

## Thermostats for Control Cabinets

to protect electric and electronic components from heat, cold, and humidity inside the control or distributor cabinets and automated systems.

alre



## Thermostats for Control Cabinets

**Intelligent solutions**  
for all areas to be controlled

alre – innovation with  
competence and tradition

# Thermostats for Control Cabinets RTBSS

Thermostat with bimetallic sensor



## Technical specifications

<b>Operating voltage:</b>	24 ... 250V~ / 24 ... 48V == (changer only)
<b>Sensor:</b>	bimetal
<b>Switching capacity:</b>	N/C contact/ N/O contact 24V~ 250V~/10(2)A, 24V == ... 48V == max. 30W changer contact cooling: 24V~ 250V~/10(2)A, 24V == ... 48V == max. 30W changer contact heating: 24V~ 250V~/10(2)A, 24V == ... 48V== max. 30W
<b>Contact:</b>	1 N/O contact (heating), 1 N/C contact (cooling) or 1 changer contact (heating/cooling)
<b>Switching differential:</b>	see Table
<b>Equipment:</b>	Outside setting, twist-type knob
<b>Protection type:</b>	IP30
<b>Protection class:</b>	0 (protection class must be ensured by the installation site)
<b>Type of connection:</b>	Screw terminals 0.5 ... 2.5mm <sup>2</sup>
<b>Type of installation:</b>	on DIN-bar (35mm)
<b>Ambient air temperature:</b>	-20T40 (-20 ... 40°C) OT60 (0 ... 60°C)
<b>Enclosure:</b>	Plastic, gray (RAL7035)
<b>Weight:</b>	approx. 50g
<b>Certifications:</b>	UL, VDE (only 0...60°C types)

## Application

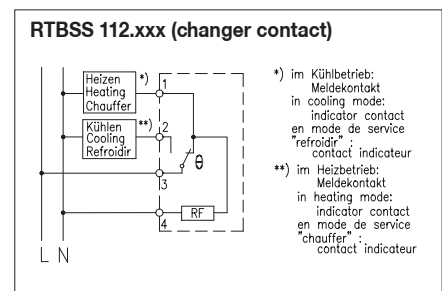
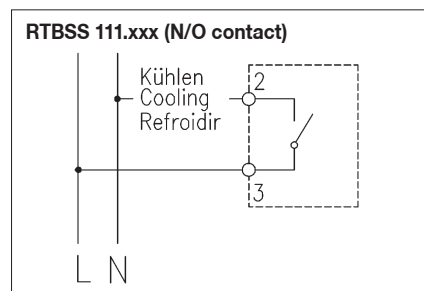
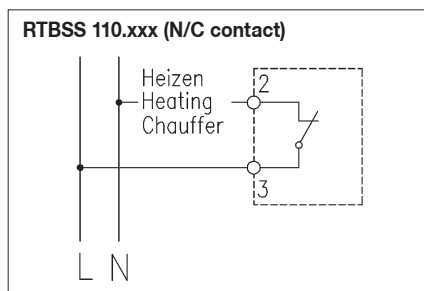
Used to monitor the temperature in switch cabinets, automated system, enclosures

Type	Product No.	Setting range	Switching differential	Equipment	Scale	WG
RTBSS-110.250/04	ZN111524	0 ... 60°C	4 ... 7K	N/C contact (heating)	red	II
RTBSS-111.250/05	ZN112525	0 ... 60°C	4 ... 7K	N/O contact (cooling)	blue	II
RTBSS-112.250/07	ZN113527	0 ... 60°C	4 ... 7K	Changer (heating and cooling)	gray	II
RTBSS-111.130	ZA112310	-20 ... 40°C	<3K	N/O contact (cooling)	blue	II
RTBSS-112.130	ZA113310	-20 ... 40°C	<3K	Changer (heating and cooling)	gray	II
RTBSS-112.230	ZA113320	0 ... 60°C	<3K	Changer (heating and cooling)	gray	II
RTBSS-112.111	ZA113110	-20 ... 40°C	~1K*	Changer (heating and cooling)	gray	II
RTBSS-112.211/12	ZN113152	0 ... 60°C	~1K*	Changer (heating and cooling)	gray	II

\* with thermal return, only with an operating voltage of 230V~

Type	Equipment	WG
JZ-13	ZA990001 Standard track with drill holes to fasten thermostats for control cabinets (length 40mm)	II

