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BUILDING AUTOMATION
CONTROL TECHNOLOGY
SENSOR TECHNOLOGY

alre

PRODUCT CATALOGUE 2018

Intelligent solutions
for intelligent people.

CERTIFICATE

This is to confirm that the organisation

ALRE-IT Regeltechnik GmbH
Richard-Tauber-Damm 10
12277 Berlin
Germany

has implemented and maintains a Management System
in accordance with the standard

DIN EN ISO 9001:2008

The scope of the certification covers:

Design, production and sales of electromechanical and electronic controls for heating, cooling and air conditioning technology

This certificate is valid until 2015-07-04
and is subject to annual surveillance audits.

Registration Number: 594300/QM/10.08

Audit report 594300-9100-0001/164532

VDE Prüf- und Zertifizierungsinstitut GmbH
VDE Testing and Certification Institute
Certification

Date: 2012-07-05

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The VDE Testing and Certification Institute is accredited by DAR Accreditation Bodies according to DIN EN ISO/IEC 17020 and DIN EN ISO/IEC 17021 and notified in the EU under ID. No. 0366.

VDE INSTITUT

ALRE-IT Regeltechnik GmbH
Your reliable partner.




Soon, Alre IT-Regeltechnik GmbH will turn 50. We are proud of this, as it shows that we meet your demands as well as our own. As a German owner-operated company, we have our headquarters in Berlin. We also produce our high-quality control technology here.

We quickly recognise trends and react to these with innovative products. In doing so, we combine state-of-the-art technology with decades of know-how. We develop and produce components and systems for the controlling and automation of heating, air-conditioning and plant technology.

Perfect customer service and the highest quality are a must for us. Since 1994, the ISO 9001 certificate has proved this.

In this product catalogue 2018, you will find our wide selection of products.

We look forward to a continued collaboration.

alre

Your reliable partner, when everything should be perfect.

Overview:

Smarthome

Heating technology

Air conditioning technology

Plant engineering

Sensor technology

Accessories/miscellaneous/Sauna controllers

SMART HOME

For an optimum ambience

SMART HOME
Intelligent remote control for controlling room temperature.




Rooms with a feel-good ambience need perfect control technology. Be it an apartment, office block or hotel room: alre's b@home is the smart solution for intelligently controlling heating and cooling systems. b@home can be retrofitted in existing alre wireless systems and can be used with all types of heating.

Following the simple installation process, you can control your b@home system via the Internet when you are out and about or via your home network when you are at home. Intuitively simple control, monitoring and programming at any time and from any location provide maximum convenience and optimise energy consumption. And if required, the sensors and actuators can provide single-room control even without b@home gate.

b@home – intelligent solutions for intelligent buildings.

Smart home overview:
System information

Individual components

Everything at a glance

Overview of smart home components

	Type	FTRFB-280.101	FTRFB-280.119	FTRFB-280.120	FTRFBu-180.117/V2	FTRFBu-180.121/V2	FTRFUd-210.123#xx	HTFMA-180.161	HTFRB-010.101	CTFRB-010.101	HTFRA-010.101	HTFRU-010.101	HTFRU-110.124	HTFRL-214.140	HTFRL-316.125	HTFRD-214.140	HTFRD-316.125	KTFRL-213.140	KTFRL-315.125	KTFRD-213.140	KTFRD-315.125	MGCBB-064.360	FTRCUd-210.021#xx	MRCOA-014.201
	Page	20	20	21	21	21	21/22	26	26	30	26	27	27	28	28	28	28	32	32	32	33	18	18/19	23
Control function	Heating	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	
	Cooling	x	x	x	x	x	x			x								x	x	x	x	x	x	
Application	Radiator	x	x	x	x	x	x	x														x	x	
	Hot water-based underfloor heating	x	x	x	x	x	x		x		x	x	x	x	x	x	x	x	x	x	x	x	x	
	Electric underfloor heating	x	x	x	x	x	x		x		x	x	x									x	x	
	Infrared heating	x	x	x	x	x	x		x		x	x										x	x	
	Cooling ceiling	x	x	x	x	x	x			x								x	x	x	x	x	x	
	Mobile heaters										x													
Sensors	NTC internal	x	x	x	x	x	x																x	
	NTC external (optional)						x																x	
	NTC external for floor control / floor monitoring (optional)												x											
	Upstream sensors (optional)																						x	
	Dew point sensors (optional)																	x	x	x	x		x	
Equipment	“ECO” input																	x	x	x	x		x	x
	“Heating / cooling changeover” input																	x	x	x	x		x	
	“Off with frost protection monitoring” input																	x	x	x	x		x	
	Central control	x	x	x	x	x	x		x	x	x	x	x					x	x	x	x			
	External antenna can be connected													x	x	x	x	x	x	x	x			
Mounting / attachment	Surface mounting / wall mounting	x	x	x	x	x			x	x				x	x	x	x	x	x	x	x	x		
	Flush mounting						x					x	x										x	
	Ready to connect (Schuko)										x													x
	M30x1.5 (adapter for Danfoss RA, RAV, RAVL included in delivery)							x																
Networking capability of individual components	FTRFB-280.101								x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
	FTRFB-280.119							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
	FTRFB-280.120							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x
	FTRFBu-180.117/V2							x	x	x	x	x	x	x	x	x	x	x	x	x	x			x
	FTRFBu-180.121/V2							x	x	x	x	x	x	x	x	x	x	x	x	x	x			x
	FTRFUd-210.123#xx							x	x	x	x	x	x	x	x	x	x	x	x	x	x			x
	FTRCUd-210.021#xx																					x		
	MRCOA-014.201	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x		x

Smart control with b@home
Intelligent remote control for heating and cooling

Smart control for smart people

Use the b@home system from alre to control and monitor your heating and cooling at any time and from any location. Smartphone/tablet app or web browser – the intuitively simple control allows you to access the rooms individually or all together. And remote control of the b@home system is incredibly simple too: If you are out and about, you can use the Internet for mobile access but if you are at home, you can simply use your home network. This individual, tailored form of control doesn't just offer maximum comfort and convenience, but also optimises your energy consumption.

The b@home gate is the central component of the b@home system and the interface between the alre wireless system and WLAN/LAN router. Existing alre wireless systems can also be retrofitted. The optional b@home control unit provides central access to the settings of all channels and/or heating/cooling zones. It can be used as a central control unit or as a room control unit and can be integrated in all common switch ranges.

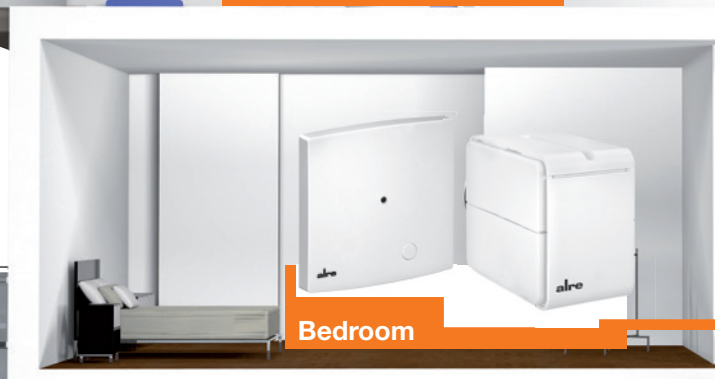
The apps are free of charge and there are no follow-on costs. Providing lots of details ensures simple installation and rapid setting up of the b@home system.

Smart control at home without the Internet

Gate b@home by alre

Control and monitoring of the heating/cooling systems in your home network using LAN/WLAN (no Internet connection needed)

Even without an Internet connection, the b@home system can be conveniently operated and programmed in the home network using an appropriate end device (app). The data and configuration parameters are simply stored locally in the b@home gate. The system can also be controlled at any time independently of your smart-phone or tablet with the optional b@home control unit.



Radiator

Hot water-based underfloor heating

Electric underfloor heating

Smart control from any location via the Internet

Control and monitoring of the heating-/cooling systems at any time and from any location via the Internet

Once you have registered on the b@home portal, the b@home system can be operated and programmed at any time and from any location via the Internet. And even if the Internet connection is lost, the control function is retained. Operation via the home network is therefore still possible. It goes without saying that data and configuration parameters are not processed further nor shared with third parties.

Suited to all types of heating

- Infrared heating
- Cooling ceiling
- Mobile heaters

System configurator for a control system offering remote control via an app or browser

1 Choice of central components

A minimal system comprises the central b@home gate component and at least one sensor and one actuator. One b@home gate can be used to monitor and control up to 32 rooms and/or heating/cooling zones. If necessary, more b@home gates can be operated in the same network

b@home gate
MGCBB-064.360

Optional

The settings of the individual rooms can be displayed and in some cases changed using the optional central control unit, again irrespective of app or browser. The control unit has a contact/sensor input for central influence (all rooms) over the b@home gate. No more than 1 central control unit can be trained on one b@home gate.

FTRCUd-210.021#xx
(Different variants for optimum integration in almost all switch ranges)

2 Choice of sensors

One sensor is needed per room to record the room temperature. Depending on the sensor selected, more functions may be available.

Sensor for recording room temperature

(The room temperature is set via an app or browser).

FTRFB-280.101

Room control unit for recording and setting the room temperature

(Room temperature can also be changed via an app or browser). The settings for the additional rooms can be displayed and in some cases changed using the room control unit, again irrespective of app or browser. A contact/sensor input is available to influence the assigned room. Up to 16 room control units can be assigned to one b@home gate.

FTRCUd-210.021#xx
(Different variants for optimum integration in almost all switch ranges)

Sensor for recording and setting the room temperature

(Room temperature setting can be activated via an app or browser rather than a set-point adjuster).

FTRFB-280.119

Optional

Up to 7 more sensors per room to record the room temperature (to calculate average values, e.g. for large rooms)

FTRFB-280.101

3 Choice of actuators

Depending on the type of heating used, an appropriate actuator is needed per room and/or per heating/cooling zone. Any number of actuators/channels can be assigned to a room.

Hot water-based under-floor heating

e.g.
HTFRx-214.140
(4 channels)
HTFRx-316.125
(8 channels)

Hot water-based radiator

e.g.
HTFMA-180.161

Electric underfloor heating

e.g.
HTFRU-110.124
(Optional external floor sensor available)

Mobile heaters

e.g.
HTFRA-010.101

Infrared heating

e.g.
HTFRU-010.101

Cooling ceiling

e.g.
CTFRB-010.101

Optional

If you experience reception problems, the plug-in MRCOA-014.201 wireless repeater can be used to increase the range of sensors/actuators in combination with the b@home gate (with the exception of FTRCUd-210.021 and HTFMA-180.161).

If necessary, a 1m long antenna cable (JZ-26) can be used to connect an external antenna (JZ-25) to the multi-channel actuators intended for mounting in heating circuit distributors.

System configurator for a control system not offering remote control

1 Choice of sensors

A minimal system comprises at least one sensor and one actuator. These are directly linked to one another without a central component. Through the combination of different sensor types, various control functions are possible. Any number of actuators can be trained on the sensors.

Single-room control

In each room there is a sensor for recording and setting the room temperature. Depending on the sensor selected, more functions may be available.

FTRFB-280.119

or

FTRFB-280.120
(ECO switch for manual energy-saving mode)

Single-room control with individual timer program

In each room there is a sensor with a timer for recording and setting the room temperature. An individual timer program can therefore be set up for each room.

FTRFBu-180.1xx

or

FTRFUd-210.123#xx
(Different variants for optimum integration in almost all switch ranges)

Single-room control with central timer program

In one room there is a sensor with a timer for recording and setting the room temperature and for setting up the central timer program. In each of the other rooms (any number of rooms) there is a sensor for recording and setting the room temperature. The timer program set up centrally effects all rooms.

Sensor with timer for recording and setting the room temperature and for setting up the central timer program

FTRFBu-180.1xx

or

FTRFUd-210.123#xx
(Different variants for optimum integration in almost all switch ranges)

+

Sensor for recording and setting the room temperature

FTRFB-280.119

or

FTRFB-280.120
(ECO switch for manual energy-saving mode)

Central control
single-room control with central temperature setting

A FTRFB-280.101 sensor is needed to record the room temperature per room (any number of rooms). A sensor is also needed to centrally set the room temperature. The room temperature set centrally applies to all rooms.

Sensor for central room temperature setting


FTRFB-280.119

or


FTRFB-280.120

or


FTRFBu-180.1xx

or


FTRFUd-210.123#xx

+

Sensor for recording room temperature


FTRFB-280.101

Calculation of average value

Up to 7 more FTRFB-280.101 sensors can be used per room to calculate average values (e.g. for large rooms). This is possible with all control functions listed.


FTRFB-280.101

2 Choice of actuators

Depending on the type of heating used, an appropriate actuator is needed per room and/or per heating/cooling zone. Any number of actuators/channels can be assigned to a room.

Hot water-based under-floor heating


e.g.
HTFRx-214.140
(4 channels)
HTFRx-316.125
(8 channels)

Hot water-based radiator


e.g.
HTFMA-180.161

Electric underfloor heating


e.g.
HTFRU-110.124
(Optional external floor sensor available)

Mobile heaters


e.g.
HTFRA-010.101

Infrared heating


e.g.
HTFRU-010.101

Cooling ceiling


e.g.
CTFRB-010.101

Optional

If you experience reception problems, the plug-in MRCOA-014.201 wireless repeater can be used to increase the range of sensors/actuators (with the exception of HTFMA-180.161).

If necessary, a 1m long antenna cable (JZ-26) can be used to connect an external antenna (JZ-25) to the multi-channel actuators intended for mounting in heating circuit distributors.

Wireless control – CENTRAL COMPONENTS

Technical data

Ambient temperature:	0…40 °C
Storage temperature:	–20…+70 °C
Permissible air humidity:	max. 95% r. H., non-condensing
Type of protection:	IP 30
Safety and EMC:	in accordance with DIN EN 60730 and DIN EN 300220
Radio frequency:	868.3 MHz
Range:	150 m line of sight or up to 30 m in buildings depending on structure

Application

The new MGCBB-064.360 b@home gate can be used to monitor and control alre wireless systems via the Internet or WLAN/LAN. Once you have registered on the free b@home portal, the b@home system is controlled simply and intuitively using a smartphone app or notebook/PC. The temperature can therefore be controlled, monitored and reprogrammed at any time and from any location, either for each room or centrally for all rooms. The system can also be accessed without an Internet connection using the local WLAN/LAN network.

When combined with the MGCBB-064.360 b@home gate, the FTRCUd-210.021 b@home control unit provides central access to the settings of more channels and can be used as a central control unit or room control unit. Changes undertaken via the b@home app or PC/notebook are shown on the graphics display.

Retrofitting in existing installations is possible (other than FTRFBu and FTRFUd wireless room temperature sensors with timers).

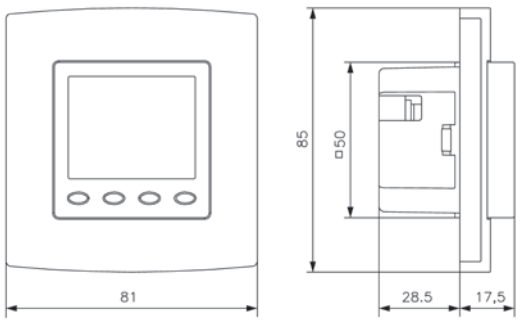
Type/photo	Art. no.	Equipment	PG
MGCBB-064.360 	BA210101	Wireless room temperature management system offering remote control via Internet or smartphone **Design:** Berlin 2000 **Surface properties:** matt **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** +5VDC **Mounting / attachment:** direct surface mounting / wall mounting using screws **Protection class:** III **Control elements:** confirmation button **Scope of delivery:** b@home gate, network cable (CAT5)/cable length 3m, micro USB wall power supply / cable length 1.8m	I
FTRCUd-210.021#21 	UA070000	Wireless room temperature sensor for recording and setting the room temperature, control unit for additional active channels **General equipment:** digital actual value display; “ECO” display; “On/Off” display; automatic changeover between summer and winter time; ECO function; ECO value can be adjusted; power reserve (approx. 3 days); background lighting; actual value correction / measured value correction; child-proof; training function; party setting; pilot function; holiday setting; valve protection; external setting; operated using one-touch keys **Design:** Berlin UP **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS, PC, PMMA **Operating voltage:** 230 VAC, 50 Hz **Electric connection:** screwed plug-in terminals **Mounting / attachment:** in flush-mounted socket (deep flush-mounted socket recommended), can be adapted in virtually all wide rocker switch ranges, see adaptation list on page 25 **Protection class:** II, following appropriate mounting **Average power consumption:** <1W **Sensors:** NTC internal, optional external (“sensor 2”) **Control range:** 5…30 °C **Transmission interval:** approx. 3 min and after change to setpoint **Type of display:** illuminated, graphic display **Display:** setpoint temperature, actual temperature/date, time, setpoint temperature, actual temperature or date, time **Scope of delivery:** wireless sensor, **50 x 50 mm pure white cover** (similar to RAL 9010), **gloss,** alre “Berlin” frame	I

Components suitable for the b@home system

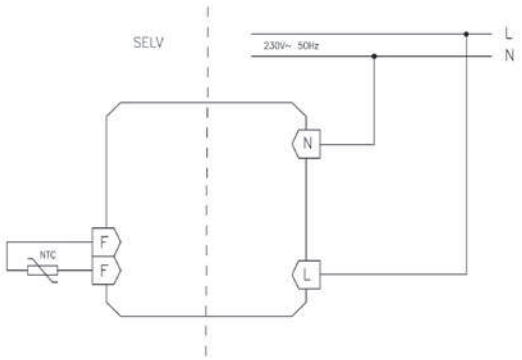
Wireless control – CENTRAL COMPONENTS

Type / photo	Art. no.	Equipment	PG
FTRCUd-210.021#07 	UA070001	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **pure white cover** (similar to RAL 9010), **gloss,** without frame	I
FTRCUd-210.021#09 	UA070002	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **pearl white cover** (similar to RAL 1013), **gloss,** without frame	I
FTRCUd-210.021#27 	UA070003	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **traffic white cover** (similar to RAL 9016), **gloss,** without frame	I
FTRCUd-210.021#28 	UA070006	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, cover **fits BUSCH-JAEGER Reflex SI / SI Linear pure white** (similar to RAL 9010), **gloss,** without frame	I
FTRCUd-210.021#55 	UA070004	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, 55 x 55 mm pure white cover **(similar to RAL 9010), gloss,** without frame	I
FTRCUd-210.021#56 	UA070008	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **pure white cover** (similar to RAL 9010), **matt,** without frame	I
FTRCUd-210.021#57 	UA070005	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **pearl white cover** (similar to RAL 1013), **gloss,** without frame	I
FTRCUd-210.021#59 	UA070007	like FTRCUd-210.021#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **traffic white cover** (similar to RAL 9016), **gloss,** without frame	I

FTRCUd with alre "Berlin" frame



FTRCUd circuit diagram



Wireless control – SENSORS / REPEATER

Technical data

Permissible air humidity:	max. 95% r. H., non-condensing
Type of protection:	IP 30
Safety and EMC:	in accordance with DIN EN 60730 and DIN EN 300220
Radio frequency:	868.3 MHz
Range:	150 m line of sight or up to 30 m in buildings depending on structure
Transmission interval:	approx. 3 min and after change to setpoint

Application

Wireless room temperature sensors for recording temperature in rooms at home, in the office and in hotels with standard levels of contamination. Single-room temperature control is achieved if used in combination with alre wireless actuators and the b@home gate. Used predominantly for redevelopment work or for extending heating systems.

The sensors can also be connected directly to the actuators without a b@home gate and then achieve single-room control.

Battery changes: a sensor indicates a battery change is needed imminently.

After an interruption to the voltage supply on the sensor or actuator, the wireless connection is automatically re-established.

