

DIN RAIL TEMPERATURE SWITCH HTS 1000

Art.-Nr. 11146 90



The HTS 1000 DIN rail temperature switch can be combined with a PT1000 temperature sensor to measure the temperature in a range between -99 degrees Celsius and +850 degrees Celsius (depending on the sensor used) in various media (air, water, oil, etc.). Based on this measured value, a variety of temperature controls can be implemented using 3 different functions (thermometer, cooling and heating). Various consumers (e.g. fan heaters, air conditioners, signaling systems, etc.) can be controlled automatically and manually or directly through 2 integrated, potential-free relays. A clear OLED display provides constant (or time-limited) information about the current temperature, the selected function and the current switching status of the integrated relays. Installed in a DIN rail housing, the HTS 1000 is perfectly designed for use in a control cabinet and professional use in commercial and private environments. The DIN rail temperature switch is suitable with all areas of application where temperature control in heating or cooling mode is required, e.g. as a replacement for defective thermostats in heating systems, as a replacement control for air conditioning systems, for monitoring and controlling temperatures e.g. in the production of beers and spirits or in a greenhouse for temperature-controlled ventilation. For example: If the water temperature is set to be at 40 degrees Celsius, the HTS 1000 can automatically reheat the system if it deviates from the set-point by using a connected heating element.

The switching capacity of the consumers connected to the HTS 1000 DIN rail temperature switch must not exceed max. 3000 W (230 V / AC, 13.0 A) for predominantly ohmic loads and max. 750 W (230 V / AC, 3.2 A) for inductive loads.

- Consumers with a predominantly ohmic load are e.g. Incandescent lamps, electric heating, etc.
- Consumers with inductive loads are e.g. Motors, ballasts, transformers, etc.

TECHNICAL SPECIFICATIONS

- Operating voltage: 230 V/AC, 50 Hz
- Power consumption (stand-by): approx. 0.3 W
- Switching capacity (max.): max. 3000 W (230 V/AC, 13.0 A) for predominantly ohmic loads max. 750 W (230 V/AC, 3.2 A) for inductive loads
- Output (screw terminals): 2 x potential-free relays (change-over contacts)
- Resolution: 0.1 °C, 1 s
- Settings: 0.1 °C, 1 s
- Measuring range (temperature switch): -99 °C to +850 °C
- Measuring range (enclosed temperature sensor): -50 °C to +150 °C

- Accuracy (temperature value): +/- 0.5%
- Sensor: PT1000 2-wire (included in delivery)
- Sensor cable: 2 m (extendable up to 50 m)
- IP code: IP20
- Operating temperature: -10 °C to 50 °C
- Dimensions (temperature switch): 90 x 72 x 72 mm
- Dimensions (temperature sensor): 50 x 6 mm
- Min./Max. display
- Mounting: DIN rail TH35
- Hysteresis (switching accuracy) freely adjustable (0.1 °C ... 10 °C)
- Sensor monitoring (short circuit, interruption, A/D converter)
- Output switches off in the event of a sensor error
- Operation and monitoring-free operation
- Adjustable to measure, cooling, heating
- OLED display for current temperature, set function and switching states of the relays
- Data retention in the event of a power failure
- Automatic restart after a power failure

Dear customer,

to ensure a correct operation of this device, please read these instructions completely and carefully before use. Please take into consideration that this manual contains important information on the operation and use of this device. This instruction manual is part of the device. Please keep this manual in a safe place for future reference. If you pass the device on to a third person, please make sure that you also pass on the manual. Damages caused by failure of following the instructions in the manual will void the warranty. No liabilities will be taken for consequential damages. This product is certified according to the applicable EC directives for Electromagnetic Compatibility and complies with statutory requirements.

DESIGNATED USE

The designated use of the device is the temperature-dependent switching of electrical household consumers or other consumers without a safety-relevant application. The device can switch connected electrical consumers (see technical data) on or off in a temperature-controlled manner. The switch-on and switch-off temperature is freely adjustable in the range from -99 °C to + 850 °C (depending on the temperature sensor used). Any use other than the specified is not permitted!