For circuit diagrams, dimensional drawings see page 7



RF only with RTBSS-112x11

# Thermostats for Control Cabinets RTKSS, PTR

Thermostats with capillary sensors



Technical specifications		Application
<b>Sensor:</b>	Capillary (1.5m)	Temperature control to monitor the temperature in control cabinets, automated systems, enclosures
<b>Switching capacity:</b>	Changer heating: 24V~...250V~/10(2) A,24V == ... 48V == max. 30W Changer cooling: 24V~ ... 250V~/5(2)A, 24V == ... 48V == max. 30W Changer (heating/cooling)	
<b>Contact:</b>	<7K	
<b>Switching differential:</b>	<7K	
<b>Equipment:</b>	Outside setting, twist-type knob	
<b>Protection type:</b>	IP30	
<b>Protection class:</b>	0 (protection class must be ensured by the installation site)	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	min. -20°C ... max. control temperature plus 15% (see setting range), approx. 50g	
<b>Enclosure:</b>	Plastic, gray (RAL7035)	
<b>Weight:</b>	approx. 70g	

Type	Product No.	Setting range	Switching differential	Equipment	Scale	WG
RTKSS-112.270/07	ZN143727	0 ... 60°C	<7K	1 changer (heating/cooling)	gray	II
RTKSS-112.370	ZA143730	20 ... 80°C	<7K	1 changer (heating/cooling)	gray	II

Thermostat with bimetallic sensor, design Pikolo

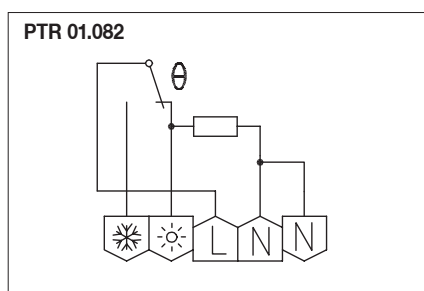
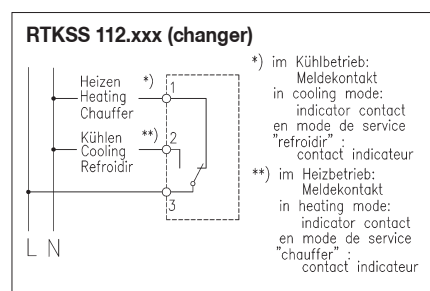


Technical specifications		Application
<b>Operating voltage:</b>	230V~	Temperature control to monitor the temperature in control cabinets, automated systems, enclosures
<b>Sensor:</b>	Bimetallic	
<b>Switching capacity:</b>	Heating: 10(4)A, Cooling: 5(2)A	
<b>Contact:</b>	1 changer	
<b>Switching differential:</b>	approx. 2K	
<b>Equipment:</b>	Outside setting, range specifications under the knob	
<b>Protection type:</b>	IP30	
<b>Protection class:</b>	II, after the appropriate installation	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	min. -20°C ... max. control temperature plus 15%	
<b>Enclosure:</b>	Plastic, gray (RAL7035)	
<b>Weight:</b>	approx. 85g	

Type	Product No.	Setting range	Switching differential	Equipment	Scale	WG
PTR 01.082	A201302	10 ... 60°C	approx. 2K	1 changer (heating/cooling)	black	II

Accessories						WG
JZ-13	ZA990001	Standard track with drill holes to fasten thermostats for control cabinets (length 40mm)				II
JZ-15	ZA990002	Installation set to fasten the remote capillary sensor				II

For circuit diagrams, dimensional drawings see page 7



# Peltier thermostats CTRRS, KTRRN

Heating or cooling



Technical specifications		Application
<b>Operating voltage:</b>	24V $\pm$ 15%	Peltier thermostat to connect a Peltier element to heat or cool – to climatize switch cabinets, ticket machines and ATM or similar applications.
<b>Sensor:</b>	Internal NTC	
<b>Switching capacity:</b>	14A (max. 16A/60,000 operating cycles)	
<b>Contact:</b>	Changer (cooling = N/C contact, heating = N/O contact)	
<b>Power consumption:</b>	0,75W	
<b>Setting range:</b>	0 ... 60°C	
<b>Switching differential:</b>	approx. 2 ... 3K	
<b>Equipment:</b>	Outside setting, twist-type knob	
<b>Protection type:</b>	IP30	
<b>Protection class:</b>	III	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	-10T60 (-10 ... 60°C)	
<b>Enclosure:</b>	Polyamide PA6.6 (UL94 V-0), gray (RAL7035)	
<b>Knob colour/scale:</b>	gray	
<b>Weight:</b>	approx. 70g	

Type	ProductNo.	Equipment	WG
CTRRS-161.000/04	DN600004	Peltier thermostat for heating and cooling	II