Type / photo	Art. no.	Equipment	PG
FTRFB-280.101  only 13.9 mm deep	BA010400	**General equipment:** wireless room temperature sensor for recording room temperature to calculate average values or central control; “training mode / flat battery status” display **Design:** Berlin 1000 **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** 2x micro AAA batteries, 1.5 V, 1100 mAh **Ambient temperature:** –10 … +50 °C **Storage temperature:** –10 … +50 °C **Mounting / attachment:** direct surface mounting / wall mounting using screws or adhesive pads **Protection class:** III **Sensors:** NTC internal **Scope of delivery:** device, batteries, adhesive pads **Control elements:** training button	I
FTRFB-280.119  only 13.9 mm deep	BA010409	**General equipment:** wireless room temperature sensor for recording and setting the room temperature; “training mode / flat battery status” display; mechanical range reduction; degrees Celsius scale; external setting **Design:** Berlin 1000 **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** 2x micro AAA batteries, 1.5 V, 1100 mAh **Ambient temperature:** –10 … +50 °C **Storage temperature:** –10 … +50 °C **Mounting / attachment:** direct surface mounting / wall mounting using screws or adhesive pads **Protection class:** III **Sensors:** NTC internal **Setting range:** 5 … 30 °C **Scope of delivery:** device, batteries, adhesive pads **Control elements:** training button	I

Components suitable for the b@home system

Wireless control – SENSORS / REPEATER

Type / photo	Art. no.	Equipment	PG
FTRFB-280.120  only 13.9 mm deep	BA010401	**General equipment:** wireless room temperature sensor for recording and setting the room temperature; 4 K fixed reduction; ECO function; “training mode / flat battery status” display; mechanical range reduction; degrees Celsius scale; external setting **Design:** Berlin 1000 **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** 2x micro AAA batteries, 1.5 V, 1100 mAh **Ambient temperature:** –10 … +50 °C **Storage temperature:** –10 … +50 °C **Mounting / attachment:** direct surface mounting / wall mounting using screws or adhesive pads **Protection class:** III **Sensors:** NTC internal **Setting range:** 5 … 30 °C **Scope of delivery:** device, batteries, adhesive pads **Control elements:** “Comfort/ECO” switch, training button	I
FTRFBu-180.117/V2 	BA010200	**General equipment:** wireless room temperature sensor for recording and setting the room temperature with pilot timer function; ECO function; ECO value can be adjusted; “ECO” display; “On / Off” display; “training mode / flat battery status” display; digital actual value display; child-proof; actual value correction / measured value correction; training function; valve protection; holiday setting; party setting; automatic changeover between summer and winter time; mechanical range setting; degrees Celsius scale; reduce / comfort / automatic button; external setting; operated using one-touch keys; On / Off button; button info; party function button; holiday setting button **Design:** Berlin 3000 **Surface properties:** matt **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** 2x micro AAA batteries, 1.5 V, 1100 mAh **Ambient temperature:** –10 … 50 °C **Storage temperature:** –10 … +50 °C **Mounting / attachment:** direct surface mounting / wall mounting using screws or adhesive pads **Protection class:** III **Sensors:** NTC internal **Setting range:** 5 … 30 °C **Type of display:** symbol display **Scope of delivery:** device, batteries, adhesive pads **Accessories:** optional JZ-18 adapter snap plate	I
FTRFBu-180.121/V2 	BA010201	like FTRFBu-180.117, but with background lighting **Operating voltage:** 3x micro AAA batteries, 1.5 V, 1100 mAh (3rd battery for background lighting)	I
FTRFUd-210.123#21 	UA080000	**General equipment:** flush-mounted wireless room temperature sensor for recording and setting the room temperature with timer, holiday and party settings, various timer programs can be set for heating and cooling, can be used as master for master-slave operation (pilot control); pilot function; ECO function; ECO value can be adjusted; “ECO” display; “On / Off” display; digital actual value display; background lighting; child proof; power reserve (3 days); actual value correction / measured value correction; training function; valve protection; holiday setting; party setting; automatic changeover between summer and winter time; external setting; operated using one-touch keys **Design:** Berlin UP **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS, PC, PMMA **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 40 °C **Storage temperature:** –20 … +70 °C **Electric connection:** screwed plug-in terminals **Mounting:** in flush-mounted socket (deep flush-mounted socket recommended), can be adapted in virtually all wide rocker switch ranges, see adaptation list on page 25 **Protection class:** II, following appropriate mounting **Average power consumption:** <1W **Sensors:** NTC internal, optional external (selection of 7 different sensors available, e.g. “sensor 2” / “sensor 8”) **Control range:** 5 … 30 °C **Type of display:** illuminated, graphic display **Scope of delivery:** controller, **50 x 50** mm **pure white cover** (similar to RAL 9010), **gloss,** alre “Berlin” frame	I

Wireless control – SENSORS / REPEATER

Type / photo	Art. no.	Equipment	PG
FTRFUd-210.123#07 	UA080001	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **pure white cover** (similar to RAL 9010), **gloss,** without frame	I
FTRFUd-210.123#09 	UA080002	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **pearl white cover** (similar to RAL 1013), **gloss,** without frame	I
FTRFUd-210.123#27 	UA080003	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **50 x 50** mm **traffic white cover** (similar to RAL 9016), **gloss,** without frame	I
FTRFUd-210.123#28 	UA080006	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, cover fits **BUSCH-JAEGER Reflex SI/SI Linear pure white** (similar to RAL 9010), **gloss,** without frame	I
FTRFUd-210.123#55 	UA080004	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **pure white cover** (similar to RAL 9010), **gloss,** without frame	I
FTRFUd-210.123#56 	UA080008	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **pure white cover** (similar to RAL 9010), **matt,** without frame	I
FTRFUd-210.123#57 	UA080005	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **pearl white cover** (similar to RAL 1013), **gloss,** without frame	I
FTRFUd-210.123#59 	UA080007	like FTRFUd-210.123#21 but scope of delivery: wireless room temperature sensor, **55 x 55** mm **traffic white cover** (similar to RAL 9016), **gloss,** without frame	I

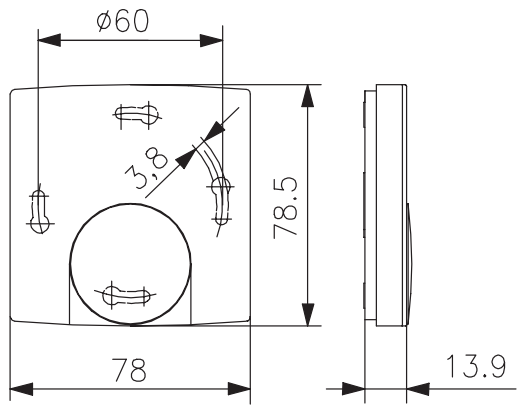
Wireless control – SENSORS / REPEATER

Type / photo	Art. no.	Equipment	PG
MRCOA-014.201 	BA210200	**General equipment:** plug-in wireless repeater to directly increase range between wireless room temperature sensors and wireless heating controllers (actuators) of an alre wireless system and the b@home gate, in-built socket can be operated permanently and can be loaded to max. 230V/16A, up to 16 sensors/channels can be trained **Housing colour:** pure white, similar to RAL 9010 **Housing material:** ABS plastic **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 40 °C **Storage temperature:** -20 … + 70 °C **Electric connection:** Schuko plug adapter **Type of protection:** IP 20 **Protection class:** II for consumers of protection classes I and II **Control elements:** training button	I
JZ-18 	MN990002	**General equipment:** optional adapter snap plate for FTRFBu wireless room temperature sensor with universal hole pattern for mounting. We would recommend using the adapter because the device can thereby be removed, making simpler battery changes possible. **Surface properties:** matt **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS	II
JZ-090.900 	VV000025	**General equipment:** alre “Berlin” frame (neutral) for all flush-mounted room temperature sensors with 50 x 50 mm cover **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic PC	I
JZ-090.910	VV000010	**General equipment:** alre “Berlin” frame (neutral) for all flush-mounted room temperature sensors with 50 x 50 mm cover **Surface properties:** gloss **Housing colour:** pearl white, similar to RAL 1013 **Housing material:** plastic PC	I

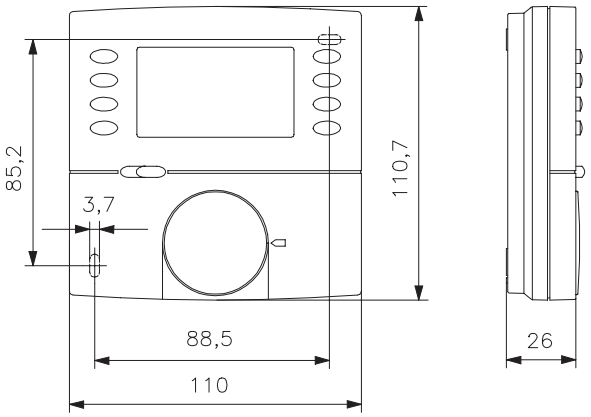
Components suitable for the b@home system

Wireless control – SENSORS / REPEATER

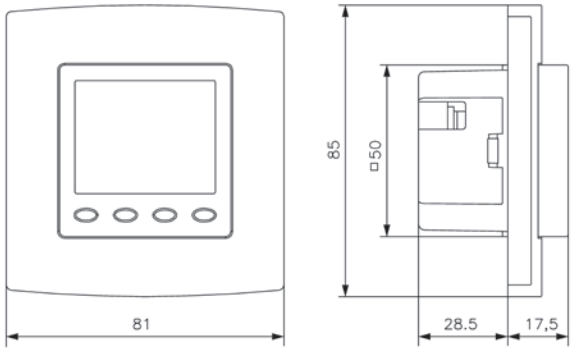
“Berlin 1000”



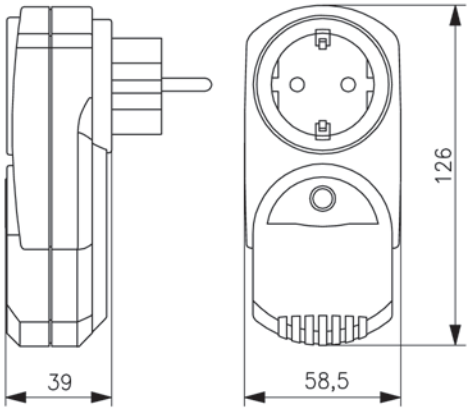
“Berlin 3000”



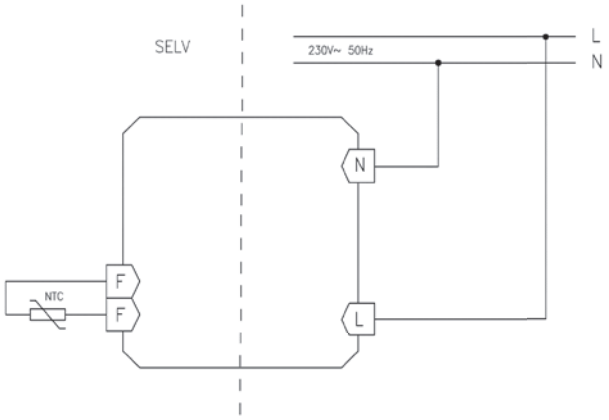
FTRFUd with alre “Berlin” frame



MRCOA-014.201



FTRFUd circuit diagram



FTRxUd-210.021 alre flush-mounted adaptation

Manufacturer	Range	RAL 9010 colour (surface properties)	Adaptation possible in switch range (55 x 55) with …	"50X50" adaptation possible with … (intermediate frame from switch manufacturer needed)
BERKER	S.1	Polar white (matt)	FTRxUd-210.xxx#56	Not needed
BERKER	S.1	Polar white (gloss)	FTRxUd-210.xxx#55	Not needed
BERKER	Arsys	Polar white (gloss)		FTRxUd-210.xxx#07 + (1108 01 69)
BERKER	B.3	Aluminium / polar white (matt)	FTRxUd-210.xxx#56	Not needed
BERKER	B.3	Aluminium / polar white (gloss)	FTRxUd-210.xxx#55	Not needed
BERKER	B.7	Glass / polar white (matt)	FTRxUd-210.xxx#56	Not needed
BERKER	B.7	Glass / polar white (gloss)	FTRxUd-210.xxx#55	Not needed
BERKER	K.1	Polar white (gloss)		FTRxUd-210.xxx#07 + (1108 71 09)
BUSCH-JAEGER	Reflex SI/SI Linear	Alpine white (gloss)	FTRxUd-210.xxx#28	Not needed
BUSCH-JAEGER	Busch-balance SI	Alpine white (gloss)	FTRxUd-210.xxx#55	Not needed
BUSCH-JAEGER	impuls	Alpine white (gloss)		FTRxUd-210.xxx#07 + (1746/10-74)
BUSCH-JAEGER	solo/future/axcent etc.	Studio white – see RAL 9016 below		
ELSO	Joy	Pure white (gloss)	HTRRUu-210.021#55	Not needed
ELSO	Fashion / Riva / Scala	Pure white (gloss)		HTRRUu-210.021#07 + 203084
GIRA	Wide rocker switch	Pure white (gloss)		FTRxUd-210.xxx#07 + (0282 112)
GIRA (System 55)	Standard/E 2	Pure white (silk matt)	FTRxUd-210.xxx#56	Not needed
GIRA (System 55)	Standard/E 2	Pure white (gloss)	FTRxUd-210.xxx#55	Not needed
GIRA (System 55)	E 22	Pure white (gloss)	FTRxUd-210.xxx#55	Not needed
GIRA (System 55)	Event	Pure white (silk matt) + opaque…	FTRxUd-210.xxx#56	Not needed
GIRA (System 55)	Event	Pure white (gloss) + opaque…	FTRxUd-210.xxx#55	Not needed
GIRA (System 55)	Esprit	Pure white (silk matt) + glass, aluminium …	FTRxUd-210.xxx#56	Not needed
GIRA (System 55)	Esprit	Pure white (gloss) + glass, aluminium …	FTRxUd-210.xxx#55	Not needed
GIRA	S-Color	Pure white (high gloss)		FTRxUd-210.xxx#07 + (0282 40)
JUNG	CD 500/CD plus	Alpine white (gloss)		FTRxUd-210.xxx#07 + (CD 590 Z WW)
JUNG	A 500/AS 500/A plus	Alpine white (gloss)	FTRxUd-210.xxx#55	Not needed
JUNG	LS 990	Alpine white (gloss)		FTRxUd-210.xxx#07 + (LS 961 Z WW)
JUNG	LS plus	Alpine white (glass)		FTRxUd-210.xxx#07 + (LS 961 Z WW)
JUNG	A creation	Alpine white (gloss)	FTRxUd-210.xxx#55	Not needed
JUNG	LS Design	Alpine white (gloss)		FTRxUd-210.xxx#07 + (LS 961 Z WW)
MERTEN (System M)	M-Smart, M-Plan, M-Pure	Polar white (matt)	FTRxUd-210.xxx#56	Not needed
MERTEN (System M)	M-Smart, M-Plan, M-Creativ, M-Pure	Polar white (gloss)	FTRxUd-210.xxx#55	Not needed
MERTEN (basic system)	1-M/Atelier-M	Polar white (gloss)	FTRxUd-210.xxx#55	Not needed
MERTEN (area system)	Artec / Antik	Polar white (gloss)		FTRxUd-210.xxx#07 + (5160 99)
MERTEN	1-M/M-Smart/M-Plan/M-Pure/D-Life etc.	Active white – see RAL 9016 below		
PEHA	Standard	Pure white (gloss)		FTRxUd-210.xxx#07 + (80.670.02 ZV)
PEHA	Dialog	Pure white (gloss)		FTRxUd-210.xxx#07 + (95.670.02 ZV)
PEHA	Aura	Pure white (matt) / glass		FTRxUd-210.xxx#07 + (20.670.02 ZV)
PEHA	Badora	Pure white (gloss)		FTRxUd-210.xxx#07 + (11.670.02 ZV)

Manufacturer	Range	RAL 9016 colour (surface properties)	Adaptation possible in switch range (55 x 55) with …	"50X50" adaptation possible with … (intermediate frame from switch manufacturer needed)
BUSCH-JAEGER	solo/future/future linear	Studio white (RAL 9016 gloss)		FTRxUd-210.xxx#27 + (1746/10-84)
BUSCH-JAEGER	axcent	Studio white (RAL 9016 gloss)		FTRxUd-210.xxx#27 + (1746/10-84)
BUSCH-JAEGER	carat (glass, bronze, gold)	Studio white (RAL 9016 gloss)		FTRxUd-210.xxx#27 + (1746/10-84)
BUSCH-JAEGER	alpha (nea/exclusive*)	Studio white (RAL 9016 gloss)		FTRxUd-210.xxx#27 + (1746/10-24G)
MERTEN	M-Smart, M-Plan, M-Pure	Active white (RAL 9016 gloss)	FTRxUd-210.xxx#59	Not needed
MERTEN	1-M/Atelier-M	Active white (RAL 9016 gloss)	FTRxUd-210.xxx#59	Not needed
MERTEN	D-Life	Lotus white (similar to RAL 9016)		HTRRUu-210.021#27 + (MEG4500-6035)
PEHA	Standard	arctic		FTRxUd-210.xxx#27 + (D 80.670 ZV AW)

*) when mounting, 4 plastic lugs on the rear should be removed

NOTE: Most light switch ranges are produced in a shade "similar to 9010" and the switch manufacturers use different designations for this. Even coloured or glass and aluminium frames are combined with white rockers or sockets meaning that controllers with white covers can be integrated in these frames too. The specific use should be checked in each individual case. The frames have different surface properties (matt / gloss). For a good design, the controller cover should have the same surface. We assume no liability for slight colour and surface deviations or for fitting accuracy. If being installed in multiple frames, temperature controllers should always be fitted in the bottom position.

"50 x 50 controllers": The housing covers of 50x50 controllers have edge dimensions of 50 x 50 mm. When using 50 x 50 mm intermediate frames according to DIN 49075, this enables them to be integrated in virtually all light switch ranges. The 50 x 50 mm intermediate frames should be ordered from the light switch manufacturer and/or wholesalers. The order number of the intermediate frame suited to the respective switch range can be found in the "For adaptation of FTRxUd in size '50 x 50'" column.

"55 x 55 controllers": The housing covers of 55x55 controllers have edge dimensions of 55 x 55 mm. Many light switch ranges have internal dimensions of 55 x 55 mm. The 55 x 55 controllers can therefore be integrated directly in these light switch frames without the use of an intermediate frame. To establish whether the 55 x 55 controller fits in the respective light switch range, consult the "Adaptation in switch range (55 x 55)" column (FTRxUd-210.xxx#xx).

All details relating to ranges and article numbers of switch manufacturers are correct as at 12/2017. | All information is supplied without guarantee. | We reserve the right to technical amendments.
You will find an adaptation list for RAL 1013 switch ranges online at www.alre.de.

Wireless control – heating ACTUATORS

Technical data

Surface properties:	matt
Permissible air humidity:	max. 95% r. H., non-condensing
Control function:	heating
Hysteresis:	approx. 0.5 K
Radio frequency:	868.3 MHz
Safety and EMC:	in accordance with DIN EN 60950-1, DIN EN 300220

Application

Wireless heating controllers (actuators), which achieve single-room temperature control if used in combination with alre wireless room temperature sensors and the b@home gate. Used predominantly for redevelopment work or for extending heating systems.

The actuators can also be connected directly to the sensors without a b@home gate and then achieve single-room control.

Type / photo	Art. no.	Equipment	PG
HTFMA-180.161 	G8000422	**General equipment:** 1-channel wireless temperature controller for heater valves; “training mode / flat battery status” display; emergency operation; adapter for Danfoss RA, RAV, RAVL **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic **Operating voltage:** 2x Mignon AA, 1.5V, 2000 mAh batteries or lithium batteries must not be used! **Ambient temperature:** 0…50 °C **Storage temperature:** –20…+50 °C **Mounting / attachment:** M30 x 1.5, adapter supplied for Danfoss RA, RAV, RAVL **Type of protection:** IP 20 **Protection class:** III **Sensors:** NTC internal (for emergency operation control) **Nominal stroke:** approx. 5mm **Nominal closing force:** approx. 100N **Control range:** 8…28 °C **Display:** readiness for mounting / mechanical adaptation / mechanical adaptation error / loss of connection / training mode **Control elements:** training button, installation button	I
HTFRA-010.101 	BA110300	**General equipment:** 1-channel wireless temperature controller; emergency operation; 3000 W switching power, for electric direct heaters, natural stone heating **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…40 °C **Storage temperature:** –20…+70 °C **Electric connection:** Schuko plug adapter **Type of protection:** IP 30 **Protection class:** II for consumers of protection classes I and II **Max. switching current:** 13 (3) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 3000 W **Switching element:** relay **Switching contact:** normally open contact **Control range:** 5…30 °C **Display:** installation mode / function check / loss of connection / training mode **Control elements:** training button	I

Components suitable for the b@home system

Wireless control – heating ACTUATORS

Type / photo	Art. no.	Equipment	PG
HTFRB-010.101 	BA110500	**General equipment:** 1-channel wireless temperature controller; central control; emergency operation; 3000 W switching power, for electric direct heaters, natural stone heating **Design:** Berlin 2000 **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 40 °C **Storage temperature:** –20 … +70 °C **Electric connection:** 0.5...2.5 mm² screw terminals **Mounting / attachment:** surface mounting / wall mounting (4-hole attachment to flush-mounted socket) **Type of protection:** IP 30 **Protection class:** II for consumers of protection classes I and II **Max. switching current:** 13 (3) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 3000 W **Switching element:** relay **Switching contact:** normally open contact **Control range:** 5 … 30 °C **Display:** installation mode / function check / loss of connection / training mode **Control elements:** training button	I
HTFRU-010.101 	BA110200	**General equipment:** 1-channel wireless temperature controller; central control; emergency operation; **Design:** Berlin UP **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic PC **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** –20 … +50 °C **Storage temperature:** –20 … +70 °C **Electric connection:** 0.5...2.5 mm² screw terminals **Mounting / attachment:** in flush-mounted socket (deep flush-mounted socket recommended) **Type of protection:** IP 30 **Protection class:** II for consumers of protection classes I and II **Max. switching current:** 11 A, as of 30 °C ambient temperature 7.5 A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2500 W, as of 30°C ambient temperature 1700 W **Switching element:** relay **Switching contact:** normally open contact **Control range:** 5 … 30 °C **Display:** installation mode / function check / loss of connection / training mode **Control elements:** training button	I
HTFRU-110.124 	BA110201	**General equipment:** 1-channel wireless temperature controller; for activating (electric) underfloor heating, the controller has a sensor input to which an optional remote sensor can be connected. This is recessed in the floor. When combined with a sensor like this, the following operating modes are possible: floor control function or room temperature control function with floor monitor with direct or central setpoint specification (central control), if there is no remote sensor, the HTFRU-110.124 acts as a room temperature controller with direct or central setpoint specification (central control); central control; emergency operation **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic PC **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** –20 … +50 °C **Storage temperature:** –20 … +70 °C **Electric connection:** 0.5...1.5 mm² screw terminals **Mounting / attachment:** in flush-mounted socket (deep flush-mounted socket recommended) **Type of protection:** IP 20 **Protection class:** II for consumers of protection classes I and II **Safety and EMC:** in accordance with DIN EN 60950-1, DIN EN 300220 **Max. switching current:** 10 A up to 30 °C ambient temperature **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W up to 30 °C ambient temperature **Switching element:** relay **Switching contact:** normally open contact **Control range:** 5 … 30 °C **Display:** installation mode / function check / loss of connection / training mode **Control elements:** training button	I

Wireless control – heating ACTUATORS

Type / photo	Art. no.	Equipment	PG
HTFRL-214.140 	BA121000	**General equipment:** 4-channel wireless temperature sensor for mounting in heating circuit distributor, max. 4 valve actuators / channel can be connected directly, including pump module, one time zone possible per channel, master-slave operation, calculation of average value with up to 8 measuring points. The upper part can be taken off to train the wireless sensors in the individual rooms. An optional commercially available 9V battery is needed for this. The channel selection button and training button allow the rooms (b@home) and/or sensors to be trained with great ease. Emergency operation; 4 mounting screws for wall mounting (for realisation of central control, see page 32 by means of KTFRx) **Housing colour:** light grey, similar to RAL 7035 **Housing material:** plastic ABS **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** –10 … +50 °C **Storage temperature:** –20 … +70 °C **Electric connection:** 0.5...1.5 mm² spring terminals **Mounting / attachment:** surface mounting / wall mounting **Type of protection:** IP 20 **Protection class:** II for consumers of protection classes I and II **Max. switching current:** 5 (1) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** total 1150 W, of which 180 W is pump output **Switching element:** 5 relays **Switching contact:** 5 normally open contacts **Control range:** 5 … 30 °C **Display:** installation mode, connection and status check, loss of connection, training mode is displayed per channel **Control elements:** channel selection button, training button	I
HTFRD-214.140 	BA120600	like HTFRL-214.140 but scope of delivery: IP 65	I
HTFRL-316.125 	BA120800	**General equipment:** 8-channel wireless temperature sensor for mounting in heating circuit distributor, max. 4 valve actuators / channel can be connected directly, including pump module, one time zone possible per channel, master-slave operation, calculation of average value with up to 8 measuring points; 4 mounting screws for wall mounting; installation mode, connection and status check, loss of connection, training mode is displayed per channel. The upper part can be taken off to train the wireless sensors in the individual rooms. An optional commercially available 9V battery is needed for this. The channel selection button and training button allow the rooms (b@home) and/or sensors to be trained with great ease. (For realisation of central control, see page 32 by means of KTFRx) **Housing colour:** light grey, similar to RAL 7035 **Housing material:** plastic ABS **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** –10 … +50 °C **Storage temperature:** –20 … +70 °C **Electric connection:** 0.5...1.5 mm² spring terminals **Mounting / attachment:** surface mounting / wall mounting **Type of protection:** IP 20 **Protection class:** II for consumers of protection classes I and II **Max. switching current:** 5 (1) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** total 1150 W, of which 180 W is pump output **Switching element:** 9 relays **Switching contact:** 9 normally open contacts **Control range:** 5 … 30 °C **Control elements:** channel selection button, training button	I
HTFRD-316.125 	BA120400	like HTFRD-316.125 but scope of delivery: IP 65	I

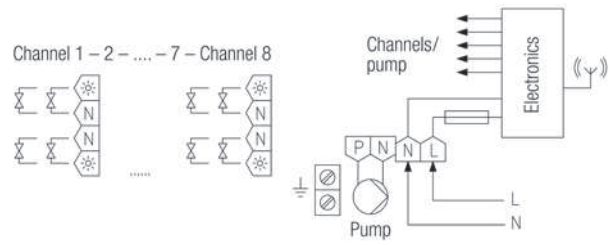
Components suitable for the b@home system

