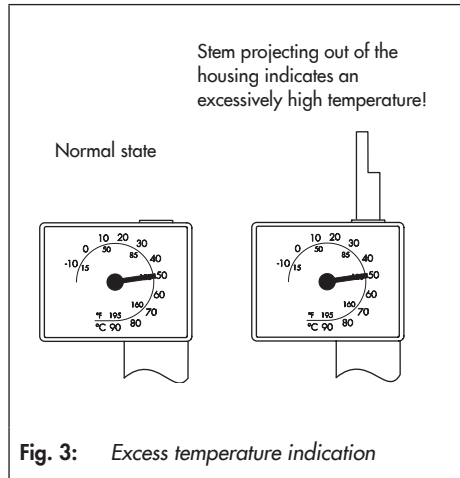
#### 3.2 Correcting the set point dial

Due to special conditions on site, the temperature adjusted at the set point dial might not be the same as the reading at the reference thermometer. If this is the case, proceed as follows:

- Undo the screw labeled "Korrektur" on the back of the dial housing.
- Turn the entire dial housing until the dial shows the same temperature as the reference thermometer.

- Turn clockwise to increase the set point and counterclockwise to reduce it (viewed from the front with the dial housing on top).
- A 360° turn corresponds to a set point change of approx. 1.5 °C.

#### 3.3 Excess temperature safeguard of the control thermostat



The temperature will exceed the adjusted limit if the valve cannot close due to dirt particles lodged between the seat and plug or due to a defective bellows. In this case, the excess temperature safeguard responds (see Fig. 3). The stem projecting out of the housing indicates a malfunction. The valve must be repaired or serviced.



## 4 Disposal



SAMSON is a producer registered at the following European institution  
 ► <https://www.ewrn.org/national-registers/national-registers>.  
 WEEE reg. no.:  
 DE 62194439/FR 025665

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

### **i** Note

*SAMSON can provide you with a recycling passport according to PAS 1049 on request. Simply e-mail us at [aftersaleservice@samsongroup.com](mailto:aftersaleservice@samsongroup.com) giving details of your company address.*

### **💡** Tip

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

## 5 Information on the UK sales region

The following information corresponds to the Pressure Equipment (Safety) Regulations 2016, STATUTORY INSTRUMENTS, 2016 No. 1105 (UKCA marking). It does not apply to Northern Ireland.

### Importer

SAMSON Controls Ltd  
 Perrywood Business Park  
 Honeycrock Lane  
 Redhill, Surry RH1 5JQ  
 Phone: +44 1737 766391  
 E-mail: [sales-uk@samsongroup.com](mailto:sales-uk@samsongroup.com)  
 Website: [uk.samsongroup.com](http://uk.samsongroup.com)

## **6 Certificates**

The EU and UKCA declarations of conformity are included on the next pages.

DECLARATION OF INCORPORATION  
TRANSLATION



**Declaration of Incorporation in Compliance with Machinery Directive 2006/42/EC**

For the following product:  
**Type 2231 Thermostat**

We certify that the Type 2231 Thermostat is partly completed machine as defined in the Machinery Directive 2006/42/EC and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, part B has been compiled.

Products we supply must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC.

Operators are obliged to install the products observing the accepted industry codes and practices (good engineering practice) as well as the mounting and operating instructions. Operators must take appropriate precautions to prevent hazards that could be caused by the process medium and operating pressure in the valve as well as by the signal pressure and moving parts.

The permissible limits of application and mounting instructions for the products are specified in the associated data sheets as well as the mounting and operating instructions; the documents are available in electronic form on the Internet at [www.samsongroup.com](http://www.samsongroup.com).

For product descriptions refer to:

- Type 2231 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comments:

- See mounting and operating instructions for residual hazards.
- Also observe the referenced documents listed in the mounting and operating instructions.