Heating and Cooling



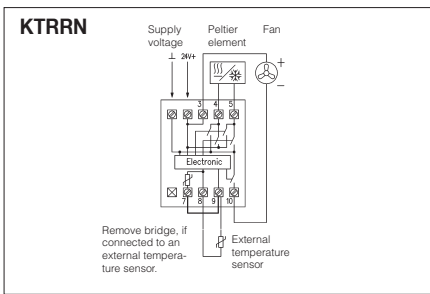
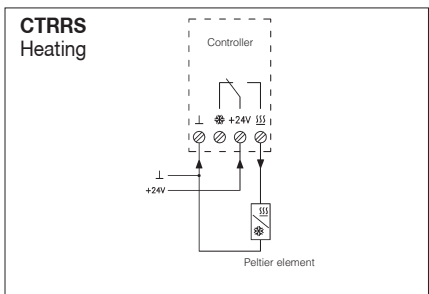
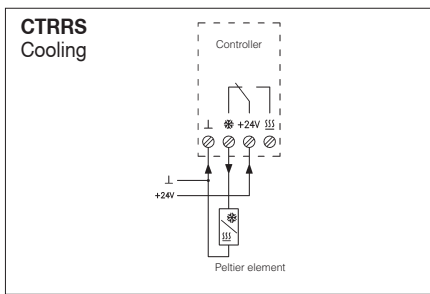
Technical specifications		Application
<b>Operating voltage:</b>	24V $\pm$	Peltier thermostat to connect a Peltier element to heat or cool – to climatize switch cabinets, ticket machines and ATM or similar applications.
<b>Sensor:</b>	Internal or optionally external 2k sensor	
<b>Switching capacity:</b>	Peltier element: 16A; fan output: 2(1)A	
<b>Contact:</b>	2 x N/O contacts (heating and cooling) with neutral zone; (Peltier element); N/O contact (fan)	
<b>Power consumption:</b>	Approx. 1W	
<b>Setting range:</b>	Heating: 0 ... 20°C; cooling: 0 ... 50°C	
<b>Switching differential:</b>	Approx. 1K	
<b>Equipment:</b>	Separate control areas for heating and cooling; neutral zone of at least 10K. The fan is only activated during heating and cooling.	
<b>Protection type:</b>	IP20	
<b>Protection class:</b>	III	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	-10T55 (-10...55°C)	
<b>Enclosure:</b>	Plastic ABS, gray (RAL7035)	
<b>Knob colour/scale:</b>	gray	
<b>Weight:</b>	approx. 105g	

Function
If the temperature drops below the set heating switch point, the thermostat turns on the outside fan and activates the Peltier element, whereby the direction of the direct current effects the heating of the control cabinet. If the set cooling switch point is exceeded, the outside fan is turned on and the Peltier element is activated by the opposite direction of the direct current. The opposite direction of the direct current effects the cooling of the control cabinet.

Type	ProductNo.	Equipment	Ext. sensor (optional)	WG
KTRRN-267.014/03	DN460003	Peltier thermostat for heating and cooling, fan control	"8" (NTC 2K), page 8	II

Accessories			WG
<b>JZ-13</b>	ZA990001	Standard track with drill holes to fasten thermostats for control cabinets (length 40mm)	II

For circuit diagrams, dimensional drawings see page 7



# Control cabinet hygrostats RFHSS, PHY



Technical specifications		Application
<b>Sensor:</b>	Plastic fibers	Hygrostat to monitor and control the humidity in switch cabinets, beverage or cigarette machines
<b>Switching capacity:</b> RFHSS-112.110/02	Humidify: 24V~...250V~/2(0.2)A at 24V~ min. 100mA Dehumidify: 24V~...250V~/5(0.2)A at 24V~	
RFHSS-113.110/01	max. 100mA, 48V~/=	
	min.: 5 mA, 5V~/=	
<b>Contact:</b>	1 changer	
<b>Switching differential:</b>	~5% rel. humidity	
<b>Equipment:</b>	Outside adjustment, twist-type knob	
<b>Protection type:</b>	IP30	
<b>Protection class:</b>	0 (protection class must be ensured at the installation site)	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	T60 (0 ... 60°C)	
<b>Enclosure:</b>	Plastic, gray (RAL7035)	
<b>Knob colour/scale:</b>	blue	
<b>Weight:</b>	approx. 50g	
<b>Approvals:</b>	UL (only RFHSS-112 and only 230V)	

Type	Product No.	Setting range	Equipment	WG
RFHSS-112.110/02	ZN273002	40 ... 90% rel.humidity	1 changer	II
RFHSS-113.110/01	ZN274001	40 ... 90% rel.humidity	1 changer, gold contacts	II