Wireless control – heating ACTUATORS

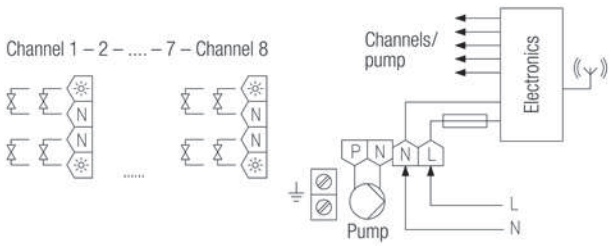
Type / photo	Art. no.	Equipment	PG
HF-8/4-K2 	G8000370	**General equipment:** optional, external floor sensor for HTFRU-110.124 **Ambient temperature:** –5 … +70 °C **Type of protection:** IP 65 **Sensors:** NTC **Connection cable:** 4 m, PVC	II
HF-8/6-K2 	G8000368	**General equipment:** optional, external floor sensor for HTFRU-110.124 **Ambient temperature:** –5 … +70 °C **Type of protection:** IP 65 **Sensors:** NTC **Connection cable:** 6 m, PVC	II
WP-01	G9990180	**General equipment:** 2 ml of heat transfer paste; R > 1TΩ/cm, silicone-free **Ambient temperature:** –40 … +150 °C **Thermal conductivity:** > 0.7W/mK	II
JZ-24 	BN990002	**General equipment:** magnetic attachment set for simple and secure attachment of multi-channel actuators on metallic base (e.g. heating circuit distributor)	II
JZ-25 	BN990003	**General equipment:** external antenna to improve reception if the multi-channel actuators are experiencing reception problems (JZ-26 antenna cable not included in scope of supply) **Design:** Berlin 1000 **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Storage temperature:** –20 … +70 °C **Permissible air humidity:** max. 95% r. H., non-condensing **Type of protection:** IP 30	II
JZ-26	BN990004	**General equipment:** antenna cable to connect the external antenna (JZ-25) with multi-channel actuators **Connection cable:** 1 m	II
THF 	C1809515	**General equipment:** 2 ml of heat transfer paste; R > 1TΩ/cm, silicone-free	II

Suitable valve actuators ZBOOA-010.100, page 82

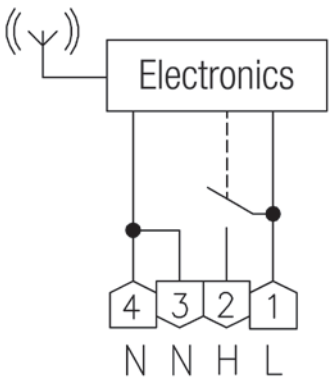
HTFRx-214.140 (4 channels)



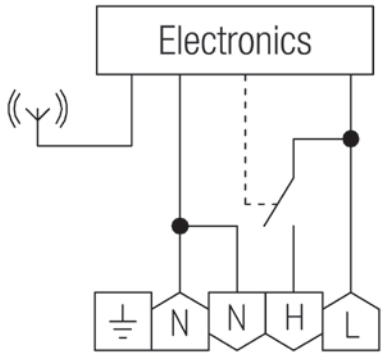
HTFRx-316.125 (8 channels)



HTFRB-010.101



HTFRU-010.101



Wireless control – cooling ACTUATOR

Technical data

Design:	“Berlin 2000”
Surface properties:	matt
Housing colour:	pure white, similar to RAL 9010
Housing material:	plastic ABS
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	–20…+45 °C
Storage temperature:	–20…+70 °C
Permissible air humidity:	max. 95% r. H., non-condensing
Electric connection:	0.5...2.5 mm² screw terminals
Mounting / attachment:	surface mounting / wall mounting (4-hole attachment to flush-mounted socket)
Type of protection:	IP 30
Protection class:	II for consumers of protection classes I and II
Safety and EMC:	in accordance with DIN EN 60950-1, DIN EN 300220
Average power consumption:	approx. 1.5 W
Max. switching current:	10 (2) A
Max. / min. switching voltage:	230 VAC, 50 Hz
Switching power:	2300 W
Switching element:	relay
Switching contact:	normally open contact
Output signal:	switching, 230 VAC, 50 Hz
Control range:	18…40 °C
Hysteresis:	approx. 0.5 K
Neutral zone:	approx. 3 K
Radio frequency:	868.3 MHz
General equipment:	Central control
Pipe system compatibility:	2 pipes
Control elements:	training button

Application

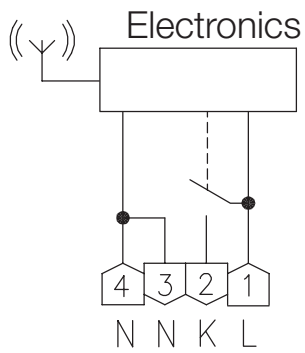
The CTFRB was developed especially for activating electro-thermal valve actuators (connected de-energised) and uses alre wireless room temperature sensors and the b@home gate to achieve single-room temperature control.

This actuator can also be connected directly to the sensors without b@home gate and single-room temperature control thereby achieved.

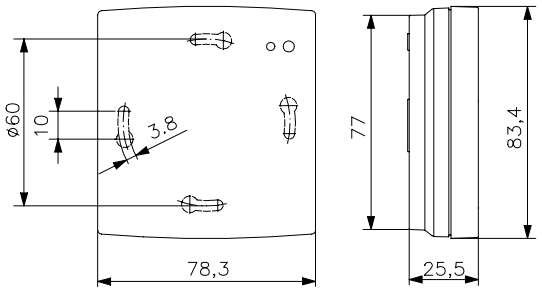
Type / photo	Art. no.	Equipment	PG
CTFRB-010.101 	BA110600	**Control function:** switches on cooling when the setpoint + neutral zone is exceeded, central control, “installation mode / function check / loss of connection / training mode” display	I

Suitable valve actuators ZBOOA-010.100, page 82

Circuit diagram



Dimensional drawing



Components suitable for the b@home system

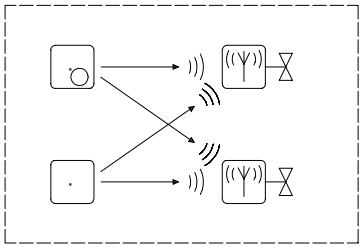
Wireless control – cooling ACTUATOR

Application examples (possible sensor / actuator combinations without b@home gate):

CTFRB for cooling operation, HTFRB for heating operation in 4-pipe system

Calculation of average value: (each actuator calculates the average value from max. 7 actual value sensors and one sensor with setpoint adjuster)

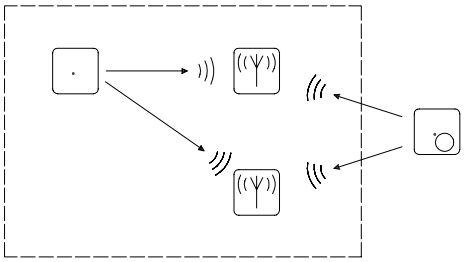
Room to be controlled



CTFRB for cooling operation, HTFRB for heating operation in 4-pipe system

Master-slave operation: (comfort temperature by room sensor, ECO mode with timer controls, ON/OFF, holiday and party function by the trained timer sensor)

Room to be controlled

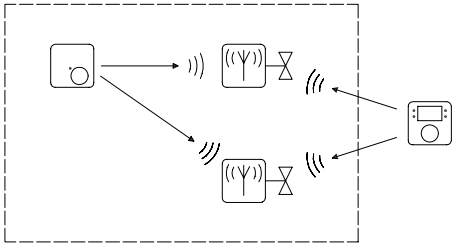


CTFRB for cooling operation, HTFRB for heating operation in 4-pipe system

Central control: (one and/or up to 7 sensors without setpoint adjuster on any number of actuators; setpoint is specified by external sensor with setpoint adjuster)

Application: child's room, guest rooms, administrative and public rooms

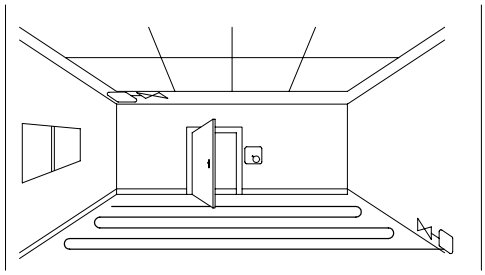
Room to be controlled



CTFRB for cooling operation, HTFRB for heating operation in 4-pipe system

Application example: CTFRB controls cooling ceiling, HTFRB controls underfloor heating

Room to be controlled



Wireless control – heating / cooling ACTUATORS

Technical data

Surface properties:	matt
Housing colour:	light grey, similar to RAL 7035
Housing material:	plastic ABS
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	–10…+50 °C
Storage temperature:	–20…+70 °C
Permissible air humidity:	max. 95% r. H., non-condensing
Electric connection:	0.5...1.5 mm² spring terminals
Mounting / attachment:	Surface mounting / wall mounting
Protection class:	II for consumers of protection classes I and II
Safety and EMC:	in accordance with DIN EN 60950-1, DIN EN 300220
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Control function:	heating or cooling
Control range:	5…30 °C
Hysteresis:	approx. 0.5 K
Neutral zone:	0…6 K adjustable
Radio frequency:	868.3 MHz
General equipment:	external dew point sensor; ECO function; Off with frost protection monitoring operating mode; central control; emergency operation
Factory setting:	neutral zone 0 K
Control elements:	channel selection button, training button
Accessories:	suitable valve actuators: ZBOOA-010.100 optional magnetic attachment set for simple mounting in the heating circuit distributor cabinet: JZ-24 external antenna: JZ-25 1m antenna cable: JZ-26
Display	installation mode, connection and status check, drop below dew point, loss of connection, training mode is displayed per channel

Application

Wireless temperature controllers, which achieve single-room climate control if used in combination with alre wireless room temperature sensors. The actuators can also be connected directly to the sensors without a b@home gate and then achieve single-room control.

Functions: heating and cooling with adjustable neutral zone; switching over between heating and cooling locally or using external contact; switching on / off using contact with frost protection function; individual channels can be excluded from cooling operation; cooling is interrupted by the dew point sensor or contact if condensation forms; 18 °C cooling limitation; central energy-saving function via external timer and/or centrally or locally using master-slave operation, (max. 4 / 8 time zones possible, i.e. up to 4 / 8 sensors with timer can be connected); status display of the wireless connection for each channel, automatic emergency operation if connection is lost;

The upper part can be taken off to train the wireless sensors/channels in the individual rooms. During this time, the power supply is ensured via a commercially available 9 V monobloc battery. The channel selection button and training button allow the sensors to be trained with great ease. Attachment: 4 screws for attaching to the wall included in standard scope of delivery – JZ-24 magnetic attachment set can be supplied as an option for simple mounting in the heating circuit distributor cabinet.

Type / photo	Art. no.	Equipment	PG
KTFRL-213.140 	BA121100	**Type of protection:** IP 20 **Max. switching current:** output 1-4: 4 (1) A **Pump output:** 0.75 A* **Total of all outputs (4 channels + pump output):** 4 (1) A **Switching power:** total 920 W, of which 180 W is pump output **Switching element:** 5 relays **Switching contact:** 5 normally open contacts	I
KTFRD-213.140 	BA120700	like KTFRL-213.140 but IP 65	I
KTFRL-315.125 	BA120900	**Type of protection:** IP 20 **Max. switching current:** output 1-8: 5 (1) A **Pump output:** 0.75 A* **Total of all outputs (8 channels + pump output):** 6 (1) A **Switching power:** total 1380 W, of which 180 W is pump output **Switching element:** 9 relays **Switching contact:** 9 normally open contacts	I

* Pump module included in scope of delivery

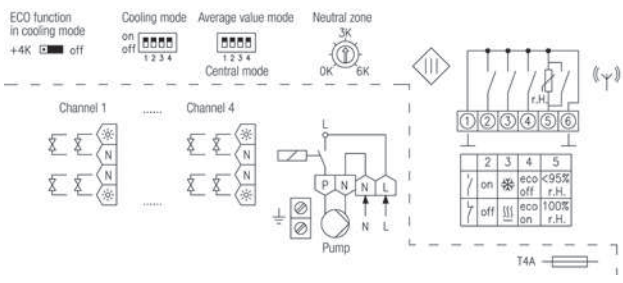
Components suitable for the b@home system

Wireless control – heating / cooling ACTUATORS

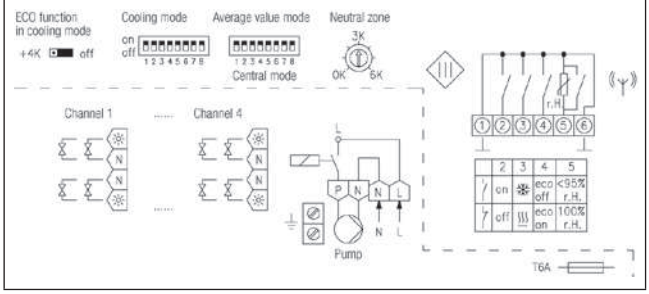
Type / photo	Art. no.	Equipment	PG
KTFRD-315.125 	BA120500	like KTFRL-315.125 but IP 65	I
JZ-24 	BN 990002	**General equipment:** magnetic attachment set for simple and secure attachment of multi-channel actuators on metallic base (e.g. heating circuit distributor)	II
JZ-25 	BN 990003	**General equipment:** external antenna to improve reception if the multi-channel actuators are experiencing reception problems (JZ-26 antenna cable not included in scope of supply) **Design:** Berlin 1000 **Surface properties:** gloss **Housing colour:** pure white, similar to RAL 9010 **Housing material:** plastic ABS **Storage temperature:** –20 … +70 °C **Permissible air humidity:** max. 95% r. H., non-condensing **Type of protection:** IP 30	II
JZ-26	BN 990004	**General equipment:** antenna cable to connect the external antenna (JZ-25) with multi-channel actuators **Connection cable:** 1 m	II

Suitable valve actuators ZBOOA-010.100, page 82

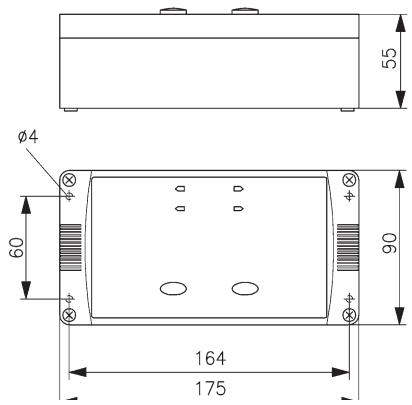
KTFRx-213.140 (4 channels)



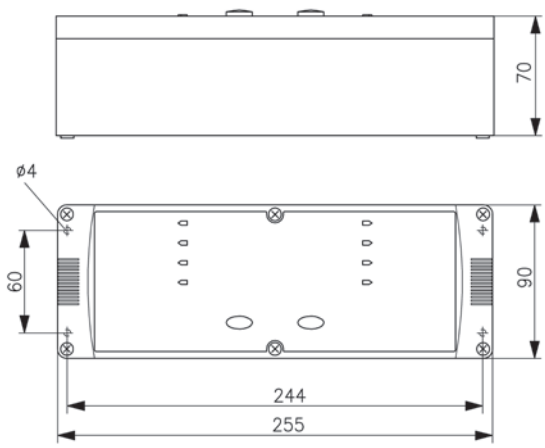
KTFRx-315.125 (8 channels)



KTFRx-213.140



KTFRx-315.125

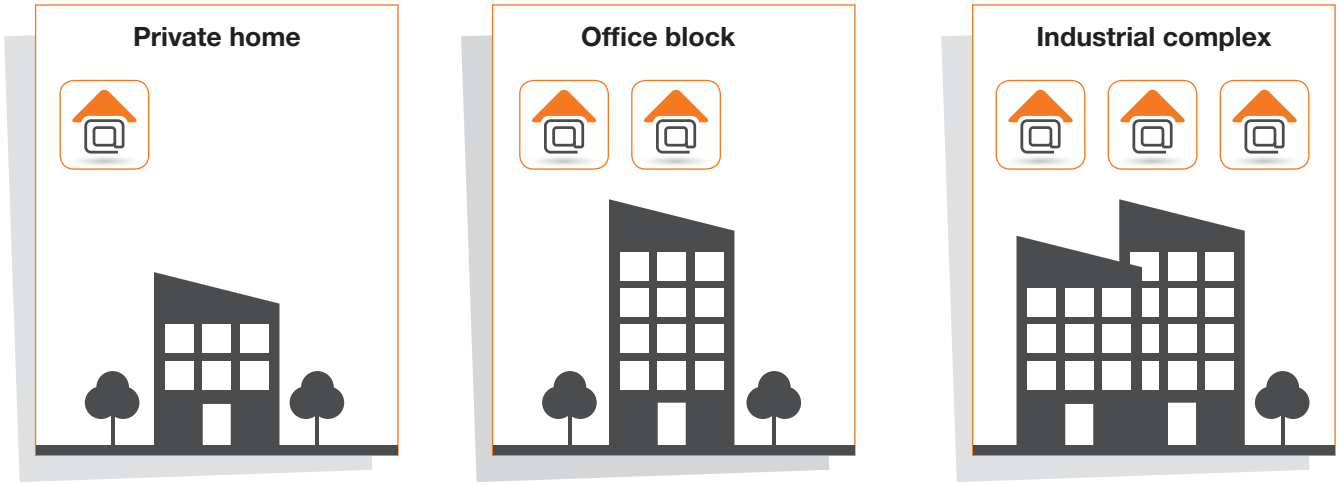


All benefits of and options for b@home at a glance

- Safe control, monitoring and programming of heating/cooling control from any location
- Up to 32 rooms and/or heating/cooling zones
- Quick and easy commissioning
- Intuitive operation
- Single-room control
- Suited to all types of heating
- Several mobile end devices can be used
- No Internet connection is needed for the control function
- Can be retrofitted in existing alre wireless systems*
- Free apps, no follow-on costs such as monthly subscription charges

*With the exception of the FTRFBu 180.1xx and FTRFUd 210.123 timer sensors, because the corresponding functions are realised via app/gate/web portal

Can be scaled up for anything from a private home to an industrial complex



One benefit of the modular smart home solution from alre is its fantastic scalability. You can use this smart home system to automate one individual home or commercial premises – from a small office block to an entire industrial complex.

b@home mobile for the smartphone or tablet

Website b@home

Product film b@home

Installation film b@home

alre website

HEATING TECHNOLOGY

Cozy warmth made easy.

HEATING TECHNOLOGY
Warmth for your well-being.




From room thermostats and terminal strips for heating manifolds to valve actuators – we offer a wide range of products in a timeless elegant design.

The right solution for every need.

Overview of heating technology:
Room and floor temperature controllers

Terminal strips for heating manifolds / valve actuators

Overview of heating controllers

	Type	RTBSB-001.000	RTBSB-001.002	RTBSB-001.010	RTBSB-001.026	RTBSB-001.045	RTBSB-001.048	RTBSB-001.062	RTBSB-001.065	RTBSB-001.075	RTBSB-001.086	RTBSB-001.096	RTBSB-001.110	RTBSB-001.202	RTBSB-001.500	RTBSB-001.910	RTBSB-001.910/2	RTBSB-001.948/1	RTBSB-201.000	RTBSB-201.002	RTBSB-201.010	RTBSB-201.034	RTBSB-201.062	RTBSB-201.065	RTBSB-201.202	RTBSB-201.500	RTBSB-001.401	RTBSB-001.411	HTRTB-210.100	HTRTB-250.100	HTRRBu-110.117/21	HTRRBu-110.121/21	FTR 101.000	FTR 101.002	FTR 101.010	FTR 101.034	FTR 101.052	FTR 101.062	FTR 101.063	FTR 101.065	FTR 101.075	FTR 101.086	FTR 101.202	FTR 101.210	FTR 101.262	FTR 101.902	HTRRUu-210.021	HTRRB-011.010	HTRRB-010.310	HTRRB-011.410	HTRRBu-110.021	FETR 101.715	FETR 101.716	FETR 101.745	FETR 101.700
	Page	39	39	40	40	40	41	41	41	42	42	42	42	43	43	43	43	44	45	45	45	46	46	46	46	48	49	50	50	51	51	53	54	54	54	55	55	55	55	56	56	56	57	57	57	70	74	74	74	76	78	78	79	78
Design	Berlin 1000																		x	x	x	x	x	x	x			x	x																								
	Berlin 2000	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x												x	x															x	x	x				
	Berlin 3000																													x	x																			x				
	Berlin flush-mounted																															x	x	x	x	x	x	x	x	x	x	x	x	x	x				x	x	x	x
	Berlin 2000 with plug																									x	x																											
Sensor	Bimetal (NC contact)	x	x					x			x	x		x	x				x	x		x	x		x	x	x					x	x		x	x	x			x	x	x		x	x							
	Bimetal (toggler)			x	x	x	x		x	x			x			x	x	x			x			x										x				x	x				x									
	NTC, internal																											x	x	x	x															x							x	
	NTC, external																																													x	x	x	x	x	x	x		x
	NTC for floor monitoring																																													x							x	
Controller type	Heating controller	x	x	x*	x*	x*	x*	x	x*	x*	x	x	x*	x	x	x*	x*	x*	x	x	x*	x	x	x*	x	x	x	x	x	x	x	x	x	x	x*	x	x	x	x*	x	x	x	x*	x	x	x	x	x	x	x	x	x	x	x
	Cooling function			x		x	x		x				x			x	x	x			x			x										x				x	x				x									
	Cooling function with fan output				x																																																	
	Model with timer																													x	x															x								
Pipe system	Air conditioning controller in 2-pipe system			x	x	x	x		x				x			x	x	x			x			x										x				x	x				x									
Application	Natural stone heating										x	x																		x	x											x				x							
	Tiled stove heating																																																x					
	Electric direct heating systems										x	x															x	x			x	x											x				x							
	Electric floor heating																													x	x															x	x	x		x	x	x	x	x
	Night storage heater																																			x																		
	Hot water floor heating	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x	x		x	x	x	x		x	x	x	x	x				x				
	Partial air conditioner			x	x	x	x		x				x			x	x	x			x			x										x				x	x				x									
Features	Output “temperature reduction”																													x	x																			x				
	Input “temperature reduction”		x					x		x				x		x	x			x			x		x								x	x			x			x		x		x	x					x	x	x	x
	Switch “On/Off”				x			x															x							x	x						x					x			x	x	x			x	x	x	
	Switch “Heating/Cooling”								x															x																x														
	Switch “Heating/Off/Cooling”																																					x																	
	Switch “Reduction/Comfort/Automatic”									x																				x	x										x												
	Switch “Auxiliary heating”																																			x																		
	Display																													x																								
	Display with backlighting																														x															x				x				
	Indicator lamp “On/Off”																																																						
	Indicator lamp “Heating”							x				x										x	x					x	x						x		x					x		x	x	x	x		x	x	x	x
	Indicator lamp “Reduction”									x																																	x									x	x	x	x
	Indicator lamp “Auxiliary heating”																																			x																		
Technology	Control range –20 … +30 °C					x																																																	
	Control range 5 … 30 °C	x	x	x	x			x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				x			
	Control range 10 … 42 °C																																																x		x		x		x	
	Control range 10 … 50 °C																																																			x			x
	Control range 10 … 60 °C						x											x																																	x				
	Control range 20 … 80 °C																																																			x			
	3000 W switching power										x	x															x	x															x											
	Internal setting															x	x	x																													x							
	2-wire connection													x											x																														
	24 V~												x			x								x					x																	x	x	x					
	230 V~	x	x	x	x	x	x	x	x	x	x	x		x	x				x	x	x	x	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x
	24 V~ or 230 V~												x					x																																				

x * Heating controllers using normally open valve actuators

Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

Technical data

Design:	Berlin 2000
Surface finish:	matt
Colour of housing:	pure white, like RAL 9010
Material of housing:	ABS plastic
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.12 mm² to 2.5 mm²
Mounting / attachment:	surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Safety and EMC:	according to DIN EN 60730
Average power consumption:	< 0.5 W
Switching element:	bimetallic contact
Sensor:	bimetal
General features:	thermal feedback

Application

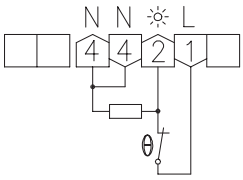
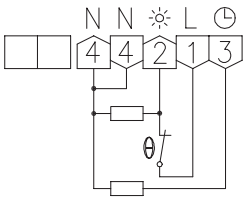
Control or monitoring of temperatures in closed spaces. Suitable for all heating systems.