NOTES ON OPERATION

The HTS 1000 is designed for installation in control cabinets and distribution boxes, which are have DIN rail mounting. The user is responsible for the compliant installation according to the rules and regulations of the country in which the device is installed. This also applies to the application in which the control is used.

Overloading can damage the HTS 1000 DIN rail temperature switch and could result in malfunctions or damages. No devices that might be the cause of a fire hazard may be operated unattended with the HTS 1000. The HTS 1000 may not be changed, converted, modified or repaired. Do not open the device! Make sure that all electrical devices are switched off when the HTS 1000 is connected.

NOTE: This device left the factory in perfect technical condition. In order to maintain this condition and to ensure safe operation, the user must observe and follow the safety instructions and warning notes in this instruction manual. Any use other than that specified is not permitted!

1. SAFETY

WARNING: Failure to follow the safety instructions may result in hazards causing damage to property but also serious injury or death.

- Do not touch damaged connecting cables.
- Do not work on the unit or on the connecting cables during a thunderstorm.
- The device may only be used in dry surroundings.
- Do not allow liquids to penetrate the device.
- Check connecting cables and devices regularly for damage and replace them if damaged.
- Repairs may only be carried out by a specialist.

WARNING: Danger of tripping! Tripping can lead to serious injuries.

- Do not obstruct escape routes and stairs.
- Lay the cables so that nobody can step on them or trip over them.
- All work on the mains and device may only be carried out by authorized electricians.
- A qualified person is defined as a person, due to his professional training and experience, has sufficient knowledge in the field of wireless transmission of control commands and the relevant health and safety regulations, accident prevention regulations and guidelines, generally has the knowledge of technical regulations (for example, DIN standards, VDE regulations, technical rules, etc.) so that he can assess the safe working condition of devices for the wireless transmission of control commands.

2. SAFETY INSTRUCTIONS FOR INSTALLATION

The applicable laws and standards of the country in which the device is operated must be followed. The product is not intended to control electrical equipment that has safety-related functions. Even in normal operation, there is a risk of unexpected malfunction due to a failure or malfunction of the output stage or signal transmission. The user must ensure that no consequential damage occurs as a result of a malfunction or an undefined switching state.

This product has not been tested for use in safety-related applications!

If certain safety requirements apply, they must be implemented by qualified higher-level measures with approved equipment!

This device may be used by children 8 years of age and over, and by persons with reduced physical, sensory or mental abilities, or lack of experience and knowledge, if they have been supervised or instructed in the safe use of the device and understand the possible hazards. Children are not allowed to play with the device. Cleaning and maintenance may not be carried out by children without supervision.

3. WARNING AND SAFETY INSTRUCTIONS

Please observe the following safety instructions to avoid malfunctions, damage and health hazards:

- The operation of the device under adverse environmental conditions must be avoided under all circumstances. Adverse environmental conditions are: Ambient temperatures below -10 °C or above 50 °C, combustible gases, solvents, vapors, dust, humidity above 80% rel., splash or standing water.
- The receiver may only be operated in dry and closed rooms.

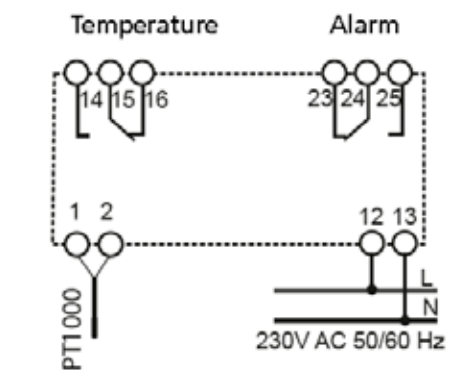
- The remote control may not switch devices with a safety function for machines or other devices which are not actively monitored.
- No devices with a risk of fire (such as radiant heaters, irons, etc.) may be switched by the device or operated unattended.
- The device may not be changed, modified, modified or repaired other than approved by the manufacturer.
- If it can be assumed that safe operation is no longer possible, the device must be put out of operation immediately and secured against unintentional operation. Safe operation is no longer guaranteed if the device is no longer functioning, has visible damage, has transport damage and after storage under unfavourable conditions.
- If there are any doubts regarding the application or wiring, it is essential to seek the advice of experts or advice from the manufacturer.
- Maintenance work and repairs may only be carried out by authorized specialist personnel. Before commissioning a device, it must generally be checked whether this device or module is suitable for the application for which it is to be used. In case of doubt, it is absolutely necessary to ask advice from experts or the manufacturer.
- Please note that operating and connection errors are beyond our control. Understandably, we cannot accept any liability for any resulting damage.
- In industrial facilities the accident prevention regulations of the Association of Trade Associations for electrical installations and equipment must to be followed.
- In schools, training facilities, hobby and Self-Repair shops it is required, that the operation of devices must be supervised by trained personnel.
- If the device needs to be repaired, only original spare parts may be used! The use of deviating spare parts can lead to serious damage and personal injury!
- Dispose of unnecessary packaging material or store it in a place inaccessible to children. There is danger of suffocation!