## Design Pikolo

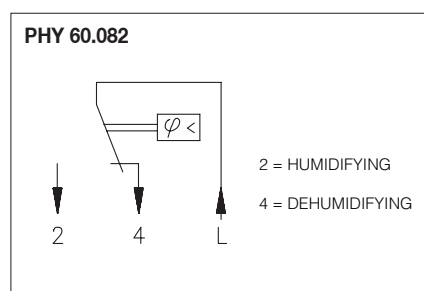
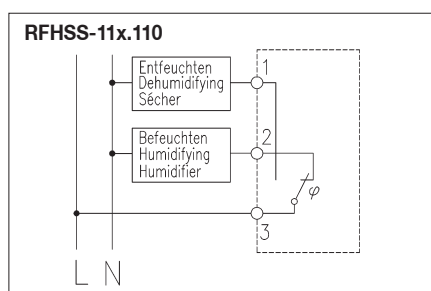


Technical specifications		Application
<b>Sensor:</b>	Plastic fibers	Hygrostat to monitor and control the humidity in switch cabinets, beverage or cigarette machines
<b>Switching capacity:</b>	Dehumidify: 5(0,2)A; Humidifying: 2(0,2)A at 24V~ min. 100mA Min.: 100mA, 24V~	
<b>Contact:</b>	1 changer	
<b>Switching differential:</b>	~4% rel. humidity	
<b>Equipment:</b>	Outside adjustment, range specification beneath knob	
<b>Protection type:</b>	IP30	
<b>Protection class:</b>	II upon appropriate installation	
<b>Type of connection:</b>	Screw terminals 0,5 ... 2,5mm <sup>2</sup>	
<b>Type of installation:</b>	on DIN-bar (35mm)	
<b>Ambient air temperature:</b>	10 ... 60°C	
<b>Enclosure:</b>	Plastic, gray (RAL7035)	
<b>Knob colour/scale:</b>	blue	
<b>Weight:</b>	approx. 85g	

Type	Product No.	Setting range	Equipment	Skala	WG
PHY 60.082	A261004	30 ... 100% rel.humidity	1 changer	gray	II

Accessories			WG
JZ-13	ZA990001	Standard track with drill holes to fasten thermostats for control cabinets (length 40 mm)	II

For circuit diagrams, dimensional drawings see page 7



# Controller for distributor installation (hat rail) ITR 79

Electronic, remote sensor



## Technical specifications

<b>Operating voltage:</b>	230V~, 50Hz
<b>Switching capacity:</b>	Up to 250V~ (not for SELV) PELV 10(3)A NC contact 5(1.5)A
<b>Contact:</b>	1 relays as potential changer
<b>Switching differential:</b>	Adjustable from 0.5...5K With the exception of ITR 79.600, ITR 79.503
<b>Ambient air temperature:</b>	-10 ... +40°C
<b>Protection type:</b>	IP 20
<b>Protection class:</b>	II
<b>Operating display:</b>	LED – red: heating LED – green: cooling
<b>Type of connection:</b>	on DIN-bar (35mm)
<b>Type of installation:</b>	Screw terminals for max. 2,5mm <sup>2</sup>
<b>Enclosure:</b>	gray (RAL7035)
<b>Knob colour/scale:</b>	gray

## Application

Temperature control and monitoring for halls, greenhouses, and floor heating systems. The equipment has a sensor break and short circuit fuse.

**Sensors are not part of the delivery** (except in ITR 79.804, ITR 79.805, ITR 79.811) (consult page 8 of the main catalogue for sensor selection).

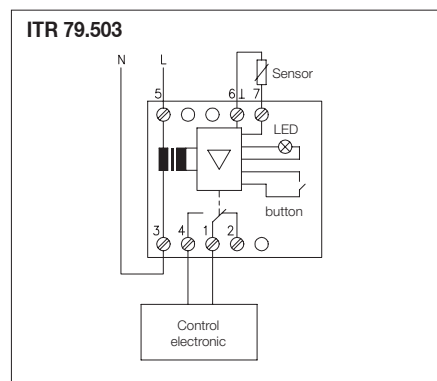
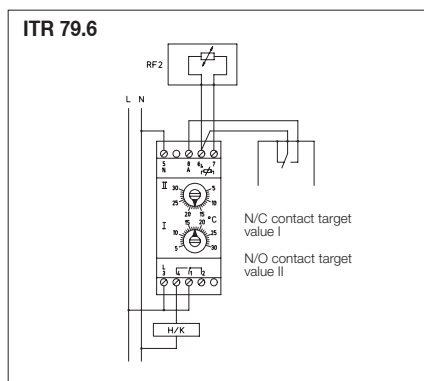
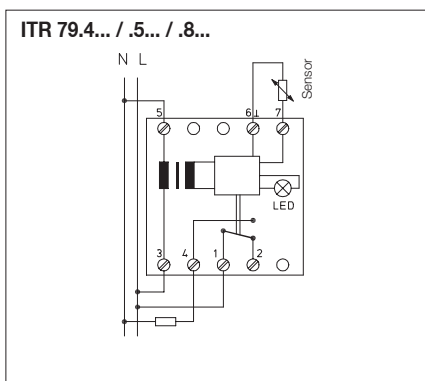
Use sensor in accordance with the specified sensor number (e.g. sensor number 24 or 4: all sensors with this number can be used, e.g. HF-4 or LF 24). Avoid installing the sensor line parallel to the power supply line or to shielded cables.