Valve actuator: normally closed. If normally open heating valves are available, they should be connected with the cooling output of the changeover switch (toggler).

Up to a maximum of 10 actuators for valves can be connected (normally closed, NC); with a toggler, on the NO contact, up to 5 units (in this context, please check the switching capacity listed in the technical specifications).

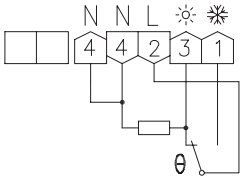
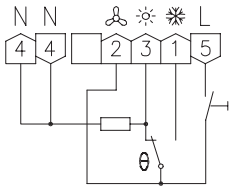
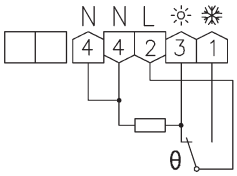
Installation note: Owing to the existing wiring space in the controller itself, installation on a flush-mounted socket is recommended, but it can also be performed on a plane, non-conducting substrate.

Explanations of technical terms can be found in the annex to the product catalogue or at www.alre.de.

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.000 	MA 010000	**General features:** mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** II, if properly mounted **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h		I
RTBSB-001.002 	MA 010100	**General features:** ECO function; mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** II, if properly mounted **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h **Input "temperature reduction":** approx. 4 K (230 VAC, 50 Hz)		I

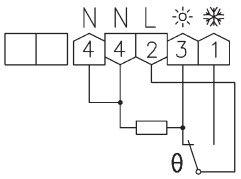
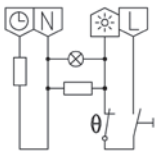
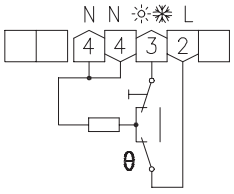
Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.010 	MA 010200	**General features:** mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 30 °C **Protection class:** II, if properly mounted **Max. switching current:** heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** Terminal 3: 2300 W, terminal 1: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5 … 30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h		I
RTBSB-001.026 	MA 010900	**General features:** mechanical range limitation; scale: degrees Celsius; **on / off switch**; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 30 °C **Protection class:**II, if properly mounted **Max. switching current:** heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A, fan (terminal 2) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** terminal 3: 2300 W, terminal 1: 1150 W, terminal 2: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz); fan permanently operating (230 VAC, 50 Hz) if device has been switched on **Control function:** heating or cooling **Control range:** 5 …30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h		I
RTBSB-001.045 	MA 011200	**General features:** mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** –20 … +30 °C **Protection class:**II, if properly mounted **Max. switching current:** heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** terminal 3: 2300 W, terminal 1: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** –20 … +30 °C **Hysteresis:** approx. 1.5 K at a temperature change of max. 4 K / h		I

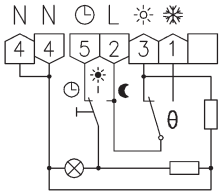
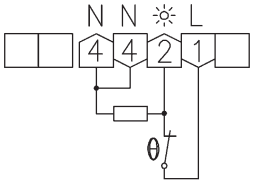
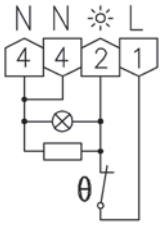
Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.048 	MA 011300	**General features:** mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 10…60 °C **Protection class:**II, if properly mounted Max. switching current: heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** terminal 3: 2300 W, terminal 1: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 10…60 °C **Hysteresis:** approx. 1.5 K at a temperature change of max. 4 K/h		I
RTBSB-001.062 	MA 012400	**General features:** ECO function; **“heating” display;** mechanical range limitation; scale: degrees Celsius; **on / off switch;** external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:**II, if properly mounted **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** heating, switching (230 VAC, 50 Hz) **Control function:** heating **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h **Input “temperature reduction”:** approx. 4 K (230 VAC, 50 Hz)		I
RTBSB-001.065 	MA 010600	**General features:** mechanical range limitation; scale: degrees Celsius; **Heating / Cooling switch;** external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:**II, if properly mounted **Max. switching current:** 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 1150 W **Switching contact:** changeover switch (toggler, max. 5 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h		I

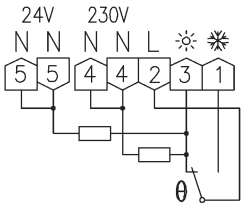
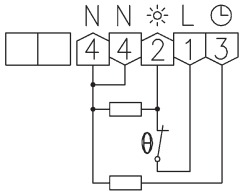
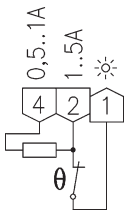
Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.075 	MA 010500	**General features:** ECO function; **"reduction" display;** mechanical range limitation; scale: degrees Celsius; **switch for reduction / heating / reduction via external timer;** external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 30 °C **Protection class:** II, if properly mounted **Max. switching current:** heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** terminal 3: 2300 W, terminal 1: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5 … 30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h **Input "temperature reduction":** approx. 4 K (230 VAC, 50 Hz)		I
RTBSB-001.086 	MA 010800	**General features:** mechanical range limitation; 3000 W switching power, for electric direct heating systems, natural stone heating; multi-digit display 1 … 6; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0 … 30 °C **Protection class:** II, if properly mounted **Max. switching current:** 13 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 3000 W **Switching contact:** NC contact **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Control range:** 5 … 30 °C **Hysteresis:** approx. 1 K at a temperature change of max. 4 K / h **Accessories:** can be combined with plug-in socket JZ-19		I
RTBSB-001.096 	MA 012500	like RTBSB-001.086, **but with "heating" display (LED red)**		I

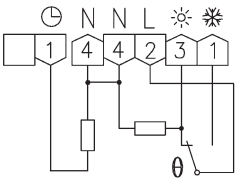
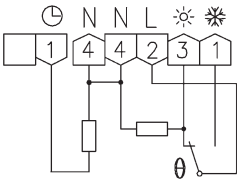
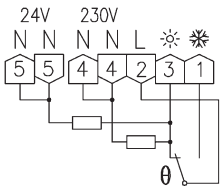
Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.110 	MA 012701	**General features:** mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 230 VAC, 50 Hz or 24 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** II, if properly mounted; with 24 V, protection class III **Max. switching current:** heating (terminal 3) 230 VAC 10 (4) A or 24 VAC 2 (2) A, cooling (terminal 1) 5 (2) A or 24 VAC 2 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Switching power:** terminal 3: 2300 W at 230 VAC, 48 W at 24 VAC, terminal 1: 1150 W at 230 VAC, 48 W at 24 VAC **Switching contact:** changeover switch (toggler, max. 5 actuators) **Output signal:** switching (230 VAC, 50 Hz or 24 VAC, 50 Hz) **Output signal:** cooling, switching (230 VAC, 50 Hz or 24 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h		I
RTBSB-001.202 	MA 011700	**General features:** ECO function; mechanical range limitation; scale: degrees Celsius; external setting **Operating voltage:** 24 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** III **Max. switching current:** 1 (1) A **Max. switching voltage:** 24 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Switching power:** 24 W **Switching contact:** NC contact (max. 5 actuators) **Output signal:** switching (24 VAC, 50 Hz) **Control function:** heating **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h **Input "temperature reduction":** approx. 4 K (24 VAC, 50 Hz)		I
RTBSB-001.500 	MA 013401	**General features: 2-wire room temperature controller;** mechanical range limitation; multi-digit display *…6; external setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** II, if properly mounted **Max. switching current:** 1 A or 5 A (see circuit diagram) **Min. switching current:** 0.5 A or 1 A (see circuit diagram) **Min. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 230 W or 1150 W (see circuit diagram) **Switching contact:** NC contact **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Control range:** 5…30 °C **Hysteresis:** approx. 1 K at a temperature change of max. 4 K/h (load-dependent)		I

Mechanical room temperature controller, RTBSB

Surface-mounted installation – Design Berlin 2000

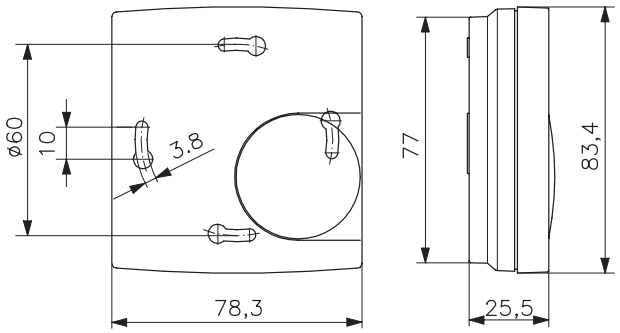
Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.910 	MA 012000	**General features:** ECO function; scale: degrees Celsius; internal setting **Operating voltage:** 230 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:**II, if properly mounted **Max. switching current:**heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** terminal 3: 2300 W, terminal 1: 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h **Input "temperature reduction":** approx. 4 K (230 VAC, 50 Hz)		I
RTBSB-001.910/2 	MA 012100	**General features:** ECO function; scale: degrees Celsius; internal setting **Operating voltage:** 24 VAC, 50 Hz **Ambient temperature:** 0…30 °C **Protection class:** III **Max. switching current:** 1 (1) A **Max. switching voltage:** 24 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Switching power:** 24 W **Switching contact:** changeover switch (toggler, max. 3 actuators) **Output signal:** switching (24 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5…30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K/h **Input "temperature reduction":** approx. 4 K (24 VAC, 50 Hz)		I
RTBSB-001.948/1 	MA 012600	**General features:** scale: degrees Celsius; internal setting **Operating voltage:** 230 VAC, 50 Hz or 24 VAC, 50 Hz **Ambient temperature:** 10…60 °C **Protection class:** II, if properly mounted; with 24 V, protection class III **Max. switching current:** Heating (terminal 3) 230 VAC 10 (4) A or 24 VAC 2 (2) A, cooling (terminal 1) 5 (2) A or 24 VAC 2 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Switching power:** terminal 3: 2300 W at 230 VAC, 48 W at 24 VAC, terminal 1: 1150 W at 230 VAC, 48 W at 24 VAC **Switching contact:** changeover switch (toggler, max. 10 actuators output terminal 3, max. 5 actuators output terminal 1) **Output signal:** switching (230 VAC, 50 Hz or 24 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 10…60 °C **Hysteresis:** approx. 1.5 K at a temperature change of max. 4 K/h		I

Mechanical room temperature controller, RTBSB

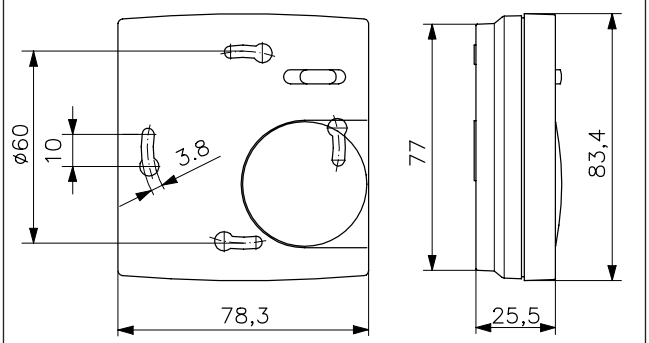
Surface-mounted installation – Design Berlin 2000

Accessories: terminal strips VOOxx, suitable valve actuators ZBOOA
You can find other/similar controllers with outputs for heating/cooling in the “Air conditioning technology” section.

RTBSB



RTBSB with switch



Mechanical room temperature controller, RTBSB

Surface-mounted superflat installation – Design Berlin 1000

Technical data

Design:	Berlin 1000
Surface finish:	glossy
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Ambient temperature:	0…30 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.33 mm² to 1.5 mm²
Mounting / attachment:	surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Safety and EMC:	according to DIN EN 60730
Average power consumption:	< 0.25 W
Max. switching current:	2 (1) A
Switching element:	bimetallic contact
Sensor:	bimetal
Control range:	5…30 °C
Hysteresis:	approx. 0.5 K at a temperature change of max. 4 K / h
General features:	mechanical range limitation; thermal feedback; external setting

Application

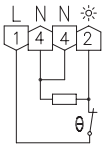
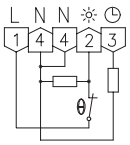
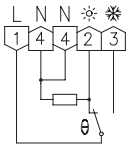
Control or monitoring of temperatures in closed spaces.

Valve actuator: normally closed. If normally open heating valves are available, they should be connected with the cooling output of the changeover switch (toggler).

Up to a maximum of 10 actuators for valves can be connected (normally closed, NC); with a toggler, on the NO contact, up to 5 units (in this context, please check the switching capacity listed in the technical specifications).

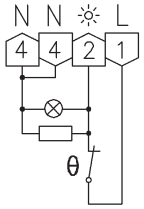
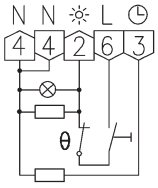
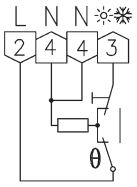
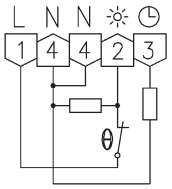
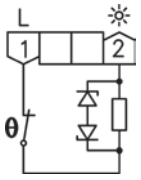
Installation note: Owing to the existing wiring space in the controller itself, installation on a flush-mounted socket is recommended, but it can also be performed on a plane, non-conducting substrate.

Explanations of technical terms can be found in the annex to the product catalogue or at www.alre.de.

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-201.000 	MA 300000	**General features:** scale: degrees Celsius colour RAL 9016 (traffic white) upon request **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating		I
RTBSB-201.000 / 08	MA 300008	like RTBSB-201.000 but with multi-digit display * …		I
RTBSB-201.000-20	MA 300800	like RTBSB-201.000 but housing colour traffic white / studiowhite, like RAL 9016		I
RTBSB-201.002 	MA 300100	**General features:** ECO function; scale: degrees Celsius **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Input "temperature reduction":** approx. 3 K (230 VAC, 50 Hz)		I
RTBSB-201.010 	MA 300200	**General features:** scale: degrees Celsius **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** changeover switch (toggler, max. 10 actuators (NC contact), max. 5 actuators (NO contact)) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling		I

Mechanical room temperature controller, RTBSB

Surface-mounted superflat installation – Design Berlin 1000

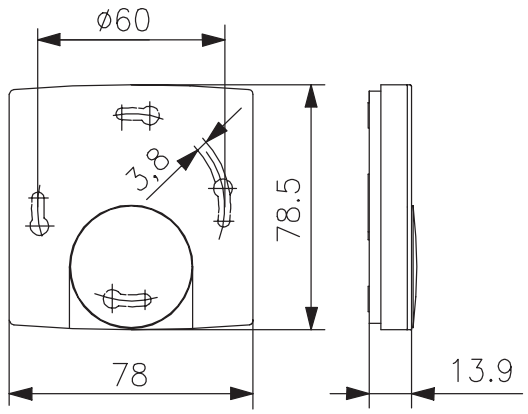
Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-201.034 	MA 301400	**General features: "heating" display;** scale: degrees Celsius **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating		I
RTBSB-201.062 	MA 300400	**General features:** ECO function; **"heating" display;** scale: degrees Celsius; **on / off switch** **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** NC contact (max. 10 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating **Input "temperature reduction":** approx. 3 K (230 VAC, 50 Hz)		I
RTBSB-201.065 	MA 300500	**General features:** climate controller for 2-pipe systems, especially heat pumps, scale: degrees Celsius; **heating / cooling switch** **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 460 W **Switching contact:** changeover switch (toggler, max. 5 actuators) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** Heating or cooling		I
RTBSB-201.065 / 02	MA 300502	like RTBSB-201.065 but with multi-digit display * … 6		I
RTBSB-201.202 	MA 302100	**General features:** ECO function; scale: degrees Celsius **Operating voltage:** 24 VAC, 50 Hz **Protection class:** III **Max. switching voltage:** 24 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Switching power:** 48 W **Switching contact:** NC contact (max. 5 actuators) **Output signal:** switching (24 VAC, 50 Hz) **Control function:** heating **Input "temperature reduction":** approx. 3 K (24 VAC, 50 Hz)		I
RTBSB-201.500 	MA 304000	**General features:** 2-wire room temperature controller; mechanical range limitation; multi-digit display * … 6; external setting **Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching current:** 20mA **Min. switching current:** 5mA **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 4,6 W (max. 2 actuators NC) **Switching contact:** NC contact **Output signal:** switching (230 VAC, 50Hz) **Control function:** heating **Control range:** 5 … 30 °C **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h		I

Accessories: terminal strips VOOxx, suitable valve actuators ZBOOA
You can find other controllers with outputs for heating / cooling in the "Air conditioning technology" section.

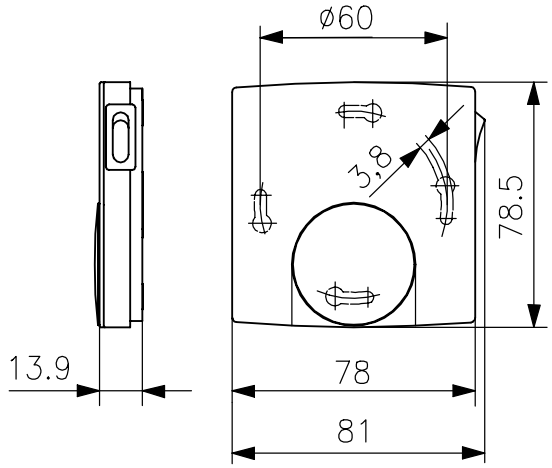
Mechanical room temperature controller, RTBSB

Surface-mounted superflat – Design Berlin 1000

RTBSB-201.xxx



RTBSB-201.xxx with "ON / OFF" switch at the side



Mechanical room temperature controller, RTBSB

Surface-mounted or plug-in installation – Design Berlin

Technical data

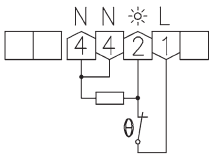
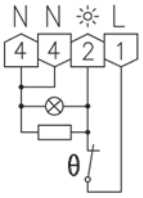
Design:	Berlin 2000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	– 20 … + 70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Protection rating:	IP 30
Protection class:	II for loads of protection classes I and II
Safety and EMC:	according to DIN EN 60730
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching element:	bimetallic contact
Switching contact:	NC contact
Output signal:	switching (230 VAC, 50 Hz)
Sensor:	bimetal
Control function:	heating
Control range:	5 … 30 °C
Hysteresis:	approx. 1 K at a temperature change of max. 4 K/h

Application

For controlling the room temperature for radiators, heating chimneys, direct electric heating systems, marble heating systems etc.

Attention! For loads > 2,300 W, the wall socket must be designed for 16 A (danger of fire).

The plugs are designed in such a way that they can also be used in sockets with a central pin (for example, as used in France).

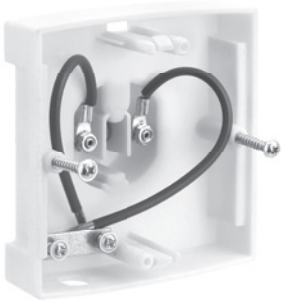
Type / image	Item no.	Features	Circuit diagram	PG
JZ-19 	MN 990003	**General features:** plug-in socket (as with RTBSB-001.411 / RTBSB-001.474) completely pre-wired **Mounting / attachment:** Can be fitted with room thermostats RTBSB-001.xxx **Protection rating:** Depends on the pre-fitted room thermostat **Protection class:** Depends on the pre-fitted room thermostat **Max. switching current:** Depends on the pre-fitted room thermostat **Switching power:** 3000 W		I
RTBSB-001.086 	MA 010800	**General features:** mechanical range setting; 3000 W switching power for electric direct heating systems, natural stone heating; thermal feedback; multi-digit display 1 … 6; external setting **Electrical connection:** screw-type terminals 0.12 mm² to 2.5 mm² **Average power consumption:** < 0.5 W **Max. switching current:** 13 (4) A **Switching power:** 3000 W **Accessories:**can be combined with plug-in socket JZ-19		I
RTBSB-001.096 	MA 012500	like RTBSB-001.086, but with “heating” display (LED red)		I
RTBSB-001.401 	MA 013100	**General features:** mechanical range limitation; 3000 W switching power for electric direct heating systems, natural stone heating; multi-digit display 1 … 6; external setting **Electrical connection:** Schuko adapters **Mounting / attachment:** optionally surface- / wall-mounting (4-hole assembly on flush-mounted socket) or with adapter plate (2-hole assembly) for wall hanging **Average power consumption:** < 0.1 W **Max. switching current:** 13 (4) A **Switching power:** 3000 W **Connecting cable:** 1.5 m		I

Mechanical room temperature controller, RTBSB

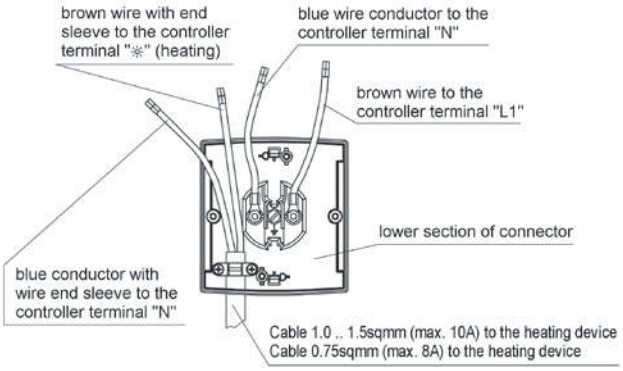
Surface-mounted or plug-in installation – Design Berlin

Type / image	Item no.	Features	Circuit diagram	PG
RTBSB-001.411 	MA 013200	**General features:** mechanical range limitation; 3000 W switching power, for electric direct heating systems, natural stone heating; multi-digit display 1 … 6; external setting **Electrical connection:** pre-fitted Schuko plug-in socket JZ-19 at the controller, 1.5-m cable with Schuko coupling **Mounting / attachment:** ready-to-plug **Average power consumption:** < 0.1 W **Max. switching current:** 13 (4) A **Switching power:** 3000 W **Hysteresis:** approx. 1 K at a temperature change of max. 4 K / h		I

Plug-in socket

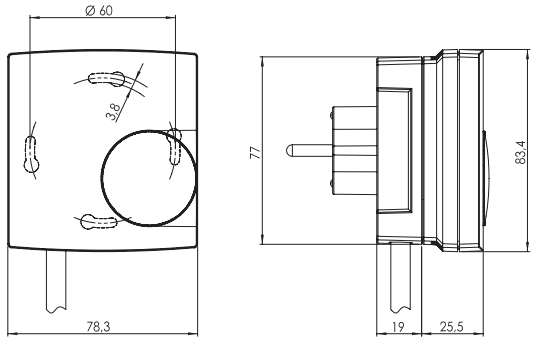


Plug-in socket



RTBSB-001.411

RTBSB-001.411
(Different from dimensions of RTBSB-001.401)



RTBSB-001.401

Electronic room temperature controller with triac output (soundless)

Surface-mounted **superflat** installation – Design Berlin 1000

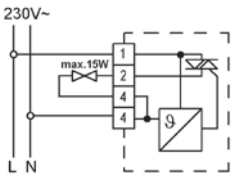
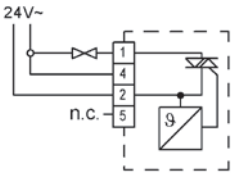
Technical data

Design:	Berlin 1000
Surface finish:	glossy
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Ambient temperature:	0 … 40 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.5 mm² to 1.5 mm²
Mounting / attachment:	surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Safety and EMC:	according to DIN EN 60730
Average power consumption:	< 0.8 W (5 VA)
Switching power:	15 W
Switching element:	triac
Switching contact:	NO contact
Sensor:	NTC
Control function:	heating
Control range:	5 … 30 °C
Proportional range:	approx. 1 K
General features:	“heating” display; mechanical range setting; scale: degrees Celsius; external setting

Application

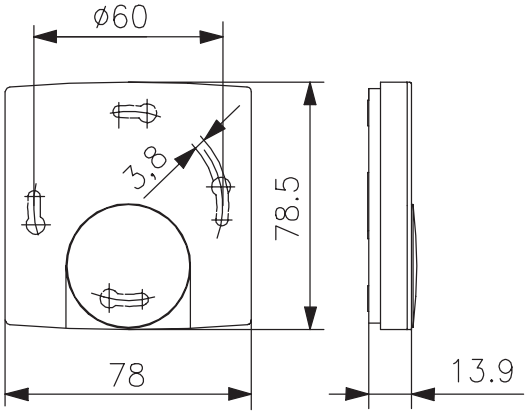
This room temperature controller, which is specifically designed for temperature control and monitoring in offices, homes and hotels, can be connected directly to the valve actuators for hot water heating systems. Electrical underfloor heating systems need to be controlled via an additional power contactor. A maximum of five normally closed valves can be connected to the heating output of hot water heating systems.