4. WIRING AND INSTALLATION

When handling products that come into contact with electrical voltage, the applicable VDE regulations must be followed, in particular VDE 0100, VDE 0550/0551, VDE 0700, VDE 0711 and VDE 0860.

- Before opening the device, make sure that the device is disconnected from power.
- Tools may only be used on devices, components or assemblies if it is ensured that the devices are disconnected from the supply voltage and that electrical charges stored in the components in the device have been discharged beforehand.
- Live cables or lines to which the device, component or assembly is connected must always be checked for insulation damages.
- The operating voltage is connected to terminals 12 and 13. The electrical connection must be a fixed connection according to VDE 0100.
- The enclosed PT1000 (2-wire) temperature sensor is connected to terminals 1 and 2.
- For safety reasons, make sure that only identical voltages are switched on the relay contacts (e.g. NOT Rel. 1: 12 V and Rel. 2: 230 V). The device is designed for protection class II. Please make sure that the protective conductor of the connected consumers (if not protection class II) is connected according to VDE.
- The relay contacts (temperature "Rel T") and (alarm "Rel A") have potential-free changeover contacts and must be connected accordingly depending

on the application. Consumers (e.g. fans, heaters, etc.) must each be secured with their own fuse in accordance with the specifications.



Connection: HTS 1000

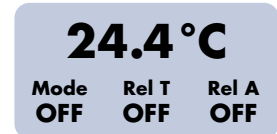
5. OPERATION

KEYS

- Key ▲: increase the desired value
- Key ▼: decrease the desired value
- SET key: Select or confirm settings
- ESC key: back

5.1 MAIN DISPLAY

The main display appears after the connection to the operating voltage and a connected temperature sensor PT1000 (2-wire).

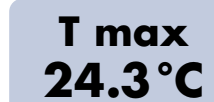


The following values are shown on the device display:

1. Actual value of the current temperature in degrees Celsius
2. Selected mode (OFF = thermometer, C = cooling, H = heating)
3. Switching status of the "Temperature" relay (OFF = Off, ON = On)
4. Switching status of the "Alarm" relay (OFF = Off, ON = On)

DISPLAY OF THE MINIMUM AND MAXIMUM TEMPERATURE VALUES

With the "▼▲" buttons, the minimum and maximum values of the measured temperature can be shown in the main display. The values are reset with the SET key. After 10 seconds the display changes back to the main display or exit the display directly by pressing the ESC key.



5.2 MAIN MENU

When the SET button is pressed, the device switches to setting mode. The following menu items are displayed:

- **MODE** (OFF, heating, cooling)
- **T SET** (set-point setting of the switching temperature)
- **HYST** (switching hysteresis/switching accuracy)
- **REL T DLY** (switch-on delay relay temperature "Rel T")
- **T AL MIN** (alarm temperature minimum temperature value)
- **T AL MAX** (alarm temperature maximum temperature value)

- **REL A DLY** (switch-on delay relay alarm "Rel A")
- **R ADJ** (power resistance compensation/expert setting)
- **T ADJ** (set reference temperature/expert setting)
- **SCR TO** (automatic time-out/Time-out 30 s OLED display)
- **MANUAL** (manual control of the relay alarm and temperature)