Persons authorized to compile the technical file:

SAMSON AG, Weismüllerstraße 3, 60314 Frankfurt am Main, Germany  
Frankfurt am Main, 20 September 2021

*i.v.*

Stephan Giesen  
Director  
Product Management

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Director  
Product Life Cycle Management and ETO Development for  
Valves and Actuators

Revision no. 00

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DECLARATION OF INCORPORATION  
TRANSLATION



**Declaration of Incorporation in Compliance with Machinery Directive 2006/42/EC**

For the following product:  
**Type 2232 Thermostat**

We certify that the Type 2232 Thermostat is partly completed machine as defined in the Machinery Directive 2006/42/EC and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, part B has been compiled.

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The permissible limits of application and mounting instructions for the products are specified in the associated data sheets as well as the mounting and operating instructions; the documents are available in electronic form on the Internet at [www.samsongroup.com](http://www.samsongroup.com).

For product descriptions refer to:  
- Type 2232 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:  
- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]  
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comments:  
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Persons authorized to compile the technical file:

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Frankfurt am Main, 20 September 2021

  
Stephan Giesen  
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Peter Scheermesser  
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Valves and Actuators

Revision no. 00

DECLARATION OF INCORPORATION  
TRANSLATION



**Declaration of Incorporation in Compliance with Machinery Directive 2006/42/EC**

For the following product:  
**Type 2234 Thermostat**

We certify that the Type 2234 Thermostat is partly completed machine as defined in the Machinery Directive 2006/42/EC and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, part B has been compiled.

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The permissible limits of application and mounting instructions for the products are specified in the associated data sheets as well as the mounting and operating instructions; the documents are available in electronic form on the Internet at [www.samsongroup.com](http://www.samsongroup.com).

For product descriptions refer to:

- Type 2234 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
- VCI, VDMA, VGB: "Zusatzdokument zum Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen vom Mai 2018" [German only], based on DIN EN ISO 12100:2011-03

Comments:

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Persons authorized to compile the technical file:

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UK DECLARATION OF INCORPORATION  
ORIGINAL



**Declaration of Incorporation of Partly Completed Machinery**

in accordance with Schedule 2 Part 2 Annex II, section 1.B. of the Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008

For the following product:  
**Type 2231 Thermostat**

We certify that the Type 2231 Thermostat is partly completed machinery as defined in the in Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008 and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, (Part 7 of Schedule 2) part B has been compiled.

Products we supply must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008.

Operators are obliged to install the products observing the accepted industry codes and practices (good engineering practice) as well as the mounting and operating instructions. Operators must take appropriate precautions to prevent hazards that could be caused by the process medium and operating pressure in the valve as well as by the signal pressure and moving parts.

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For product descriptions refer to:  
- Type 2231 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:  
- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]  
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Comments:  
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- Also observe the referenced documents listed in the mounting and operating instructions.

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**UK** UK DECLARATION OF INCORPORATION  
**CA** ORIGINAL



**Declaration of Incorporation of Partly Completed Machinery**

in accordance with Schedule 2 Part 2 Annex II, section 1.B. of the Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008

For the following product:  
**Type 2232 Thermostat**

We certify that the Type 2232 Thermostat is partly completed machinery as defined in the in Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008 and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, (Part 7 of Schedule 2) part B has been compiled.

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For product descriptions refer to:

- Type 2232 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
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For the following product:  
**Type 2234 Thermostat**

We certify that the Type 2234 Thermostat is partly completed machinery as defined in the in Directive 2008 No. 1597 Supply of Machinery (Safety) Regulations 2008 and that the safety requirements stipulated in Annex I, 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.4 and 1.3.7 are observed. The relevant technical documentation described in Annex VII, (Part 7 of Schedule 2) part B has been compiled.

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For product descriptions refer to:

- Type 2234 Thermostat: Mounting and Operating Instructions EB 2231

Referenced technical standards and/or specifications:

- VCI, VDMA, VGB: "Leitfaden Maschinenrichtlinie (2006/42/EG) – Bedeutung für Armaturen, Mai 2018" [German only]
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**EB 2231 EN**



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