The room temperature controller measures the room temperature with an internal sensor and activates the heating system depending on the deviation from the configured setpoint temperature. As the switching element used is a triac rather than a relay or bimetal, the system operates **without bothersome switching sounds**.

Type / image	Item no.	Features	Circuit diagram	PG
HTRTB-210.100 	MA 700600	**Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching current:** 65 mA **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Output signal:** switching (230 VAC, 50 Hz) **Other / similar items:** triac controller with ECO contact: KTRTB-211.108		I
HTRTB-250.100 	MA 700700	**Operating voltage:** 24 VAC, 50 Hz **Protection class:** III **Max. switching current:** 600 mA **Max. switching voltage:** 24 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Output signal:** switching (24 VAC, 50 Hz) **Other / similar items:** triac controller with ECO contact: KTRTB-251.108		I

Accessories: terminal strips VOOxx, suitable valve actuators ZBOOA
You can find other controllers with outputs for heating / cooling in the “Air conditioning technology” section.

HTRTB



Electronic room temperature controller with timer, HTRRBu

Surface-mounted installation – Design Berlin 3000

Technical data

Design:	Berlin 3000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	surface / wall-mounting or by means of adapter plate on flush-mounted socket
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching current:	heating (terminal 4) 8 (2) A, cooling (terminal 3) 100 mA,
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	terminal 4: 1840 W, terminal 3: 23 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	heating, switching (230 VAC, 50 Hz)
Sensor:	NTC
Control function:	heating
Control range:	5 … 30 °C
Hysteresis:	< 1 K
Display type:	symbol display
Output “temperature reduction”:	switching (230 VAC, 50 Hz) (for pilot function)

Application

For time-dependent control of temperatures in closed spaces. Suitable for all heating systems.

Valve actuator: normally closed.

It can be used as a master (pilot regulator) for the temperature reduction of other controllers. Controllers of the series FETR, FTR and RTBSB are suitable as slaves (satellite controllers).

Programming procedures for every day, familiar from mechanical timers, by means of “electronic tabs”. Shortest switching time 15 min.

Load setting: The control accuracy is influenced by the different levels of intrinsic heating of the controller depending on the magnitude of the heating load. By inputting the heating load, this influence is compensated and the control accuracy is retained.

General features:
pilot function; ECO function, ECO value adjustable; “ECO” display; “on / off” display; “heating” display; digital actual value display; child-safe features; power reserve (approx. 4 – 7 days); load setting; actual value correction / measured value correction; learning function; valve protection; holiday setting; party setting; automatic adjustment to standard / daylight savings time; mechanical range limitation; scale: degrees Celsius; reduction / comfort / automatic button; external setting; operation using direct-dial buttons; on / off button; information button; party function button; holiday setting button

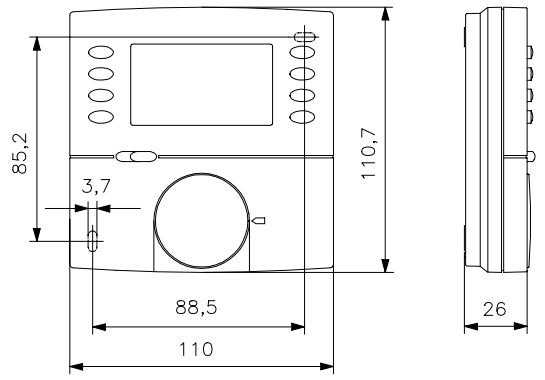
Type / image	Item no.	Features	PG
HTRRBu-110.117 / 21 	MA 600003		I
HTRRBu-110.121 / 21 	MA 600301	like HTRRBu-110.117 / 21, but with backlighting	I

Accessories	Item no.	Features	PG
JZ-17 	MN 990001	**General features:** adapter plate for mounting devices on flush-mounted sockets (including fastening screws for mounting the controller on the adapter plate) **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic	II

Electronic room temperature controller with timer, HTRRBu

Surface-mounted installation – Design Berlin 3000

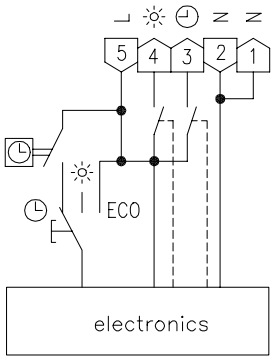
HTRRBu-110.XXX



Factory setting:

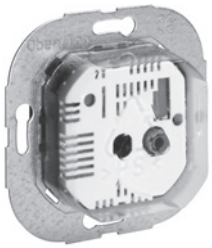
- Setback temperature 17 °C
- Continuous time display
- Programme display using switching segments enabled
- Child-safe features disabled
- Automatic adjustment to standard / daylight savings time enabled
- °C display, valve and pump protection disabled
- Learning function disabled
- Heating load 0.0 kW
- Comfort times:
  Mon-Fri 5 am – 9 am / 4 pm – 10 pm,
  Sat / Sun 6 am – 10 pm

Circuit diagram HTRRBu-110.XXX



Mechanical room temperature controller, FTR

Flush-mounted installation – Design Berlin UP



Technical data

Design:	Berlin UP (flush-mounted)
Housing material:	PC plastic
Ambient temperature:	0 … 30 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	in flush-mounted socket – with cover set 50 x 50 mm or 55 x 55 mm, can be used with almost all switch ranges (deep flush-mounted socket recommended)
Protection rating:	IP 30
Protection class:	II, if properly mounted, with 24 VAC, protection class III
Safety and EMC:	according to DIN EN 60730
Max. power consumption:	< 0,5 W
Switching element:	bimetallic contact
Output signal:	switching
Sensor:	bimetal
Control range:	5 … 30 °C
Setting range:	5 … 30 °C
Hysteresis:	approx. 0.5 K at a temperature change of max. 4 K / h
General features:	thermal feedback; multi-digit display *…6

Application

Control or monitoring of temperatures in closed, dry spaces. Suitable for all heating systems.

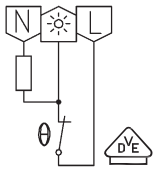
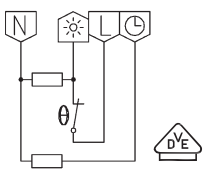
Valve actuator: normally closed. If normally open heating valves are available, they should be connected to the cooling output of the changeover switch (toggler), e.g., FTR 101.010.

Up to a maximum of 10 actuators for valves can be connected (normally closed, NC); with a toggler, on the NO contact, up to 5 units.

The 55 x 55-mm variants visually fit perfectly in many switch ranges of 55 x 55 mm without an insert frame.

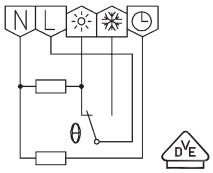
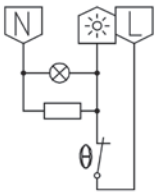
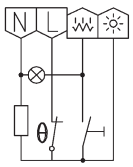
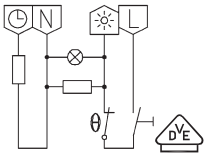
The 50 x 50-mm variants fit in nearly all switch ranges with the use of an insert frame.

Further complete devices (#21 types) with alre frame „Berlin“ (neutral) incl. 50 x 50mm cover (pure white, similar to RAL 9010, glossy) available on request.

Type / image	Item no.	Features	Circuit diagram	PG
FTR 101.000#00 	UA 010017	**General features:** mechanical range limitation; external setting; protective cap; contact hazard protection cover plate; VDE-tested **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I
FTR 101.000#21 	UN 010009	like FTR 101.000#00, but with scope of delivery: Controller, alre frame “Berlin” (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.002#00 	UA 010134	**General features:** ECO function; mechanical range limitation; external setting; protective cap; contact hazard protection cover plate; VDE-tested **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Input “temperature reduction”:** approx. 4 K (230 VAC, 50 Hz) Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)” and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I

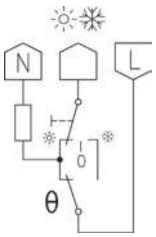
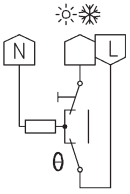
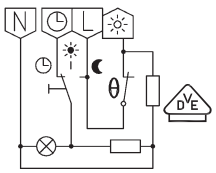
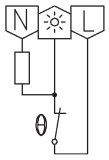
Mechanical room temperature controller, FTR

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
FTR 101.010#00 	UA 010222	**General features:** ECO function; mechanical range limitation; external setting; protective cap; contact hazard protection cover plate; VDE-tested **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** heating terminal 10 (4) A, cooling terminal 5 (2) A, **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** heating terminal: 2300 W, **Cooling terminal:** 1150 W **Switching contact:** changeover switch (toggler, max. 10 actuators output heating, max. 5 actuators output cooling) **Control function:** heating or cooling **Input "temperature reduction":** approx. 4 K (230 VAC, 50 Hz) Cover sets are offered in various designs (see the separate overview, "alre flush-mounted range (cover sets)" and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I
FTR 101.034#07 	UA 012404	**General features: "heating" display;** mechanical range limitation; external setting; contact hazard protection cover plate **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Scope of delivery:** controller, cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.034#55	UA 012405	like FTR 101.034#07 but with 55 x 55 mm cover		I
FTR 101.052#21 	UA 010702	**General features: "auxiliary heating" display;** mechanical range limitation; **auxiliary heating switch;** external setting **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** the total current (heating + auxiliary heating) may not exceed 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:**230 VAC, 50 Hz **Switching power:** the total power output (heating + auxiliary heating) may not exceed 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Scope of delivery:** controller, alre frame "Berlin" (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.062#00 	UA 010811	**General features:** ECO function; **"heating" display**; mechanical range limitation; **on / off switch;** external setting; protective cap; contact hazard protection cover plate; VDE-tested **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Input "temperature reduction":** approx. 4 K (230 VAC, 50 Hz) Cover sets are offered in various designs (see the separate overview, "alre flush-mounted range (cover sets)") and are not included in the delivery. **Suitable set no: JZ-002.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-002.000 cover set 55 x 55 mm, pure white, glossy: JZ-002.100		I

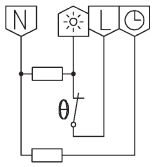
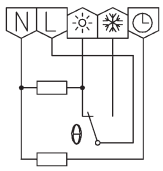
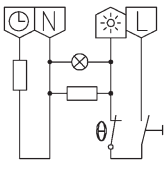
Mechanical room temperature controller, FTR

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
FTR 101.063#00 	UA 011000	**General features:** mechanical range limitation; Switch Heating / Off / Cooling; external setting; protective cap; contact hazard protection cover plate **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 1150 W **Switching contact:** changeover switch (toggler, max. 5 actuators) **Control function:** heating or cooling Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-012.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-012.000 cover set 55 x 55 mm, pure white, glossy: JZ-012.100		I
FTR 101.065#00 	UA 010910	**General features:** climate controller for 2-pipe systems, especially heat pumps; mechanical range limitation; **heating / cooling switch;** external setting; protective cap; contact hazard protection cover plate **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 5 (2) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 1150 W **Switching contact:** changeover switch (toggler, max. 5 actuators) **Control function:** heating or cooling Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-004.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-004.000 cover set 55 x 55 mm, pure white, glossy: JZ-004.100		I
FTR 101.075#00 	UA 010415	**General features:** ECO function; **“reduction” display;** mechanical range limitation; **switch for reduction / heating / reduction via external timer;** external setting; protective cap; contact hazard protection cover plate; VDE-tested **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Input “temperature reduction”:** approx. 4 K (230 VAC, 50 Hz) Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-003.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-003.000 cover set 55 x 55 mm, pure white, glossy: JZ-003.100		I
FTR 101.086#00 	UA 010615	**General features:** mechanical range limitation; 3000 W switching power for electric direct heating systems, natural stone heating; external setting; protective cap; contact hazard protection cover plate **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 13 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 3000 W **Switching contact:** NC contact **Control function:** heating Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I

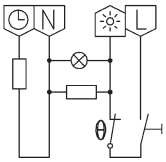
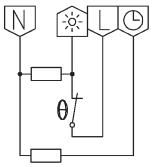
Mechanical room temperature controller, FTR

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
FTR 101.086#21 	UN 010607	like FTR 101.086#00, but with scope of delivery: Controller, alre frame “Berlin” (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.202#00 	UA 012008	**General features:** ECO function; mechanical range limitation; external setting; protective cap; contact hazard protection cover plate **Input “temperature reduction”:** approx. 4 K (24 VAC/50 Hz, 24 VDC) **Operating voltage:** 24 VAC/50 Hz, 24 VDC **Max. switching current:**1 (1) A **Max. switching voltage:** 24 VAC/50 Hz, 24 VDC **Min. switching voltage:** 24 VAC/50 Hz, 24 VDC **Switching power:** 24 W **Switching contact:** NC contact (max. 5 actuators) **Control function:** heating Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I
FTR 101.202#21 	UN 102009	like FTR 101.202#00, but with scope of delivery: Controller, alre frame “Berlin” (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.210#00 	UA 012301	**General features:** ECO function; mechanical range limitation; external setting; protective cap; contact hazard protection cover plate **Operating voltage:** 24 VAC/50 Hz, 24 VDC **Max. switching current:**1 (1) A **Max. switching voltage:** 24 VAC/50 Hz, 24 VDC **Min. switching voltage:** 24 VAC/50 Hz, 24 VDC **Switching power:** 24 W **Switching contact:** changeover switch (toggler, max. 5 actuators) **Control function:** heating or cooling **Input “temperature reduction”:** approx. 4 K (24 VAC/50 Hz, 24 VDC) Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-001.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-001.000 cover set 55 x 55 mm, pure white, glossy: JZ-001.100		I
FTR 101.262#00 	UA 012500	**General features:** ECO function; **“heating” display**; mechanical range limitation; **on / off switch;** external setting; protective cap; contact hazard protection cover plate; **Operating voltage:** 24 VAC / 50 Hz **Max. switching current:** 1 (1) A **Max. switching voltage:** 24 VAC / 50 Hz **Max. switching voltage:** 24 VAC / 50 Hz **Switching power:** 24 W **Switching contact:** NC contact (max. 5 actuators) **Control function:** heating **Input “temperature reduction”:**approx. 4 K (24 VAC / 50 Hz) Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-002.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-002.000 cover set 55 x 55 mm, pure white, glossy: JZ-002.100		I

Mechanical room temperature controller, FTR

Flush-mounted installation – Design Berlin UP

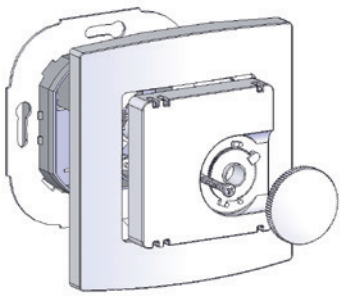
Type / image	Item no.	Features	Circuit diagram	PG
FTR 101.262#21	UA 012501	like FTR 101.262#00, but with scope of delivery: Controller, alre frame “Berlin” (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FTR 101.902#07 	UA 013000	**General features:** ECO function; internal setting; contact hazard protection cover plate **Operating voltage:** 230 VAC, 50 Hz **Max. switching current:** 10 (4) A **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 2300 W **Switching contact:** NC contact (max. 10 actuators) **Control function:** heating **Input “temperature reduction”:** approx. 4 K (230 VAC, 50 Hz) **Scope of delivery:** Controller, cover 50 x 50 mm, pure white (like RAL 9010), glossy		I

For model FTR 101.xxx#21, the contact hazard protection cover plate and protective cap are not included in the delivery.

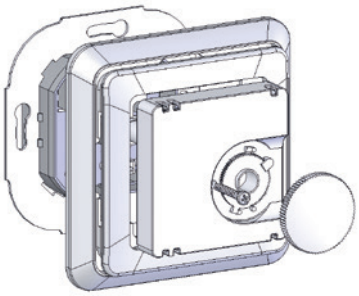
Accessories: terminal strips VOOxx, suitable valve actuators ZBOOA, suitable cover sets: see separate overview “alre flush-mounting range (cover sets)”

Type / image	Item no.	Features	PG
JZ-090.900 	VV 000025	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Housing material:** plastic PC	I
JZ-090.910	VV 000010	like JZ-090.900 but like RAL 1013	I

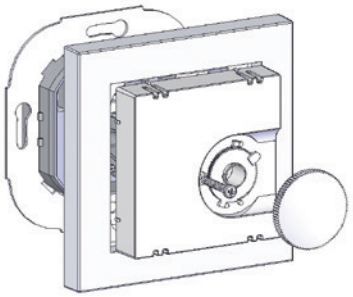
alre frame “Berlin” (#21 types)



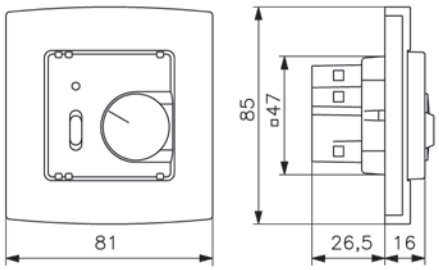
with 50 x 50 insert frame



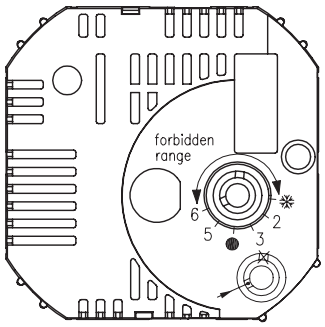
without 55 x 55 insert frame



FTR with alre frame “Berlin” (FTR 101.xxx#21 types)



FTR 101.902#07 contact hazard protection cap with setting range (internal setting)



alre flush-mounted range (cover sets)

all basic types and suitable cover sets **50 x 50 mm**

Basic type	Cover set 50 x 50 mm pure white (RAL 9010) glossy (JZ-xxx.000)		Cover set 50 x 50 mm pure white (RAL 9010) matt (JZ-xxx.001)		Cover set 50 x 50 mm pearl white (RAL 1013) glossy (JZ-xxx.010)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	
FTR 101.000#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.002#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.010#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.062#00	JZ-002.000	UN 990036	JZ-002.001	UN 990041	JZ-002.010	UN 990046	I
FTR 101.063#00	JZ-012.000	UN990107	-	-	-	-	I
FTR 101.065#00	JZ-004.000	UN 990037	JZ-004.001	UN 990042	JZ-004.010	UN 990047	I
FTR 101.075#00	JZ-003.000	UN 990038	JZ-003.001	UN 990043	JZ-003.010	UN 990048	I
FTR 101.086#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.202#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.210#00	JZ-001.000	UN 990035	JZ-001.001	UN 990040	JZ-001.010	UN 990045	I
FTR 101.262#00	JZ-002.000	UN 990036	JZ-002.001	UN 990041	JZ-002.010	UN 990046	I

In flush-mounted socket, it can be adapted to fit virtually any switch range.

Basic type	Cover set 50 x 50 mm traffic/studio white (RAL 9016) glossy (JZ-xxx.020)		Cover set 50 x 50 mm traffic/studio white (RAL 9016) matt (JZ-xxx.021)		PG
	Cover set	Item no.	Cover set	Item no.	
FTR 101.000#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.002#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.010#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.062#00	JZ-002.020	UN 990072	JZ-002.021	UN 990101	I
FTR 101.065#00	JZ-004.020	UN 990073	JZ-004.021	UN 990103	I
FTR 101.075#00	JZ-003.020	UN 990074	JZ-003.021	UN 990102	I
FTR 101.086#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.202#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.210#00	JZ-001.020	UN 990071	JZ-001.021	UN 990100	I
FTR 101.262#00	JZ-002.020	UN 990072	JZ-002.021	UN 990101	I

Special colours anthracite and aluminium see product finder from pages 63-68 on.