-Setting- Mode T set Hyst

Navigate through the menu by using the "▼▲" keys. Change a menu value by pressing the SET button. The values can be reduced or increased using the "▼▲" keys. A setting is confirmed with the SET button. A menu item which is marked with a character (■) or (✓) is a so-called "check-box". There are only two setting options for these check-boxes:

- : OFF
- ✓: ON

-Setting- REL Dly Scr Flip ✓ Scr TO

NOTE: You are in the setting mode and want to switch to the main display. If the changed settings are to be saved, press the SET key and then the ESC key or wait approx. 10 seconds without pressing a key and the display changes from the settings menu back to the main display.

NOTE: When you exit the main menu (setting mode) using the ESC key or after 10 seconds without pressing a key, the display shows "—END—" or "NO DATA" for a short time. The temperature sensor then transmits updated temperature values to the control.

MENU ITEM "MODE" (OFF, HEATING, COOLING)

---Mode---
 ► ✓ Off
 ■ Cooling
 ■ Heating

The required mode is set in this menu item:
"OFF" mode: The device only works as a thermometer. The control is switched off. The device only shows the currently measured temperature at the PT1000 temperature sensor. The minimum and maximum temperature values are recorded.

"Cooling" mode: The cooling mode is set. (see functional principle "Cooling")

"Heating" mode: The mode for heating is set. (see functional principle "Heating")

MENU ITEM "T SET" (SET-POINT SETTING SWITCHING TEMPERATURE)

The desired room temperature is set in this menu item. (The desired room temperature in a room is 35 degrees Celsius – the set-point of 35 degrees Celsius is required.)
 Setting range: -99.0 °C ... + 850.0 °C

MENU ITEM "HYST" (SWITCHING HYSTERESIS/SWITCHING ACCURACY)

The temperature hysteresis (switching accuracy) is set in this menu item. (The desired room temperature should be in the range of 35 to 37 degrees Celsius – An hysteresis of 2 degrees Celsius is required.)
 Setting range: 0.1 °C ... 10 °C (in steps of 0.1 °C)

MENU ITEM "REL T DLY" (SWITCH-ON DELAY RELAY TEMPERATURE "REL T")

The relay temperature "Rel T" is set in this menu item. (The room temperature fluctuates quickly around the set-point – in this menu item the switch-on delay for the "Rel T" relay is set preventing the relay from being switched on and off frequently in the event of rapidly fluctuating temperatures.)
Setting range: 0 ... 999.9 s

MENU ITEM "T AL MIN" (ALARM TEMPERATURE MINIMUM TEMPERATURE VALUE)

The alarm temperature is set for a minimum temperature value in this menu item. The value can be set with the "▼▲" keys. The setting is saved with the **SET** button.

The relay alarm "Rel A" is switched on when the measured temperature is less than or equal to the set value for "T AL MIN".

Setting range: -99.0 °C ... +850.0 °C

TIP: If you want to deactivate the function, select the lowest value (-99.0 degrees Celsius) for the setting "T AL MIN".

MENU ITEM "T AL MAX" (ALARM TEMPERATURE MAXIMUM TEMPERATURE VALUE)

The alarm temperature is set for a maximum temperature value in this menu item. The value can be set with the "▼▲" keys. The setting is saved with the **SET** button.

The relay alarm "Rel A" is switched on when the measured temperature is greater than or equal to the set value for "T AL MAX".

Setting range: -99.0 °C ... +850.0 °C

TIP: If you want to deactivate the function for setting "T AL MAX", select the highest value (+850.0 degrees Celsius).

MENU ITEM "REL A DLY" (SWITCH-ON DELAY RELAY ALARM "REL A")

The switch-on delay for the relay alarm "Rel A" is set in this menu item. (The relay "Rel A" is switched on with a delay after the alarm temperature has been reached – in this menu item the desired delay time is set.)