Type	Product No.	Setting range	Equipment	Sensor	WG
ITR 79.402	D4780167	-35 ... +15°C	Heating LED red	1 / 21 (NTC 1K)	II
ITR 79.404	D4780155	0 ... 60°C	Heating LED red	4 / 24 (NTC 10K)	II
ITR 79.405	D4780181	35 ... 95°C	Heating LED red	5 / 25 (NTC 50K)	II
ITR 79.406	D4780205	70 ... 130°C	Heating LED red	6 (NTC 100K)	II
ITR 79.408	D4780179	-10 ... +40°C	Heating LED red	3 / 23 (NTC 8K)	II
ITR 79.503	D4780524	0 ... 11°C	Frost protection, manual reset, switch differential 1.5 firm, LED red (sensor at 75°C)	0 / 20 (NTC 2K 25)	II
ITR 79.504	D4780371	0 ... 60°C	Cooling LED green	4 / 24 (NTC 10K)	II
ITR 79.508	D4780369	-10 ... +40°C	Cooling LED green	3 / 23 (NTC 8K)	II

Two target value adjusters (e.g. day/night temperature through an external clock)					WG
ITR 79.600	D4780508	2 x 5 ... 30°C	Heating, switch differential 0.5K firm	2 (NTC 47K)	II

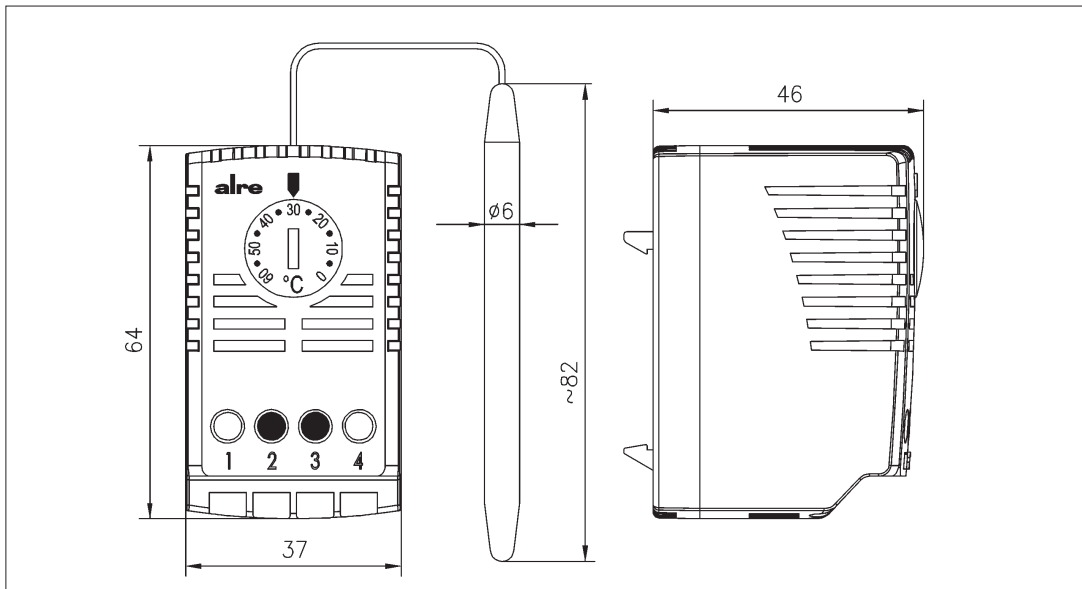
Complete devices with remote sensors					WG
ITR 79.804	D4780545	0 ... 60°C	Scale 0 ... 6, heating, LED red, incl. sensor HF-8 / 4-K2 (4m), insulated	8 (NTC 2K)	II
ITR 79.805	D4780557	+35 ... +95°C	Heating, LED red, incl. sensor HF-8 / 4-K2 (4m)	8 (NTC 2K)	II
ITR 79.811	D4780559	-15 ... +15°C	Heating, LED red, incl. sensor HF-8 / 4-K2 (4m)	8 (NTC 2K)	II