Cover set (example), individually foil-wrapped

all basic types and suitable cover sets **55 x 55 mm**

Basic type	Cover set 55 x 55 mm pure white (RAL 9010) glossy (JZ-xxx.100)		Cover set 55 x 55 mm pure white (RAL 9010) matt (JZ-xxx.101)		Design 55 x 55 mm pearl white (RAL 1013) glossy (JZ-xxx.110)		PG	Cover set 55 x 55 mm traffic/studio white (RAL 9016) glossy (JZ-xxx.120)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.		Cover set	Item no.	
FTR 101.000#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.002#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.010#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.062#00	JZ-002.100	UN 990051	JZ-002.101	UN 990056	JZ-002.110	UN 990061	I	JZ-002.120	UN 990088	I
FTR 101.063#00	JZ-012.100	UN 990123	-	-	-	-	I	-	-	
FTR 101.065#00	JZ-004.100	UN 990052	JZ-004.101	UN 990057	JZ-004.110	UN 990062	I	JZ-004.120	UN 990089	I
FTR 101.075#00	JZ-003.100	UN 990053	JZ-003.101	UN 990058	JZ-003.110	UN 990063	I	JZ-003.120	UN 990090	I
FTR 101.086#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.202#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.210#00	JZ-001.100	UN 990050	JZ-001.101	UN 990055	JZ-001.110	UN 990060	I	JZ-001.120	UN 990086	I
FTR 101.262#00	JZ-002.100	UN 990051	JZ-002.101	UN 990056	JZ-002.110	UN 990061	I	JZ-002.120	UN 990088	I

In flush-mounted sockets, it can be adapted to fit many switch ranges (for a current overview of the suitable frames and insert frames, see page 62).

alre

Examples of integration BERKER

Examples of integration BUSCH-JAEGER

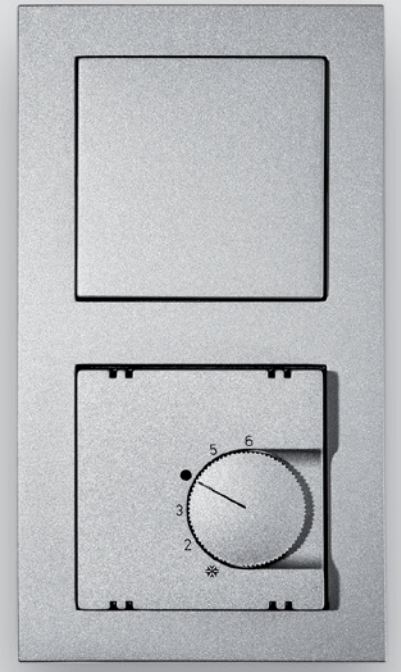
CONTROLLERS FOR ALL SWITCH RANGES

Examples of integration in switches with or without insert frames

Examples of integration GIRA

Examples of integration JUNG

Examples of integration MERTEN



For more examples of integrating components into 55 x 55 mm frames, see page 70

Adaptation of alre flush-mounted controllers

Manufacturer	Range	Colour RAL 9010 (surface finish)	Adaptation possible using "55 x 55" cover set (without insert frame)	Only adaptation with "50 x 50" cover set requires an insert frame from the manufacturer
BERKER	S.1	polar white (matt)	✓	1109 19 19
BERKER	S.1	polar white (glossy)	✓	1109 90 89
BERKER	Arsys	polar white (glossy)		1108 01 69
BERKER	B.3	aluminium/polar white (matt)	✓	1109 19 19
BERKER	B.3	aluminium/polar white (glossy)	✓	1109 90 89
BERKER	B.7	glass/polar white (matt)	✓	1109 19 19
BERKER	B.7	glass/polar white (glossy)	✓	1109 90 89
BERKER	Q.1	polar white (velvet)		1109 60 79
BERKER	K.1	polar white (glossy)		1108 71 09
BUSCH-JAEGER	Reflex SI/SI Linear	alpine white (glossy)		1746-214-101
BUSCH-JAEGER	Busch-balance SI	polar white (glossy)	✓	1746-914-101
BUSCH-JAEGER	impuls	alpine white (glossy)		1746/10-74
BUSCH-JAEGER	solo/future/axcent etc.	studio white–see RAL 9016 below		
ELSO	Joy	pure white (glossy)	✓	363084
ELSO	Fashion/Riva/Scala	pure white (glossy)		203084
GIRA	rocker switch	pure white (glossy)		0282 112
GIRA (System 55)	Standard/E 2	pure white (semi-gloss)	✓	0282 27
GIRA (System 55)	Standard/E 2	pure white (glossy)	✓	0282 03
GIRA (System 55)	E 22	pure white (glossy)	✓	0282 03
GIRA (System 55)	Event	pure white (semi-gloss) + opaque…	✓	0282 27
GIRA (System 55)	Event	pure white (glossy) + opaque…	✓	0282 03
GIRA (System 55)	Esprit	pure white (semi-gloss) + glass, aluminium…	✓	0282 27
GIRA (System 55)	Esprit	pure white (glossy) + glass, aluminium…	✓	0282 03
GIRA	S-Color	pure white (high-gloss)		0282 40
JUNG	CD 500/CD plus	alpine white (glossy)		CD 590 Z WW
JUNG	A 500/AS 500/A plus	alpine white (glossy)	✓	A 590 Z WW
JUNG	LS 990	alpine white (glossy)		LS 961 Z WW
JUNG	LS plus	alpine white (glass)		LS 961 Z WW
JUNG	A creation	alpine white (glossy)	✓	A 590 Z WW
JUNG	LS Design	alpine white (glossy)		LS 961 Z WW
MERTEN (System M)	M-Smart, M-Plan, M-Pure	polar white (matt)	✓	5181 19
MERTEN (System M)	M-Smart, M-Plan, M-Creativ, M-Pure	polar white (glossy)	✓	5185 19
MERTEN (System Basis)	1-M/Atelier-M	polar white (glossy)	✓	5185 19
MERTEN (System Design)	Artec/Antik	polar white (glossy)		5160 99
MERTEN	1-M/M-Smart/M-Plan/M-Pure/D-Life	active white–see RAL 9016 below or product finder		
PEHA	Standard	pure white (glossy)		80.670.02 ZV
PEHA	Dialog	pure white (glossy)		95.670.02 ZV
PEHA	Aura	pure white (matt)/glass		20.670.02 ZV
PEHA	Badora	pure white (glossy)		11.670.02 ZV

Manufacturer	Range	Colour RAL 9016 (surface finish)	Adaptation possible using "55 x 55" cover set (without insert frame)	Only adaptation with "50 x 50" cover set requires an insert frame from the manufacturer
BUSCH-JAEGER	solo/future/future linear	studio white (RAL 9016, glossy)		1746/10-84
BUSCH-JAEGER	future linear	studio white (RAL 9016, matt)		1746/10-884
BUSCH-JAEGER	impuls	studio white (RAL 9016, matt)		1746/10-774
BUSCH-JAEGER	axcent	studio white (RAL 9016, glossy)		1746/10-84
BUSCH-JAEGER	carat (glass, bronze, gold)	studio white (RAL 9016, glossy)		1746/10-84
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016, glossy)		1746/10-24G
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016, matt)		1746/10-24
MERTEN	M-Smart, M-Plan, M-Pure	active white (RAL 9016, glossy)	✓	5185 25
MERTEN	1-M/Atelier-M	active white (RAL 9016, glossy)	✓	5185 25
MERTEN	D-Life	lotos white (RAL 9016)		MEG4500-6035
PEHA	Standard	arctic		D 80.670 ZV AW

*) During assembly, you need to remove four plastic tabs located at the rear of the frame

NOTE: Most light switch ranges are designed in the colour "like RAL 9010", although different switch manufacturers have different designations for this colour. Coloured, glass and aluminium frames are also combined with white jacks or plugs so that controllers with white covers can also be integrated into these frames. Check the precise application in each individual case. The frames have different surface qualities (matt/glossy). For design reasons, the cover of the controller should have the same quality as the frame. We accept no liability for slight variations in colour and surface finish or for accuracy of fit. When installing devices into multi frames, always assemble the temperature controllers at the lowermost position.

"50 x 50 controller": The housing covers of the 50 x 50 controllers are 50 x 50 mm in size. Using a 50 x 50-mm insert frame, the 50 x 50 controllers can be integrated into nearly all light switch ranges in accordance with DIN 49075. The 50 x 50-mm insert frames must be ordered from the light switch manufacturer or from a wholesaler. The order number of the insert frame corresponding to the switch range in question can be found in the column "Only for adaptation with '50 x 50' cover set".

"55 x 55 controller": The housing covers of the 55 x 55 controllers are 55 x 55 mm in size. Many light switch ranges have inner dimensions of 55 x 55 mm. Therefore, the 55 x 55 controllers can be installed directly in the light switch frame without the use of an insert frame. See the column "Adaptation with '55 x 55' cover set" to determine whether the 55 x 55 controller fits in the given light switch range (✓).

All information regarding switch manufacturers' product lines and item numbers was last updated in 12/2017 | No liability is assumed for the information provided. | Technical specifications subject to change. An adaptation list for RAL 1013 switch ranges is available from our website at www.alre.de.

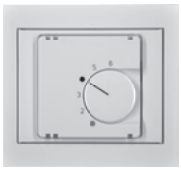
Product finder for alre cover sets for switches from BERKER

Integration examples

FTR … in S.1

FTR … in B.3

FTR … in B.7



FTR … in K.1

FTR … in Arsys

Type alre	Berker range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**S.1 / B.3 / B.7**	polar white (RAL 9010) glossy	JZ-001.100 (55 x 55, glossy)	UN 990050	I	not required
	S.1 / B.3 / B.7	polar white (RAL 9010) matt	JZ-001.101 (55 x 55, matt)	UN 990055	I	not required
	Arsys	polar white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	1108 01 69
	Q.1 / Q.3	polar white (RAL 9010) velvet	JZ-001.001 (50 x 50, matt)	UN 990040	I	1109 60 79
	K.1	polar white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	1108 71 09
	**S.1**	white (RAL 1013) glossy	JZ-001.110 (55 x 55, glossy)	UN 990060	I	not required
	Arsys	white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	1108 01 02
standard (without switch)	**S.1 / B.3 / B.7** NEW	alu / matt	JZ-001.131 / BE	UN 990114	/ I	not required
	S.1 / B.3 / B.7	anthracite / matt	JZ-001.141 / BE	UN 990115	/ I	not required

Type alre	Berker range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**S.1 / B.3 / B.7**	polar white (RAL 9010) glossy	JZ-002.100 (55 x 55, glossy)	UN 990051	I	not required
	S.1 / B.3 / B.7	polar white (RAL 9010) matt	JZ-002.101 (55 x 55, matt)	UN 990056	I	not required
	Arsys	polar white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	1108 01 69
	Q.1 / Q.3	polar white (RAL 9010) velvet	JZ-002.001 (50 x 50, matt)	UN 990041	I	1109 60 79
	K.1	polar white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	1108 71 09
	**S.1**	white (RAL 1013) glossy	JZ-002.110 (55 x 55, glossy)	UN 990061	I	not required
	Arsys	white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	1108 01 02
(ON / OFF switch, LED)						

Type alre	Berker range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**S.1 / B.3 / B.7**	polar white (RAL 9010) glossy	JZ-004.100 (55 x 55, glossy)	UN 990052	I	not required
	S.1 / B.3 / B.7	polar white (RAL 9010) matt	JZ-004.101 (55 x 55, matt)	UN 990057	I	not required
	Arsys	polar white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	1108 01 69
	Q.1 / Q.3	polar white (RAL 9010) velvet	JZ-004.001 (50 x 50, matt)	UN 990042	I	1109 60 79
	K.1	polar white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	1108 71 09
	**S.1**	white (RAL 1013) glossy	JZ-004.110 (55 x 55, glossy)	UN 990062	I	not required
	Arsys	white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	1108 01 02
(H / C switch)						

Type alre	Berker range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**S.1 / B.3 / B.7**	polar white (RAL 9010) glossy	JZ-003.100 (55 x 55, glossy)	UN 990053	I	not required
	S.1 / B.3 / B.7	polar white (RAL 9010) matt	JZ-003.101 (55 x 55, matt)	UN 990058	I	not required
	Arsys	polar white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	1108 01 69
	Q.1 / Q.3	polar white (RAL 9010) velvet	JZ-003.001 (50 x 50, matt)	UN 990043	I	1109 60 79
	K.1	polar white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	1108 71 09
	**S.1**	white (RAL 1013) glossy	JZ-003.110 (55 x 55, glossy)	UN 990063	I	not required
	Arsys	white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	1108 01 02
(triple switch, LED)						

*) must be ordered from switch manufacturer or electronics wholesaler

Product finder for alre cover sets for switches from BUSCH-JAEGER

Integration examples

FTR … in Reflex SI

FTR … in Busch-balance SI

FTR … in future linear

FTR … in solo

FTR … in alpha nea

Type alre	Busch-Jaeger range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**Reflex SI / SI Linear**	alpine white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	1746-214-101
	Busch-balance SI	alpine white (RAL 9010) glossy	JZ-001.100 (55x55 glossy)	UN 990050	I	not required
	impuls	alpine white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	1746/10-74
	future linear / solo / axcent / carat	studio white (RAL 9016) glossy	JZ-001.020 (50 x 50, glossy)	UN 990071	I	1746/10-84
	future linear	studio white (RAL 9016) matt	JZ-001.021 (50 x 50, matt)	UN 990100	I	1746/10-884
	alpha nea	studio white (RAL 9016) glossy	JZ-001.020 (50 x 50, glossy)	UN 990071	I	1746/10-24G
	alpha nea	studio white (RAL 9016) matt	JZ-001.021 (50 x 50, matt)	UN 990100	I	1746/10-24
 standard (without switch)	**Duro 2000 SI / SI Linear**	white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	1746-212-101
	future linear / solo / carat	ivory white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	1746/10-82
	alpha nea	ivory white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	1746/10-22G
	impuls	ivory white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	1746/10-72
	future linear NEW	aluminium silver / glossy	JZ-001.030 / BJ	UN 990108	I	1746/10-83
	future linear	anthracite / glossy	JZ-001.040 / BJ	UN 990109	I	1746/10-81

Type alre	Busch-Jaeger range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**Reflex SI / SI Linear**	alpine white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	1746-214-101
	Busch-balance SI	alpine white (RAL 9010) glossy	JZ-002.100 (55x55 glossy)	UN 990051	I	not required
	impuls	alpine white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	1746/10-74
	future linear / solo / axcent / carat	studio white (RAL 9016) glossy	JZ-002.020 (50 x 50, glossy)	UN 990072	I	1746/10-84
	future linear	studio white (RAL 9016) matt	JZ-002.021 (50 x 50, matt)	UN 990101	I	1746/10-884
	alpha nea	studio white (RAL 9016) glossy	JZ-002.020 (50 x 50, glossy)	UN 990072	I	1746/10-24G
 (ON / OFF switch, LED)	**alpha nea**	studio white (RAL 9016) matt	JZ-002.021 (50 x 50, matt)	UN 990101	I	1746/10-24
	Duro 2000 SI / SI Linear	white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	1746-212-101
	future linear / solo / carat	ivory white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	1746/10-82
	alpha nea	ivory white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	1746/10-22G
	impuls	ivory white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	1746/10-72

Type alre	Busch-Jaeger range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**Reflex SI / SI Linear**	alpine white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	1746-214-101
	Busch-balance SI	alpine white (RAL 9010) glossy	JZ-004.100 (55x55 glossy)	UN 990052	I	not required
	impuls	alpine white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	1746/10-74
	future linear / solo / axcent / carat	studio white (RAL 9016) glossy	JZ-004.020 (50 x 50, glossy)	UN 990073	I	1746/10-84
	future linear	studio white (RAL 9016) matt	JZ-004.021 (50 x 50, matt)	UN 990103	I	1746/10-884
	alpha nea	studio white (RAL 9016) glossy	JZ-004.020 (50 x 50, glossy)	UN 990073	I	1746/10-24G
 (H / C switch)	**alpha nea**	studio white (RAL 9016) matt	JZ-004.021 (50 x 50, matt)	UN 990103	I	1746/10-24
	Duro 2000 SI / SI Linear	white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	1746-212-101
	future linear / solo / carat	ivory white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	1746/10-82
	alpha nea	ivory white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	1746/10-22G
	impuls	ivory white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	1746/10-72

Type alre	Busch-Jaeger range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**Reflex SI / SI Linear**	alpine white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	1746-214-101
	Busch-balance SI	alpine white (RAL 9010) glossy	JZ-003.100 (55x55 glossy)	UN 990053	I	not required
	impuls	alpine white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	1746/10-74
	future linear / solo / axcent / carat	studio white (RAL 9016) glossy	JZ-003.020 (50 x 50, glossy)	UN 990074	I	1746/10-84
	future linear	studio white (RAL 9016) matt	JZ-003.021 (50 x 50, matt)	UN 990102	I	1746/10-884
	alpha nea	studio white (RAL 9016) glossy	JZ-003.020 (50 x 50, glossy)	UN 990074	I	1746/10-24G
 (triple switch, LED)	**alpha nea**	studio white (RAL 9016) matt	JZ-003.021 (50 x 50, matt)	UN 990102	I	1746/10-24
	Duro 2000 SI / SI Linear	white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	1746-212-101
	future linear / solo / carat	ivory white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	1746/10-82
	alpha nea	ivory white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	1746/10-22G
	impuls	ivory white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	1746/10-72

*) must be ordered from switch manufacturer or electronics wholesaler
For BJ future / solo there are also 55 x 55 insert frames (for the use of alre 55 x 55 cover set) – BJ item no. 1747-84 (studio white) and 1784-82 (ivory white)

Note: Busch-Jaeger central disc cannot be used with alre FTR.

Product finder for alre cover sets for switches from ELSO

Integration examples

FTR … in Joy

FTR … in Fashion

FTR … in Riva

FTR … in Scala

Type alre	Elso range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**Joy**	pure white (RAL 9010) glossy	JZ-001.100 (55x55 glossy)	UN 990050	I	not required
	Joy	pearl white (RAL 1013) glossy	JZ-001.110 (55x55 glossy)	UN 990060	I	not required
	Fashion / Riva / Scala	pure white (RAL 9010) glossy	JZ-001.000 (50x50 glossy)	UN 990035	I	203084
	Fashion / Riva / Scala	pearl white (RAL 1013) glossy	JZ-001.010 (50x50 glossy)	UN 990045	I	203080

standard (without switch)

Type alre	Elso range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**Joy**	pure white (RAL 9010) glossy	JZ-002.100 (55x55 glossy)	UN 990051	I	not required
	Joy	pearl white (RAL 1013) glossy	JZ-002.110 (55x55 glossy)	UN 990061	I	not required
	Fashion / Riva / Scala	pure white (RAL 9010) glossy	JZ-002.000 (50x50 glossy)	UN 990036	I	203084
	Fashion / Riva / Scala	pearl white (RAL 1013) glossy	JZ-002.010 (50x50 glossy)	UN 990046	I	203080

(ON / OFF switch, LED)

Type alre	Elso range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**Joy**	pure white (RAL 9010) glossy	JZ-004.100 (55x55 glossy)	UN 990052	I	not required
	Joy	pearl white (RAL 1013) glossy	JZ-004.110 (55x55 glossy)	UN 990062	I	not required
	Fashion / Riva / Scala	pure white (RAL 9010) glossy	JZ-004.000 (50x50 glossy)	UN 990037	I	203084
	Fashion / Riva / Scala	pearl white (RAL 1013) glossy	JZ-004.010 (50x50 glossy)	UN 990047	I	203080

(H / K switch)

Type alre	Elso range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**Joy**	pure white (RAL 9010) glossy	JZ-003.100 (55x55 glossy)	UN 990053	I	not required
	Joy	pearl white (RAL 1013) glossy	JZ-003.110 (55x55 glossy)	UN 990063	I	not required
	Fashion / Riva / Scala	pure white (RAL 9010) glossy	JZ-003.000 (50x50 glossy)	UN 990038	I	203084
	Fashion / Riva / Scala	pearl white (RAL 1013) glossy	JZ-003.010 (50x50 glossy)	UN 990048	I	203080

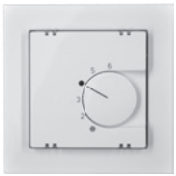
(triple switch, LED)

*) must be ordered from switch manufacturer or electronics wholesaler

Product finder for alre cover sets for switches from GIRA

Integration examples

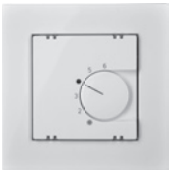
FTR … in Standard 55



FTR … in E2

FTR … in Event

FTR … in rocker switch



FTR … in E22

Type alre	Gira range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**Standard 55 / E2 / E22 / Event / Esprit**	pure white (RAL 9010) glossy	JZ-001.100 (55 x 55, glossy)	UN 990050	I	not required
	Standard 55 / E2 / E22 / Event / Esprit	pure white (RAL 9010) matt	JZ-001.101 (55 x 55, matt)	UN 990055	I	not required
	Rocker switch	pure white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	0282 112
	Standard 55 / Event / Esprit / ClassiX	cream white (RAL 1013) glossy	JZ-001.110 (55 x 55, glossy)	UN 990060	I	not required
	System 55 NEW	aluminium / matt	JZ-001.131 / GI	UN990110	I	not required
standard (without switch)	**System 55**	anthracite / matt	JZ-001.141 / GI	UN990111	I	not required

Type alre	Gira range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**Standard 55 / E2 / E22 / Event / Esprit**	pure white (RAL 9010) glossy	JZ-002.100 (55 x 55, glossy)	UN 990051	I	not required
	Standard 55 / E2 / E22 / Event / Esprit	pure white (RAL 9010) matt	JZ-002.101 (55 x 55, matt)	UN 990056	I	not required
	Rocker switch	pure white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	0282 112
(ON / OFF switch, LED)	**Standard 55 / Event / Esprit / ClassiX**	cream white (RAL 1013) glossy	JZ-002.110 (55 x 55, glossy)	UN 990061	I	not required

Type alre	Gira range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**Standard 55 / E2 / E22 / Event / Esprit**	pure white (RAL 9010) glossy	JZ-004.100 (55 x 55, glossy)	UN 990052	I	not required
	Standard 55 / E2 / E22 / Event / Esprit	pure white (RAL 9010) matt	JZ-004.101 (55 x 55, matt)	UN 990057	I	not required
	Rocker switch	pure white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	0282 112
(H / C switch)	**Standard 55 / Event / Esprit / ClassiX**	cream white (RAL 1013) glossy	JZ-004.110 (55 x 55, glossy)	UN 990062	I	not required

Type alre	Gira range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**Standard 55 / E2 / E22 / Event / Esprit**	pure white (RAL 9010) glossy	JZ-003.100 (55 x 55, glossy)	UN 990053	I	not required
	Standard 55 / E2 / E22 / Event / Esprit	pure white (RAL 9010) matt	JZ-003.101 (55 x 55, matt)	UN 990058	I	not required
	Rocker switch	pure white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	0282 112
(triple switch, LED)	**Standard 55 / Event / Esprit / ClassiX**	cream white (RAL 1013) glossy	JZ-003.110 (55 x 55, glossy)	UN 990063	I	not required

*) must be ordered from switch manufacturer or electronics wholesaler
**) for GIRA rocker switches, there are also 55 x 55 insert frames (for the use of alre 55 x 55 cover set) – GIRA item no. 0289 112 (pure white) and 0289 111 (cream white)

Product finder for alre cover sets for switches from JUNG

Integration examples

FTR … in AS 500

FTR … in A 500

FTR … in A plus

FTR … in A creation

FTR … in LS-design

Type alre	Jung range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**AS 500 / A 500 / A creation / A plus**	alpine white (RAL 9010) glossy	JZ-001.100 (55 x 55, glossy)	UN 990050	I	not required
	CD 500 / CD plus	alpine white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	CD 590 Z WW
	LS 990 / LS design / LS plus	alpine white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	LS 961 Z WW**
 standard (without switch)	**AS 500**	white (RAL 1013) glossy	JZ-001.110 (55 x 55, glossy)	UN 990060	I	not required
	CD 500 / CD plus	white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	590 Z
	LS 990 / LS design / LS plus	white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	LS 961 Z**
	Serie A NEW	aluminium / glossy	JZ-001.130 / JU	UN990112	I	not required
	Serie A	anthracite / matt	JZ-001.141 / JU	UN990113	I	not required