Setting range: 0 ... 999.9 sec

MENU ITEM "R ADJ" (COMPENSATE POWER RESISTANCE / EXPERT SETTING)

The offset correction for the resistance value of the measuring cable is set by the thermal sensor. (This setting is only necessary if you use a different temperature sensor with a different wiring than the supplied PT1000 temperature sensor.)

Setting range: 0 ... 50 Ohm

MENU ITEM "T ADJ" (COMPENSATE POWER RESISTANCE / EXPERT SETTING)

Allows a temperature correction for the temperature sensor. This value is subtracted from the actual value (see main display) or added (depending on the sign of the correction value). (This setting is only necessary if you use a different temperature sensor with a different wiring than the supplied PT1000 temperature sensor.)

Setting range: -50 °C ... + 50 °C

MENU ITEM "SCR TO" (AUTOMATIC TIME-OUT / TIME-OUT OLED DISPLAY)

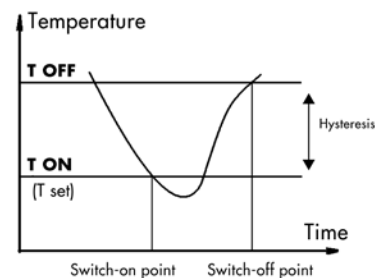
The time-out for the OLED display (30 s) is activated. After switching off (display off) and pressing the button again, the display switches on again. The button pressed is not evaluated. (You do not want the display of the HTS 1000 to be switched on permanently – in this menu item you determine whether the display should remain switched on permanently or for a limited time.)

MENU ITEM "MANUEL" (MANUAL CONTROL OF THE RELAY ALARM AND TEMPERATURE)

The relay temperature "Rel T" and relay alarm "Rel T" can be switched on and off manually. This menu item has no Time-out and can only be ended by the user (press **ESC**).

6. OPERATING PRINCIPLE OF THE "COOLING" AND "HEATING" MODES

6.1 HEATING



Abbreviations:

T ON = T set; T OFF = T set + hyst;

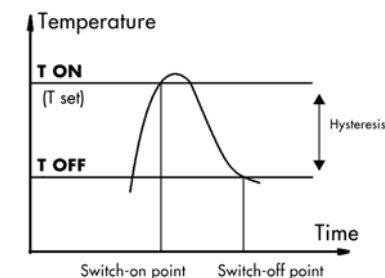
T alarm max = T AL MAX; T alarm min = T AL MIN

Example: You want to heat a room temperature using a heater. The temperature should be in the range of 22 °C and 25 °C.

The heater should switch on when the temperature drops below 22 °C (T ON = T set = 22 °C) and switch off again at 25 °C. In this case, set the hysteresis to 3 °C (T set + hyst = 25 °C).

The relay "Rel T" is switched on when the measured temperature is lower or equal to T ON. The relay is switched off if the measured temperature is greater than or equal to T OFF.

6.2 COOLING



Abbreviations:

T ON = T set; T OFF = T set - hyst;

T alarm max = T AL MAX; T alarm min = T AL MIN

Example: You want to control air conditioning. The desired room temperature is 12 °C.

The air conditioning should switch on – when the temperature rises above 12 °C (T ON = T set = 12 °C) and switch off again at 10 °C. In this case, set the hysteresis to 2 °C (T set - hyst = 10 °C).

The relay "Rel T" is switched on when the measured temperature is greater than or equal to T ON. The relay is switched off when the measured temperature is lower or equal to T OFF.

NOTE: You have selected the "Heating" mode, set 25 °C as the set-point and 5 °C for the hysteresis. If the currently measured temperature is within 25 °C to 30 °C, the relay temperature "Rel T" is not switched on. The "Rel T" relay is only switched on when the temperature has dropped below 25 °C. Conversely, this behaviour also applies to the "Cooling" mode.

7. ERROR MESSAGES

ERROR N1

Err1: A short circuit was found in the thermal sensor.

ERROR N2

Err2: No thermal sensor connected.

ERROR N

Err3: The A / D converter is malfunctioning.

NOTE: If an error occurs, the device inevitably switches off the relay "Rel T" and alarm "Rel A". Please contact our technical support (E-Mail: technik@h-tronic.de).