## For circuit diagrams, dimensional drawings see page 7

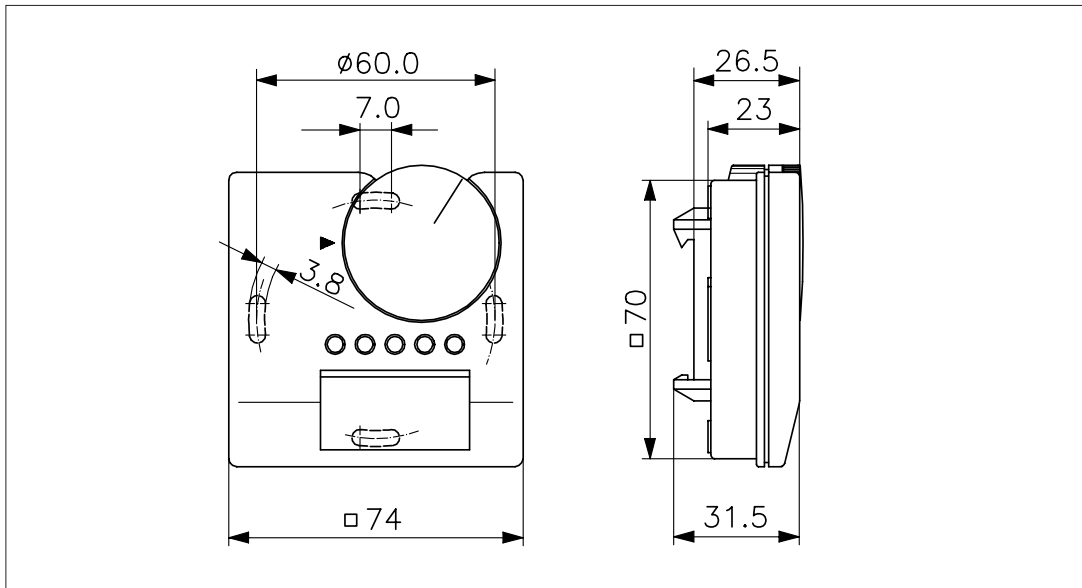


## Dimensional drawings

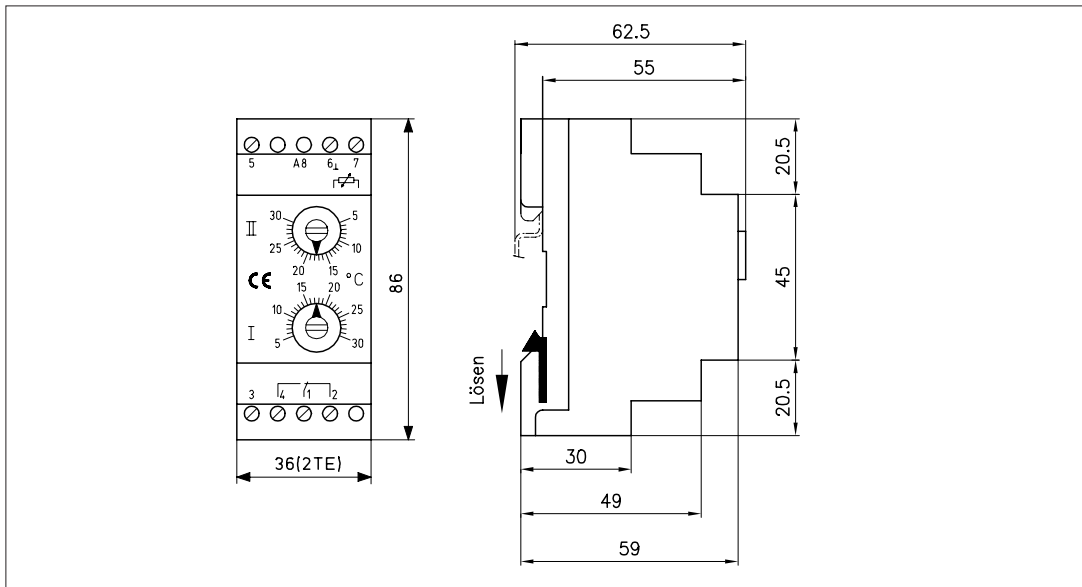
RTBSS, RTKSS, CTRRS, RFHSS:



PHY 60.082, PTR 01.082



KTRRN, ITR



# Sleeve temperature sensors HF

(Remote sensors for Alre standard equipment, e.g. ITR79...)