8. EXTENSION OF THE SENSOR CABLE

The HTS 1000 sensor cable carries a low voltage and must not be laid with cables that carry more than 50 V in a common cable duct. In addition, the sensor cable should not be laid in the immediate vicinity of the mains cable in order to prevent interference and measurement errors. The sensor cable can be extended up to 50 m (0.5 mm² to 1.5 mm²).

Please note the menu items:

("R Adj" (compensate power resistance/expert setting) and "T Adj" (set reference temperature/expert setting))

9. RESET TO FACTORY SETTINGS

To reset to factory settings, disconnect the HTS 1000 from the mains, hold down the **SET** button and reconnect the device to the mains voltage. (Note: Please note the safety instructions).

10. GUARANTEE

The dealer/manufacturer from which the device was purchased provides a guarantee of 2 years from the date of handover for the material and manufacture of the device.

In the event of a defect, the purchaser is initially only entitled to supplementary performance. The supplementary performance includes either the repair or the delivery of a replacement product. Any devices or parts which have been replaced will become the property of the dealer/manufacturer. The buyer has to notify the trader of defects immediately. Proof of the warranty claim shall be furnished by means of a proper purchase confirmation (purchase receipt, invoice, if applicable). Damages resulting from improper handling, improper connection, use of parts from other manufacturers, normal wear and tear, use of force, personal repair attempts or changes to the device, cables or terminals, change of circuit, damage due to ignoring the operating instructions, or improper use or other external influences, if connected to an incorrect voltage or current type, bridged or incorrect fuses, in case of misuse or damage caused by negligence, are not covered by the warranty or void the warranty.

Further claims against the vendor due to this warranty obligation, in particular claims for compensation for loss of profit, compensation for use and indirect damages, are excluded, unless legally mandatory.

We reserve the right to repair, rectify, replace or refund the purchase price. Costs and risks of transport, assembly and disassembly work as well as all other costs which can be connected with the

repair are not replaced. Liability for consequential damage resulting from faulty function of the device – of whatever nature – is in principle excluded.

In the following cases, the warranty will expire and the device returned at your expense:

- In the case of damage caused by improper handling, operation, storage, as well as by force majeure or other external influences.
- In the case of changes of any kind and repair attempts on the device, cables or clamps.
- When non-original components have been used.
- In the case of damage caused by failure to follow the operating instructions and the wiring diagram and in case of damage caused by negligent handling.
- In the case of damage caused by overloading the device.
- In the case of damage caused by the intervention of other persons.
- When connected to an incorrect voltage or current type.
- In case of wrong operation or damage caused by negligent treatment.
- For defects caused by bridged fuses or by using incorrect fuses.
- Incorrect connection and/or operation.
- In the case of external forces, damage to the device and/or damage to parts of the device due to mechanical effects or overload.
- When using the device for purposes not described in this manual.
- Unauthorized opening of the appliance.
- Under normal wear and tear.
- In case of consequential damage caused by improper use and/or improper use and/or defective batteries.

11. ENVIRONMENT



Consumers are legally obligated and responsible for the proper disposal of electronic and electrical devices by returning them to collecting sites designated for the recycling of electrical and electronic equipment waste. This device and/or components within the device can be recycled. For more information concerning disposal sites, please contact your local authority or waste management company.

CE-MARK AND CONFORMITY

H-TRONIC GmbH hereby declares that this device is in compliance with the essential requirements and the relevant provisions of Directive 2014/30/EU, 2014/35/EU and 2011/65/EU.

The relevant records are in the hands of the manufacturer:

H-TRONIC GmbH
Industriegebiet Dienhof 11
DE-92242 Hirschau



This manual is a publication of H-TRONIC GmbH, Industriegebiet Dienhof 11, D-92242 Hirschau, Germany.

All rights including translation reserved. Information provided in this manual may not be copied, transferred or put in storage systems without the express written consent of the publisher. Reprinting, also for parts only, is prohibited. This manual is according to the technical data when printed. This manual is according to the technical status at the time of printing and is a constituent part of the device. Changes in technique, equipment and design reserved. V 1.00

© Copyright 2020 by H-TRONIC GmbH