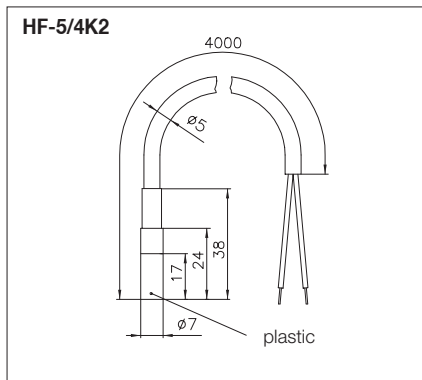
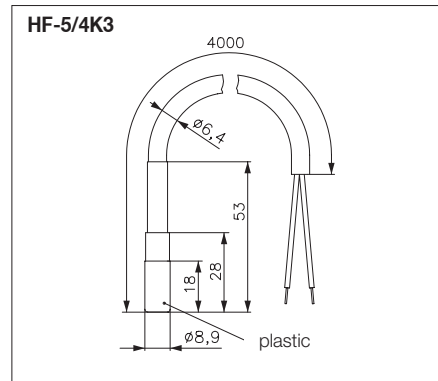
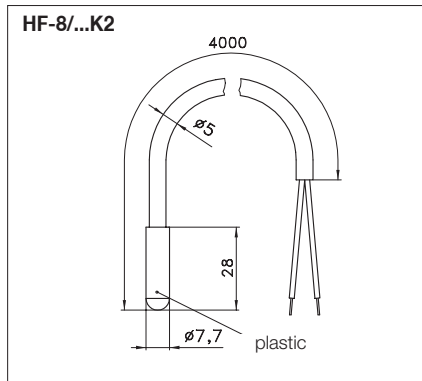
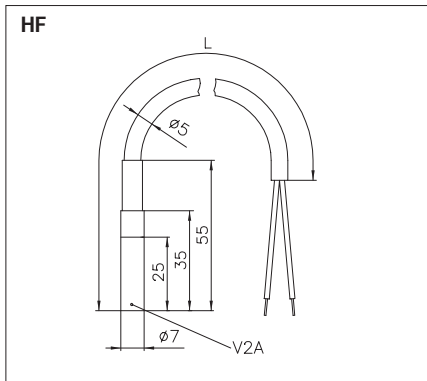
Technical specifications	Application
<b>Ambient air temperature with PE cable:</b>	-50 ... +85°C
<b>Ambient air temperature with silicon cable:</b>	-50 ... +150°C
<b>Ambient air temperature with PVC cable:</b>	-5 ... +70°C
<b>Protection type:</b>	IP 65
<b>Sensor line (can be extended up to):</b>	NTC 50m, PTC 100m
<b>Sensor characteristics:</b>	See main catalogue

(Please follow the EMV guidelines. Avoid installing lines parallel to power supply lines or shielded lines.)  
In V2 A sleeve molded (except ... K = plastic sleeve). Time constant of approx. 20sec in moving water.

Type	Product No.	Sensor
HF-0	D4779114	"0" (NTC 2K 25) PE cable 1.5m
HF-0/6	D4779126	"0" (NTC 2K 25) PE cable 6m
HF-1	D4779203	"1" (NTC 1K) PE cable 1.5m
HF-2	D4779823	"2" (NTC 47K) PE cable 1.5m
HF-3	D4779090	"3" (NTC 8K) PE cable 1.5m
HF-3/6	D4779102	"3" (NTC 8K) PE cable 6m
HF-4	D4779088	"4" (NTC 10K) PE cable 1.5m
HF-4/6	D4779710	"4" (NTC 10K) PE cable 6m
HF-5	D4779025	"5" (NTC 50K) PE cable 1.5m
HF-5/4K2	D4771303	"5" (NTC 50K) PVC cable (HAR) 4m
HF-5/4K3*	D4771304	"5" (NTC 50K) Silicon cable 4m
HF-5/6	D4779619	"5" (NTC 50K) PE-Kabel 6m
HF-6	D4779037	"6" (NTC 100K) Silicon cable 1.5m
HF-6/3	D4779835	"6" (NTC 100K) Silicon cable 3m
HF-8/4K2	G8000370	"8" (NTC 2K) PVC cable (VDE) 4m acc. to DIN 44574
HF-8/6K2	G8000368	"8" (NTC 2K) PVC cable (VDE) 6m acc. to DIN 44574

\* Please note: for diameters larger than 8.9mm for TH/NTH 140 see main catalogue

## Dimensional drawings





# Overview of the Control Cabinet Thermostats

	Thermostats							Humidity controller		Peltier thermostat		Built-in thermostat	
	RTBSS 110.x50	RTBSS 111.x50	RTBSS 112.x50	RTBSS 111.x30	RTBSS 112.x30	RTBSS 112.x11	RTKSS 112.x70	PTR 01.082	RFHSS 112.110	PHY 60.082	CTRRS	KTRRN	ITR 79
Contact	N/C contact	N/O contacts	Changer	N/O contacts	Changer	Changer	Changer	Changer	Changer	Changer (cooling=N/C contact; heating = N/O contact)	2x N/O contact (heating and cooling) with neutral zone (Peltier element); N/O contact (ventilating)	Changer	
Voltage*	24V- ... 250V~/24V <sup>==</sup> ...48V <sup>==</sup> max. 30W							100V ... 230V~	24V- ... 230V~		24V <sup>==</sup>		Up to 250V (not for SELV)
Current	10(2)/A	10(2)/A	N/C contact 10(2) A N/O contact 5(2)/A	10(2)/A	N/C contact 10(2) A N/O contact 5(2)/A	N/C contact 10(2) A N/O contact 5(2)/A	N/C contact 10(2) A N/O contact 5(2)/A	N/C contact 10(4) A N/O contact 5(2)/A	Dehumidify at 5(0,2)A Humidity at 2 (0,2)A Minimum 100 mA (at 24V~)	14A (max. 16A/60,000 operating cycles)	2-pole switch contact for one Peltier element 16A Ventilator output 2(1)A	PELV 10(3)A NC contact: 5 (1.5)A	
Control ranges	x=1: -20 ... 40°C x=2: 0 ... 60°C x=3: -20 ... 80°C							10 ... 60°C	40 ... 90% rel. humidity	30 ... 100% rel. humidity	0 ... 60°C	Heating: 0...20°C Cooling: 30...50°C	-35...130°C Depending on the type
Switching differential*	4 ... 7K		ca. 3K		ca. 1K		< 7K	2K	ca. 5% rel. humidity	ca. 4% rel. humidity	2 ... 3K	ca. 1K	0.5...5K adjustable (except ITR 79,600)
Sensor element	Bimetallic sensor							Bimetallic	Plastic fibers		Internal 47k sensor	Internal or external 2k sensor	NTC
Type of connection	Screw terminals 2,5mm <sup>2</sup>												
Ambient air temperature (storage temperature)	x=1: -20 ... 40°C x=2: 0 ... 60°C (-20 ...+80°C)							10 ... 60°C (-20 ... 70°C)	0 ... 60°C (-20 ... 80°C)	10 ... 60°C (-20 ... 60°C)	-10 ... 70°C (-20 ... 70°C)	-10 ... 55°C (-20 ... 70°C)	-10 ... +40°C (-20 ... 60°C)
Protection type	IP30							IP20					
Protection class	0 (the protection class must be ensured on-site) (PTR and PHY are protection class II)							III				II	
Knob color	red	blue	gray	blue	gray	gray	gray	gray	gray	blue	gray	gray	gray
Enclosure	Kunststoff												
Approx. weight	50g		70g		85g		85g	50g	85g	70g	105g		

\* Because of the thermal return the RTBSS 112.x11 with 1K switching differential needs a supply voltage of 230V~

## Technical Terms

### Bimetal

In general, thermo-bimetal is composed of about two equal layers of metals or alloys, which are firmly connected with one another; however, they expand to a different degree upon exposure to heat. There it flexes when the temperature changes. If the heat rises, one side distends while the other metallic component does not expand as much. The heat is transferred from the environment through the conductivity, radiation or convection (indirect heating).

### Capillary sensor:

Capillary sensors use the thermal expansion of a liquid to measure temperature. Liquid with a defined expansion coefficient is filled in a metallic pipe (capilla). The liquid is transported through the capillary to a membrane, which transforms the thermal expansion into a mechanical movement. This motion can then be used to activate a micro-switch. Capillary sensors are often used in immersion sleeves or in contact sensors. They work free of any ancillary energy.

### Neutral zone:

Any control range, which does not heat or cool is defined as neutral zone.

### N/C contact (bimetallic):

This control contact opens as the temperature rises and closes as the temperature drops (for "heating").

### Peltier element:

A Peltier element is an electrical component that generates a temperature difference between two pole plates when under direct voltage. The physical basis for it is the Peltier effect (according to Jean Peltier (1785-1845)). When the polarity of the voltage fluctuates, the heat and cold pole switch. Therefore, Peltier elements can be used in small enclosures and devices for both heating and cooling. To increase the effectiveness and thermal output, the elements are generally cascaded. The advantage of this application is that they can cool without requiring a coolant and they can heat at the same time. Peltier thermostats are maintenance-free.

### Switch differential and hysteresis:

This is the difference between turning the heat or thermostat on and off. The specified switch differential refers always to the thermostat. It does not specify the truly generated hysteresis of the room temperature. It changes depending on the location where it is used and the conditions under which it is used. The room temperature is always subject to fluctuations. These fluctuations result in the switch differential of the thermostat, the room's characteristics such as the heating time, loss of heat, etc. and the levels of disturbance."

### N/O contact (bimetallic):

This control contact closes when the temperature rises and opens when the temperature drops (for "cooling").

### Thermal return:

The additionally installed heating resistor ensures that the thermostat is turned off in time during the heating process. Therefore, it reduces an overshoot of room temperature and it generates a smaller switching differential.

### Changer (bimetallic):

This is a changer with an N/C and N/O contact. It works as described under N/C and N/O contact.

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