Type alre	Jung range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**AS 500 / A 500 / A creation / A plus**	alpine white (RAL 9010) glossy	JZ-002.100 (55 x 55, glossy)	UN 990051	I	not required
	CD 500 / CD plus	alpine white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	CD 590 Z WW
	LS 990 / LS design / LS plus	alpine white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	LS 961 Z WW**
 (ON / OFF switch, LED)	**AS 500**	white (RAL 1013) glossy	JZ-002.110 (55 x 55, glossy)	UN 990061	I	not required
	CD 500 / CD plus	white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	590 Z
	LS 990 / LS design / LS plus	white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	LS 961 Z**

Type alre	Jung range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**AS 500 / A 500 / A creation / A plus**	alpine white (RAL 9010) glossy	JZ-004.100 (55 x 55, glossy)	UN 990052	I	not required
	CD 500 / CD plus	alpine white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	CD 590 Z WW
	LS 990 / LS design / LS plus	alpine white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	LS 961 Z WW**
 (H / C switch)	**AS 500**	white (RAL 1013) glossy	JZ-004.110 (55 x 55, glossy)	UN 990062	I	not required
	CD 500 / CD plus	white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	590 Z
	LS 990 / LS design / LS plus	white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	LS 961 Z**

Type alre	Jung range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**AS 500 / A 500 / A creation / A plus**	alpine white (RAL 9010) glossy	JZ-003.100 (55 x 55, glossy)	UN 990053	I	not required
	CD 500 / CD plus	alpine white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	CD 590 Z WW
	LS 990 / LS design / LS plus	alpine white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	LS 961 Z WW**
 (triple switch, LED)	**AS 500**	white (RAL 1013) glossy	JZ-003.110 (55 x 55, glossy)	UN 990063	I	not required
	CD 500 / CD plus	white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	590 Z
	LS 990 / LS design / LS plus	white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	LS 961 Z**

*) must be ordered from switch manufacturer or electronics wholesaler
**) for the Jung LS series, there are also 55 x 55 insert frames (for the use of alre 55 x 55 cover set) – JUNG item no. LS 961 Z5 WW (alpine white) and LS 961 Z5 (white)

Product finder for alre cover sets for switches from MERTEN

Integration examples

FTR…in 1-M

FTR…in M-Smart

FTR…in M-Plan

FTR…in Artec

FTR…in Antik

Type alre	Merten range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.000#00 FTR 101.002#00 FTR 101.010#00 FTR 101.086#00 FTR 101.202#00 FTR 101.210#00	**1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ**	polar white (RAL 9010) glossy	JZ-001.100 (55 x 55, glossy)	UN 990050	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	polar white (RAL 9010) matt	JZ-001.101 (55 x 55, matt)	UN 990055	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	active white (RAL 9016) glossy	JZ-001.120 (55 x 55, glossy)	UN 990086	I	not required
	D-Life	lotos white (RAL 9010) glossy	JZ-001.020 (50 x 50, glossy)	UN 990071	I	MEG4500-6035
	System Design: Artec, Antik	polar white (RAL 9010) glossy	JZ-001.000 (50 x 50, glossy)	UN 990035	I	5160 99
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	white (RAL 1013) glossy	JZ-001.110 (55 x 55, glossy)	UN 990060	I	not required
	System Design: Artec, Antik	white (RAL 1013) glossy	JZ-001.010 (50 x 50, glossy)	UN 990045	I	5160 94
 standard (without switch)	**System M** NEW	aluminium / matt	JZ-001.131 / ME	UN 990116	I	not required
	System M	anthracite / matt	JZ-001.141 / ME	UN 990117	I	not required

Type alre	Merten range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.062#00 FTR 101.262#00	**1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ**	polar white (RAL 9010) glossy	JZ-002.100 (55 x 55, glossy)	UN 990051	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	polar white (RAL 9010) matt	JZ-002.101 (55 x 55, matt)	UN 990056	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	active white (RAL 9016) glossy	JZ-002.120 (55 x 55, glossy)	UN 990088	I	not required
	D-Life	lotos white (RAL 9010) glossy	JZ-002.020 (50 x 50, glossy)	UN 990072	I	MEG4500-6035
 (ON / OFF switch, LED)	**System Design: Artec, Antik**	polar white (RAL 9010) glossy	JZ-002.000 (50 x 50, glossy)	UN 990036	I	5160 99
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	white (RAL 1013) glossy	JZ-002.110 (55 x 55, glossy)	UN 990061	I	not required
	System Design: Artec, Antik	white (RAL 1013) glossy	JZ-002.010 (50 x 50, glossy)	UN 990046	I	5160 94

Type alre	Merten range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.065#00	**1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ**	polar white (RAL 9010) glossy	JZ-004.100 (55 x 55, glossy)	UN 990052	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	polar white (RAL 9010) matt	JZ-004.101 (55 x 55, matt)	UN 990057	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	active white (RAL 9016) glossy	JZ-004.120 (55 x 55, glossy)	UN 990089	I	not required
	D-Life	lotos white (RAL 9010) glossy	JZ-004.020 (50 x 50, glossy)	UN 990073	I	MEG4500-6035
 (H / C switch)	**System Design: Artec, Antik**	polar white (RAL 9010) glossy	JZ-004.000 (50 x 50, glossy)	UN 990037	I	5160 99
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	white (RAL 1013) glossy	JZ-004.110 (55 x 55, glossy)	UN 990062	I	not required
	System Design: Artec, Antik	white (RAL 1013) glossy	JZ-004.010 (50x50, glossy)	UN 990047	I	5160 94

Type alre	Merten range	Colour (RAL) / surface finish	alre cover set	Cover set Item no.	PG	insert frame 50 x 50 *
FTR 101.075#00	**1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ**	polar white (RAL 9010) glossy	JZ-003.100 (55 x 55, glossy)	UN 990053	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	polar white (RAL 9010) matt	JZ-003.101 (55 x 55, matt)	UN 990058	I	not required
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	active white (RAL 9016) glossy	JZ-003.120 (55 x 55, glossy)	UN 990090	I	not required
	D-Life	lotos white (RAL 9010) glossy	JZ-003.020 (50 x 50, glossy)	UN 990074	I	MEG4500-6035
 (triple switch, LED)	**System Design: Artec, Antik**	polar white (RAL 9010) glossy	JZ-003.000 (50 x 50, glossy)	UN 990038	I	5160 99
	1-M, Atelier-M / M-Smart, M-Pure, M-Plan, M-Creativ	white (RAL 1013) glossy	JZ-003.110 (55 x 55, glossy)	UN 990063	I	not required
	System Design: Artec, Antik	white (RAL 1013) glossy	JZ-003.010 (50 x 50, glossy)	UN 990048	I	5160 94

*) must be ordered from switch manufacturer or electronics wholesaler

Note: Merten central plates cannot be used with alre FTR.

Notes

Electronic room or floor temperature controller with timer HTRRUu

Flush-mounted installation – Design Berlin UP

Technical data

Design:	Berlin UP (flush-mounted)
Housing material:	PC, PMMA, ABS plastic
Operating voltage:	230 VAC, 50 Hz
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	pluggable screw terminals
Mounting / attachment:	in flush-mounted socket, can be adapted to fit virtually any switch range (deep flush-mounted socket recommended), see adaptation list on page 73
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching current:	10 (2) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	2300 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	230 VAC, 50 Hz
Sensor:	internal NTC, optional external floor sensor see accessories, optional external room sensor see sensors “Sensor 2”
Sensor rupture and short-circuit safeguarding:	If the internal or external sensor is faulty or the external sensor is not connected in the functions room temperature controller with floor monitoring, floor temperature controller or romm temperature controller with external sensor, emergency operation is triggered.
Control function:	heating
Control range:	5 … 30 °C (room) / 10 … 42 °C (floor)
Setting range:	The setting range varies, depending on the use of the controller as a room temperature controller (5 … 30 °C) or floor temperature controller (10 … 42 °C)
Hysteresis:	for room control < 1 K, for floor control < 2 K
Display type:	illuminated graphical display
Display:	setpoint, actual temperature / date, time; setpoint, actual temperature or date, time
Accessories:	terminal strips: VOOPL / VOOPD suitable valve actuators: ZBOOA-010.100

Application

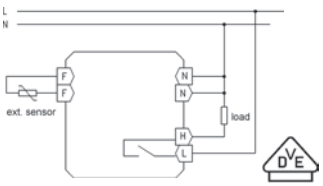
Flush-mounted controller for time-dependent single room or floor temperature control for electrical and hot water heating systems (normally closed actuators). The device can be used as a room temperature controller with internal or external sensor or, in combination with an optional remote sensor, also as a room temperature controller with floor monitoring or floor temperature controller. (Remote sensor is not a part of the scope of delivery)

This timer thermostat has a weekly timer with individually adjustable programs (factory setting: “normal” daily sequences.

Self-learning function: Automatic adjustment of the controller to the start of the heating period. The goal is to achieve the comfort temperature at the time that has been set. The learning function is disabled upon delivery, but it can be enabled.

Standby function: This function disables the control; frost protection is still ensured.

General features:
ECO function, ECO value adjustable; “ECO” display; “on / off” display; “heating” display; digital actual value display; backlighting; operating mode Standby with frost protection monitoring;
child-safe features; load setting; power reserve (approx. 5 days); actual value correction / measured value correction; learning function; valve protection;
holiday setting; party setting; external setting; intuitive operation by touch keys; VDE-tested
Special colours for projects on request.

Type / image	Item no.	Features	Circuit diagram	PG
HTRRUu-210.021#21 	UA 060000	Scope of delivery: controller, cover 50 x 50 mm, **pure white** (like RAL 9010), **glossy, alre frame** “Berlin”		I
HTRRUu-210.021#21 / 7 	UN060011	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **50 x 50** mm, **pure white** (like RAL 9010), **glossy, alre frame** “Berlin”, **external floor sensor** (HF-8 / 4-K2)		I
HTRRUu-210.021#07 	UA 060001	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **50 x 50** mm, **pure white** (like RAL 9010), **glossy,** without frame		I

Electronic room or floor temperature controller with timer HTRRUu

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
HTRRUu-210.021#09 	UA 060002	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **50 x 50** mm, **pearl white** (like RAL 1013), **glossy,** without frame		I
HTRRUu-210.021#27 	UA 060003	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **50 x 50** mm, **traffic white** (like RAL 9016), **glossy,** without frame		I
HTRRUu-210.021#28 	UA 060006	like HTRRUu-210.021#21, but with scope of delivery: controller, cover for use with **BUSCH-JAEGER Reflex SI / SI Linear pure white** (similar to RAL 9010), **glossy,** without frame		I
HTRRUu-210.021#55 	UA 060004	like HTRRUu-210.021#21, but with scope of delivery: Controller, cover **55 x 55** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
HTRRUu-210.021#56 	UA 060020	like HTRRUu-210.021#21, but with scope of delivery: Controller, cover 55 x 55 mm, **pure white** (like RAL 9010), **matt,** without frame		I
HTRRUu-210.021#57 	UA 060005	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **55 x 55** mm, **pearl white** (like RAL 1013), **glossy,** without frame		I
HTRRUu-210.021#59 	UA 060014	like HTRRUu-210.021#21, but with scope of delivery: controller, cover **55 x 55** mm, **traffic white** (like RAL 9016), **glossy,** without frame		I

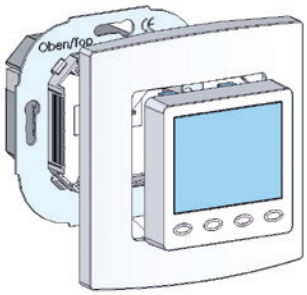
Accessories	Item no.	Features	PG
HF-8 / 4-K2 	G 8000370	**General features:** optional, external floor sensor **Ambient temperature:** – 5 … + 70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 4 m, PVC	II
HF-8 / 6-K2 	G 8000368	**General features:** optional, external floor sensor **Ambient temperature:** – 5 … + 70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 6 m, PVC	II
WP-01	G 9990180	**General features:** heat conduction paste 2 ml; R > 1 TΩ / cm, silicon-free **Ambient temperature:** – 40 … + 150 °C **Heat conductivity:** > 0.7 W / mK	II
THF 	C 1809515	**General features:** protective sleeve for screed mounting (for sleeve sensor HF Ø 7.7, for example, HF-8 / 4-K2 or HF-8 / 6-K2), copper	II
JZ-090.900 	VV 000025	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Housing material:** PC plastic	II

Electronic room or floor temperature controller with timer HTRRUu

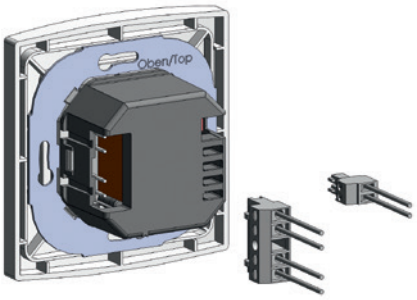
Flush-mounted installation – Design Berlin UP

Accessories	Item no.	Features	PG
JZ-090.910	VV 000010	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:**Berlin **Surface finish:** glossy **Housing colour:** pearl white like RAL 1013 **Housing material:** PC plastic	II

HTRRUu with alre frame “Berlin”



pluggable screw-type terminals



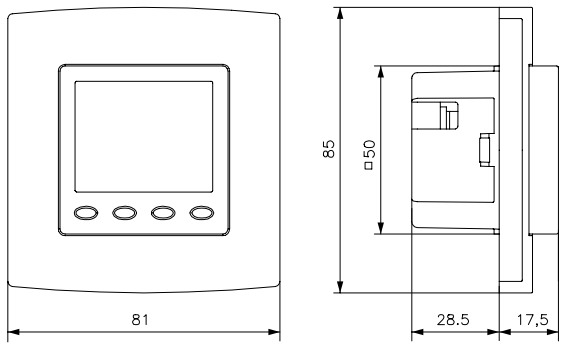
other benefits:

- Pluggable screw-type terminals facilitate quick and easy assembly
- Illuminated, graphics-capable display
- Choice of four different external floor sensors (2, 12, 15, 33 kOhm), thus also ideal for retrofitting
- VDE mark
- Automatic adjustment to standard/daylight savings time
- Learning function
- Correction of measurement values
- Configurable display content during installation, choice of various languages: German, English, French, Dutch, Polish, Spanish, Czech, Russian
- Limit setting for floor temperature
- Standby frost protection function
- Key lock
- Valve protection function
- Configurable control method (PI-PWM or 2-point control)
- Holiday and party function
- Power reserve
- “Heating operation” display (LED orange)
- Load setting for improved control

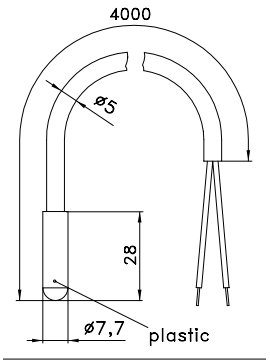
Factory setting:

- Holiday temperature 17 °C,
- Setback temperature 17 °C,
- Comfort temperature 20 °C,
- Comfort times: Mon – Fri 5 am – 9 am/4 pm – 10 pm, Sat/Sun 6 am – 10 pm
- Key lock disabled
- Automatic adjustment to standard/daylight savings time enabled
- Valve and pump protection disabled
- Learning function disabled
- Display lighting 10 s
- Heating load 0.1 kW
- 2-point control method
- External sensor
- 2 kOhm and max. floor temperature 42 °C (if configured as floor temperature controller)

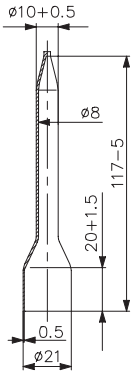
HTRRUu with alre frame “Berlin”



HF-8/4-K2



THF



Examples of integration in switches with or without insert frame

Adaptation of alre flush-mounted HTRRUu-210.021 controllers

Manufacturer	Range	Colour RAL 9010 (surface finish)	Adaptation in switch range “55 x 55” possible using…	“50 x 50” adaptation possible with… (insert frame from manufacturer required)
BERKER	S.1	polar white (matt)	HTRRUu-210.021#56	not required
BERKER	S.1	polar white (glossy)	HTRRUu-210.021#55	not required
BERKER	Arsys	polar white (glossy)		HTRRUu-210.021#07 + (1108 01 69)
BERKER	B.3	aluminium/polar white (matt)	HTRRUu-210.021#56	not required
BERKER	B.3	aluminium/polar white (glossy)	HTRRUu-210.021#55	not required
BERKER	B.7	glass/polar white (matt)	HTRRUu-210.021#56	not required
BERKER	B.7	glass/polar white (glossy)	HTRRUu-210.021#55	not required
BERKER	K.1	polar white (glossy)		HTRRUu-210.021#07 + (1108 71 09)
BUSCH-JAEGER	Reflex SI/SI Linear	alpine white (glossy)	HTRRUu-210.021#28	not required
BUSCH-JAEGER	Busch-balance SI	polar white (glossy)	HTRRUu-210.021#55	not required
BUSCH-JAEGER	impuls	alpine white (glossy)		HTRRUu-210.021#07 + (1746/10-74)
BUSCH-JAEGER	solo / future / axcent etc.	studio white – see RAL 9016 below		
ELSO	Joy	pure white (glossy)	HTRRUu-210.021#55	not required
ELSO	Fashion/Riva/Scala	pure white (glossy)		HTRRUu-210.021#07 + 203084
GIRA	rocker switch	pure white (glossy)		HTRRUu-210.021#07 + (0282 112)
GIRA (System 55)	Standard/E 2	pure white (semi-gloss)	HTRRUu-210.021#56	not required
GIRA (System 55)	Standard/E 2	pure white (glossy)	HTRRUu-210.021#55	not required
GIRA (System 55)	E 22	pure white (glossy)	HTRRUu-210.021#55	not required
GIRA (System 55)	Event	pure white (semi-gloss) + opaque…	HTRRUu-210.021#56	not required
GIRA (System 55)	Event	pure white (glossy) + opaque…	HTRRUu-210.021#55	not required
GIRA (System 55)	Esprit	pure white (semi-gloss) + glass, aluminium…	HTRRUu-210.021#56	not required
GIRA (System 55)	Esprit	pure white (glossy) + glass, aluminium…	HTRRUu-210.021#55	not required
GIRA	S-Color	pure white (high-gloss)		HTRRUu-210.021#07 + (0282 40)
JUNG	CD 500/CD plus	alpine white (glossy)		HTRRUu-210.021#07 + (CD 590 Z WW)
JUNG	A 500/AS 500/A plus	alpine white (glossy)	HTRRUu-210.021#55	not required
JUNG	LS 990	alpine white (glossy)		HTRRUu-210.021#07 + (LS 961 Z WW)
JUNG	LS plus	alpine white (glass)		HTRRUu-210.021#07 + (LS 961 Z WW)
JUNG	A creation	alpine white (glossy)	HTRRUu-210.021#55	not required
JUNG	LS Design	alpine white (glossy)		HTRRUu-210.021#07 + (LS 961 Z WW)
MERTEN (System M)	M-Smart, M-Plan, M-Pure	polar white (matt)	HTRRUu-210.021#56	not required
MERTEN (System M)	M-Smart, M-Plan, M-Creativ, M-Pure	polar white (glossy)	HTRRUu-210.021#55	not required
MERTEN (System Basis)	1-M/Atelier-M	polar white (glossy)	HTRRUu-210.021#55	not required
MERTEN (System Design)	Artec/Antik	polar white (glossy)		HTRRUu-210.021#07 + (5160 99)
MERTEN	1-M/M-Smart/M-Plan/M-Pure/D-Life	active white – see RAL 9016 below		
PEHA	Standard	pure white (glossy)		HTRRUu-210.021#07 + (80.670.02 ZV)
PEHA	Dialog	pure white (glossy)		HTRRUu-210.021#07 + (95.670.02 ZV)
PEHA	Aura	pure white (matt)/glass		HTRRUu-210.021#07 + (20.670.02 ZV)
PEHA	Badora	pure white (glossy)		HTRRUu-210.021#07 + (11.670.02 ZV)

Manufacturer	Range	Colour RAL 9016 (surface finish)	Adaptation in switch range “55 x 55” possible using…	“50 x 50” adaptation possible with … (insert frame from manufacturer required)
BUSCH-JAEGER	solo/future/future linear	studio white (RAL 9016, glossy)		HTRRUu-210.021#27 + (1746/10-84)
BUSCH-JAEGER	axcent	studio white (RAL 9016, glossy)		HTRRUu-210.021#27 + (1746/10-84)
BUSCH-JAEGER	carat (glass, bronze, gold)	studio white (RAL 9016, glossy)		HTRRUu-210.021#27 + (1746/10-84)
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016, glossy)		HTRRUu-210.021#27 + (1746/10-24G)
MERTEN	M-Smart, M-Plan, M-Pure	active white (RAL 9016, glossy)	HTRRUu-210.021#59	not required
MERTEN	1-M/Atelier-M	active white (RAL 9016, glossy)	HTRRUu-210.021#59	not required
MERTEN	D-Life	lotos white (RAL 9016)		HTRRUu-210.021#27 + MEG4500-6035
PEHA	Standard	arctic		HTRRUu-210.021#27 + (D 80.670 ZV AW)

*) During assembly, you need to remove four plastic tabs located at the rear of the frame

NOTE: Most light switch ranges are designed in the colour “like RAL 9010”, although different switch manufacturers have different designations for this colour. Coloured, glass and aluminium frames are also combined with white jacks or plugs so that controllers with white covers can also be integrated into these frames. Check the precise application in each individual case. The frames have different surface qualities (matt/glossy). For design reasons, the cover of the controller should have the same quality as the frame. We accept no liability for slight variations in colour and surface finish or for accuracy of fit. When installing devices into multi frames, always assemble the temperature controllers at the lowermost position.

“50 x 50 controller”: The housing covers of the 50 x 50 controllers are 50 x 50 mm in size. Using a 50 x 50-mm insert frame, the 50 x 50 controllers can be integrated into nearly all light switch ranges in accordance with DIN 49075. The 50 x 50-mm insert frames must be ordered from the light switch manufacturer or from a wholesaler. The order number of the insert frame corresponding to the switch range in question can be found in the column “For adaptation of size ‘50 x 50’ HTRRUu”.

“55 x 55 controller”: The housing covers of the 55 x 55 controllers are 55 x 55 mm in size. Many light switch ranges have inner dimensions of 55 x 55 mm. Therefore, the 55 x 55 controllers can be installed directly in the light switch frame without the use of an insert frame. See the column “Adaptation with switch range (55 x 55)” to determine whether the 55 x 55 controller fits in the given light switch range (HTRRUu-210.021#xx).

All information regarding switch manufacturers’ product lines and item numbers was last updated in 12/2017 | No liability is assumed for the information provided. | Technical specifications subject to change.
An adaptation list for RAL 1013 switch ranges is available from our website at www.alre.de.

Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating / tiled stove) HTRRB

Surface-mounted installation – Design Berlin 2000

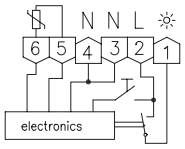
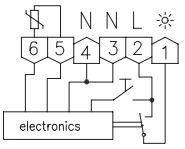
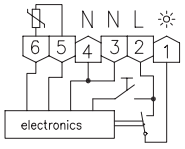
Technical data	
Design:	Berlin 2000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching current:	13 (2) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	3000 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	230 VAC, 50 Hz
Sensor:	external, NTC
Sensor rupture and short-circuit safeguarding:	heating is switched off
Control function:	heating
Hysteresis:	approx. 1 K
General features:	“heating” display: mechanical range limitation; 3000 W switching power for electric direct heating systems, natural stone heating; “on / off” switch; external setting

Application

Temperature control (e.g., of electrical heating systems) for floor, fringe zone, bathroom, ceiling, tiled stove, marble and wall heating systems or tempering systems.

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Floor temperature controller with timer: HTRRBu-110.021
Floor temperature controller for distributor assembly:
ITR 79 series (plant engineering)

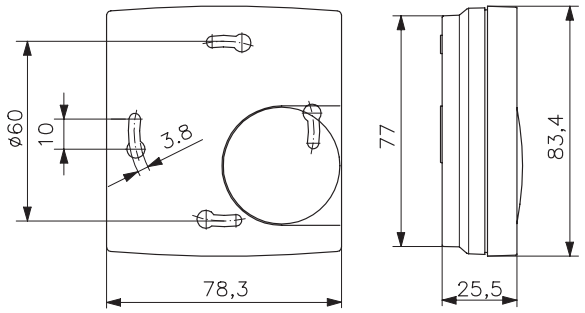
Type / image	Item no.	Features	Circuit diagram	PG
HTRRB-010.310 	DA 400003	**General features:** Floor temperature controller with remote sensor HF-8 / 4-K2 4 m **Control range:** 10 … 42 °C **Operating elements:** Multi-digit display 1 … 4		I
HTRRB-011.010 	DA 400000	**General features:** Floor temperature controller with remote sensor HF-8 / 4-K2 4 m, multi-digit display 1 … 6 **Control range:** 10 … 60 °C		I
HTRRB-011.410 	DA 400100	**General features:** tiled stove surface temperature controller with remote sensor HF-5 / 4-K3 4 m; scale: degrees Celsius; threshold arrow **Control range:** 20 … 80 °C		I

Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating / tiled stove) HTRRB

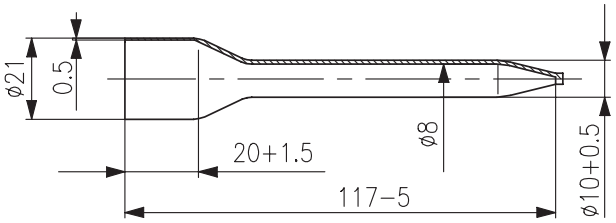
Surface-mounted installation – Design Berlin 2000

Accessories	Item no.	Features	PG
HF-8/4-K2 	G 8000370	**General features:** Spare sensor for HTRRB-010.310, HTRRB-011.010 **Ambient temperature:** –5…+70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 4 m, PVC	II
HF-8/6-K2 	G 8000368	**General features:** Spare sensor for HTRRB-010.310, HTRRB-011.010 **Ambient temperature:** –5…+70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 6 m, PVC	II
HF-5/4-K3 	D 4771304	**General features:** Spare sensor for HTRRB-011.410 **Ambient temperature:** –50…+150 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 4 m, silicone, H05SS-F <VDE> 2x0.75 mm²	I
WP-01	G 9990180	**General features:** Heat conduction paste 2 ml; R > 1 TΩ/cm, silicon-free Heat conductivity: > 0.7 W/mK **Ambient temperature:** –40…+150 °C	II
THF 	C 1809515	**General features:** protective sleeve for screed mounting (for sleeve sensor HF Ø 7.7, for example, HF-8/4-K2 or HF-8/6-K2), copper	II

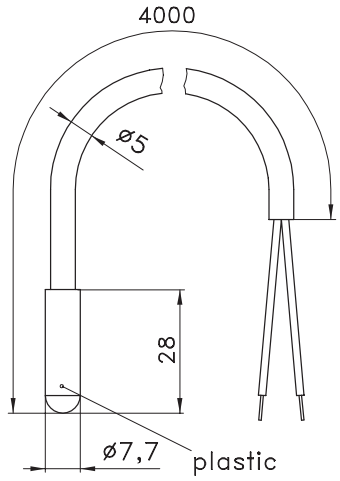
HTRRB



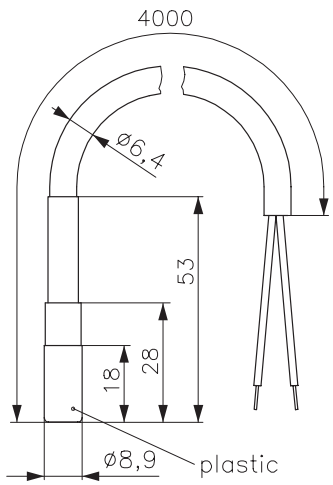
THF



HF-8/4-K2



HF-5/4-K3



Electronic floor or surface temperature controller with timer and remote sensor (for floor heating / wall and ceiling heating) HTRRBu

Surface-mounted installation – Design Berlin 3000

Technical data

Design:	Berlin 3000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	– 20 … + 70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.5 … 1.5 mm²
Mounting / attachment:	Surface- / wall-mounting or by means of adapter plate on flush-mounted socket
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching current:	heating (terminal 4) 13 (2) A, timer output (terminal 3) 100 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	terminal 4: 3000 W, terminal 3: 23 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	switching (230 VAC, 50 Hz)
Sensor:	external, NTC
Control function:	heating
Control range:	10 … 42 °C
Hysteresis:	approx. 1 K
Display type:	symbol display
Output “temperature reduction”:	switching (230 VAC, 50 Hz), for pilot function

Application

Time-dependent temperature control (for example, of electrical heating systems) for floor, fringe zone, bathroom, ceiling, tiled stove, marble and wall heating systems or tempering systems.

It can be used as a master (pilot regulator) for the temperature reduction of other controllers. Controllers of the series FETR, FTR and RTBSB are suitable as slaves (satellite controllers).

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Programming procedures for every day, familiar from mechanical timers, by means of “electronic tabs”. Shortest switching time 15 min.

General features:
Pilot function; ECO function; ECO value adjustable; display “ECO”; display “On / Off”; display “Heating”; child-safe features; power reserve (approx. 4 – 7 days); learning function; valve protection; holiday setting; party setting; automatic adjustment to standard / daylight savings time; mechanical range limitation; reduction / comfort / automatic button; external setting; operation using direct-dial buttons; on / off button; information button; party function button; holiday setting button

Type / image	Item no.	Features	Circuit diagram	PG
HTRRBu-110.021	MA 600400	with backlighting		I

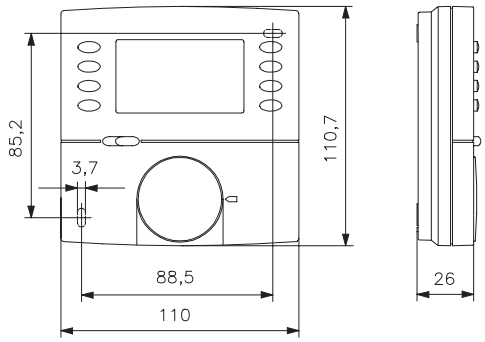
Accessories: terminal strips: VOOPL / VOOPD, suitable valve actuators: ZBOOA-010.100

Electronic floor or surface temperature controller with timer and remote sensor (for floor heating / wall and ceiling heating) HTRRBu

Surface-mounted installation – Berlin 3000

Accessories	Item no.	Features	PG
JZ-17 	MN 990001	**General features:** adapter plate for mounting devices on flush-mounted sockets (including fastening screws for mounting the controller to the adapter plate) **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic	II
HF-8/4-K2 	G 8000370	**General features:** spare sensor for HTRRBu-110.017, HTRRBu-110.021 **Ambient temperature:** –5 … +70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 4 m, PVC	II
HF-8/6-K2 	G 8000368	**General features:** spare sensor for HTRRBu-110.017, HTRRBu-110.021 **Ambient temperature:** –5 … +70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 6 m, PVC	II
WP-01	G 9990180	**General features:** heat conduction paste 2 ml; R > 1 TΩ/cm, silicon-free **Ambient temperature:** –40 … +150 °C	II
THF 	C 1809515	**General features:** protective sleeve for screed mounting (for sleeve sensor HF Ø 7.7, for example, HF-8/4-K2 or HF-8/6-K2), copper	II

HTRRBu-110.XXX

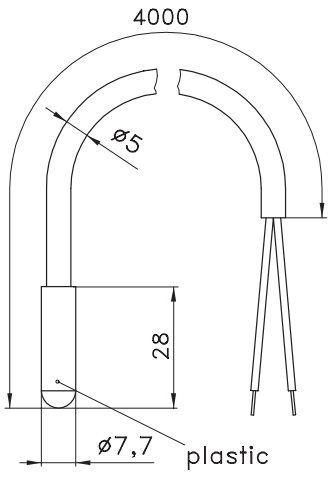


JZ-17

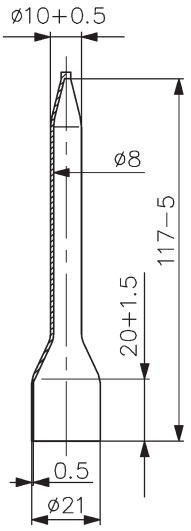
Factory setting:

- Setback temperature 1.7 °C
- Continuous time display
- Programme display using switching segments enabled
- Child-safe features disabled
- Automatic adjustment to standard/daylight savings time enabled
- Valve and pump protection disabled
- Learning function disabled
- Comfort times:
  Mon–Fri 5 am–9 am/4 pm–10 pm,
  Sat/Sun 6 am–10 pm
- Sensor rupture and short-circuit safeguarding:
  In case of a sensor rupture or sensor short-circuit, the heating is activated with a power-on time of 30% to prevent cooling or frost damage in the room. Temperatures below –20 °C are also evaluated as sensor rupture, and the emergency function is triggered.

HF-8/4-K2



THF



Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating) FETR

Flush-mounted installation – Design Berlin UP

Technical data

Design:	Berlin UP (flush-mounted)
Housing material:	PC plastic
Operating voltage:	230 VAC, 50 Hz
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	in flush-mounted socket (deep flush-mounted socket recommended), adaptable with cover set 50 x 50 mm or 55 x 55 mm in almost all switch ranges
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	NO contact
Output signal:	switching (230 VAC, 50 Hz)
Sensor:	external or internal / external (monitors)
Sensor type (external):	HF-8 / 4-K2
Sensor rupture and short-circuit safeguarding:	heating is switched off
Sensor wire extendable up to:	50 m with min. 0.5 mm² double-insulated
Control function:	heating
Hysteresis:	< 1 K
General features:	ECO function; “reduction” display; “heating” display
Input “temperature reduction”:	approx. 5 K (230 VAC, 50 Hz)

Application

Temperature control (e.g., of electrical heating systems) for floor, fringe zone, bathroom, ceiling, tiled stove, marble and wall heating systems or tempering systems, direct floor heating systems.

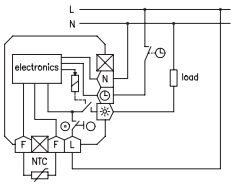
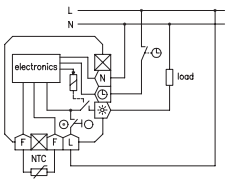
Reduction: With these flush-mounted controllers, the temperature can be reduced by 5 K. For this purpose, potential is applied to the timer input terminal by an external pilot controller or an external timer L1.

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry alternating currents is not admissible.

The 55 x 55-mm variants visually fit perfectly without an insert frame in many switch ranges of 55 x 55 mm.

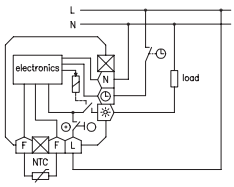
Using an insert frame, the 50 x 50-mm variants fit in almost all switch ranges.

Overview of possible combinations and insert frames on page 62.

Type / image	Item no.	Features	Circuit diagram	PG
FETR 101.700#07 	UN 030000	**General features:** floor temperature controllers; internal setting; multi-digit display 1 … 6 **Ambient temperature:** 0 … 40 °C **Max. switching current:**16 (2) A **Switching power:** 3680 W **Control range:** 10 … 60 °C **Scope of delivery:** controller, remote sensor 4 m, cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FETR 101.715#00 	UA 030119	**General features:** floor temperature controller; mechanical range limitation; **on / off switch;** external setting; protective cap; contact hazard protection cover plate; multi-digit display 1 … 5 **Ambient temperature:** 0 … 40 °C **Max. switching current:**16 (2) A **Switching power:** 3680 W **Control range:** 10 … 50 °C **Scope of delivery:** controller, remote sensor 4 m Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-005.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-005.000 cover set 55 x 55 mm, pure white, glossy: JZ-005.100		I

Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating) FETR

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
FETR 101.715#21 	UN 030109	like FETR 101.715#00, but with scope of delivery: controller, remote sensor 4 m, alre frame “Berlin” (neutral), cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
FETR 101.716#00 	UA 030502	like FETR 101.715#00, but control range 0 … 42 °C (multi-digit display 1 … 4) Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-009.xxx, e.g.:** cover set 50 x 50 mm, pure white, glossy: JZ-009.000 cover set 55 x 55 mm, pure white, glossy: JZ-009.100 Complete device with alre frame “Berlin” (neutral) incl. 50 x 50 mm cover (pure white, similar to RAL 9010, glossy) available on request.		I
FETR 101.745#00 	UA 030412	**General features:** room temperature controller with floor monitoring; mechanical range limitation; multi-digit display *… 6; **on / off switch;** external setting; protective cap; contact hazard protection cover plate **Ambient temperature:** 0 … 30 °C **Max. switching current:** 10 (1.5) A **Switching power:** 2300 W **Control range:** 5 … 30 °C (room), 20 … 60 °C (internal scale for limiting the floor temperature) **Scope of delivery:** controller, remote sensor 4 m Cover sets are offered in various designs (see the separate overview, “alre flush-mounted range (cover sets)”) and are not included in the delivery. **Suitable set no: JZ-006.xxx, for example:** cover set 50 x 50 mm, pure white, glossy: JZ-006.000 cover set 55 x 55 mm, pure white, glossy: JZ-006.100 Complete device with alre frame “Berlin” (neutral) incl. 50 x 50 mm cover (pure white, similar to RAL 9010, glossy) available on request.		I

Accessories	Item no.	Features	PG
HF-8 / 4-K2 	G 8000370	**General features:** spare sensor for FETR 101.7xx **Ambient temperature:** – 5 … + 70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 4 m, PVC	II
HF-8 / 6-K2 	G 8000368	**General features:** spare sensor for FETR 101.7xx **Ambient temperature:** – 5 … + 70 °C **Protection rating:** IP 65 **Sensor:** NTC **Connecting cable:** 6 m, PVC	II
WP-01	G 9990180	**General features:** heat conduction paste 2 ml; R > 1 TΩ / cm, silicon-free **Ambient temperature:** – 40 … + 150 °C	II
THF 	C 1809515	**General features:** protective sleeve for screed mounting (for sleeve sensor HF Ø 7.7, for example, HF-8 / 4-K2 or HF-8 / 6-K2), copper	II

Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating) FETR

Flush-mounted installation – Design Berlin UP

Accessories	Item no.	Features	PG
JZ-090.900 	VV 000025	**General features:** alre frame "Berlin" (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:**Berlin **Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Housing material:** PC plastic	I
JZ-090.910	VV 000010	**General features:** alre frame "Berlin" (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:**Berlin **Surface finish:** glossy **Housing colour:** pearl white like RAL 1013 **Housing material:** PC plastic	I

alre flush-mounted range (cover sets)

all basic types and suitable cover sets **50 x 50 mm**

Basic type	Cover set 50 x 50 mm **pure white (RAL 9010) glossy** (JZ-xxx.000)		Cover set 50 x 50 mm **pure white (RAL 9010) matt** (JZ-xxx.001)		Cover set 50 x 50 mm **pearl white (RAL 1013) glossy** (JZ-xxx.010)		Cover set 50 x 50 mm **traffic / studio white (RAL 9016) glossy** (JZ-xxx.020)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	
FETR 101.715#00	JZ-005.000	UN 990003	JZ-005.001	UN 990006	JZ-005.010	UN 990009	JZ-005.020	UN 990075	I
FETR 101.716#00	JZ-009.000	UN 990004	JZ-009.001	UN 990007	JZ-009.010	UN 990010	JZ-009.020	UN 990076	I
FETR 101.745#00	JZ-006.000	UN 990005	JZ-006.001	UN 990008	JZ-006.010	UN 990011	JZ-006.020	UN 990077	I

Basic type	Cover set 50 x 50 mm **traffic white (RAL 9016) matt** (JZ-xxx.021)		PG
	Cover set	Item no.	
FETR 101.715#00	JZ-005.021	UN 990104	I
FETR 101.716#00	JZ-009.021	UN 990106	I
FETR 101.745#00	JZ-006.021	UN 990105	I

In flush-mounted socket, it can be adapted to fit virtually any switch range.

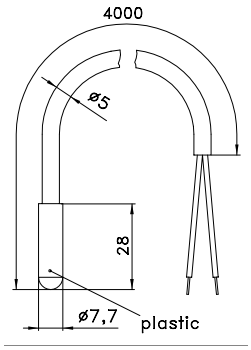
all basic types and suitable cover sets **55 x 55 mm**

Basic type	Cover set 55 x 55 mm **pure white (RAL 9010) glossy** (JZ-xxx.100)		Cover set 55 x 55 mm **pure white (RAL 9010) matt** (JZ-xxx.101)		Cover set 55 x 55 mm **pearl white (RAL 1013) glossy** (JZ-xxx.110)		Cover set 55 x 55 mm **traffic / studio white (RAL 9016) glossy** (JZ-xxx.120)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	
FETR 101.715#00	JZ-005.100	UN 990012	JZ-005.101	UN 990015	JZ-005.110	UN 990018	JZ-005.120	UN 990091	I
FETR 101.716#00	JZ-009.100	UN 990013	JZ-009.101	UN 990016	JZ-009.110	UN 990019	JZ-009.120	UN 990092	I
FETR 101.745#00	JZ-006.100	UN 990014	JZ-006.101	UN 990017	JZ-006.110	UN 990020	JZ-006.120	UN 990093	I

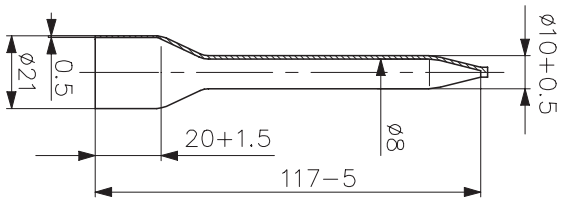
Electronic floor or surface temperature controller with remote sensor (for floor heating / wall and ceiling heating) FETR

Flush-mounted installation – Design Berlin UP

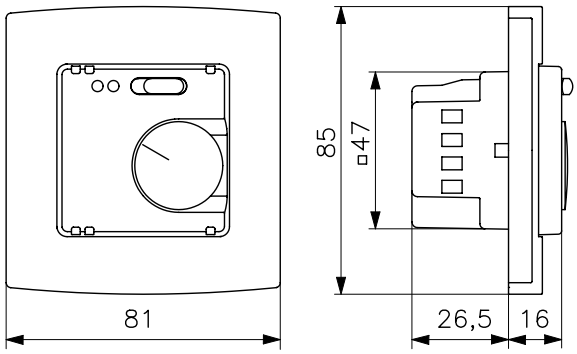
HF-8/4-K2



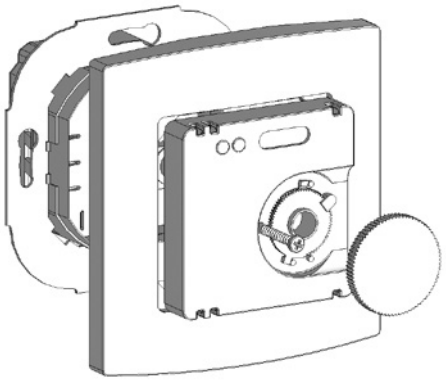
THF



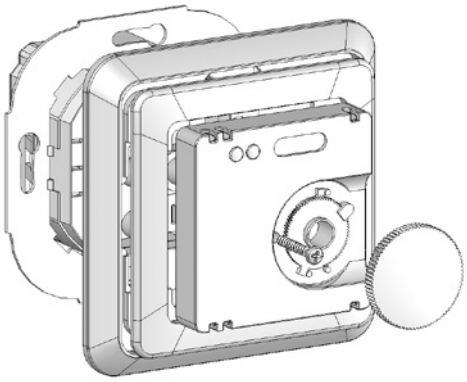
FETR with alre frame “Berlin” (#21 types)



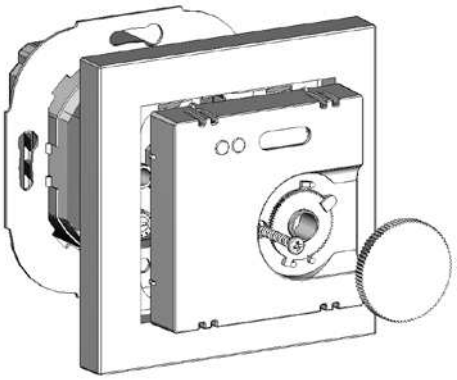
alre frame “Berlin” (#21 types)



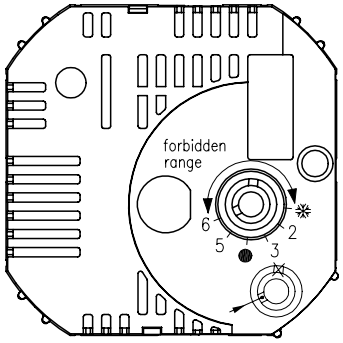
with 50 x 50-mm insert frame



without 55 x 55-mm insert frame



Contact hazard protection cap with setting range (for FETR 101.700 with internal setting – similar to illustration)



Electrothermal valve actuators

for heating, ventilation and air conditioning technology

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PC plastic, GF (20%)
Ambient temperature:	0…50 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Mounting/attachment:	M 30 x 1.5
Protection rating:	IP 42
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Average power consumption:	approx. 3 W
Opening/closing time:	approx. 4 min
Nominal stroke:	3 mm
Function type:	normally closed
Nominal closing force:	90 N
Connecting cable:	0.8 m/2 x 0.5 mm²
Valve position indicator:	2X (at the top and the side)

Application

Extremely compact design:
Can be fitted quickly and comfortably thanks to the slim shape in the area around the fastening nut.

Can be fitted in any position:
Lateral drainage holes carry off any leakage water that from the valve plunger into the open, thus avoiding damage to the drive.

Additional valve monitoring:
Two additional viewing windows at the side allow users to visually check the respective valve position with ease; this does not work when mounted in a suspended manner.

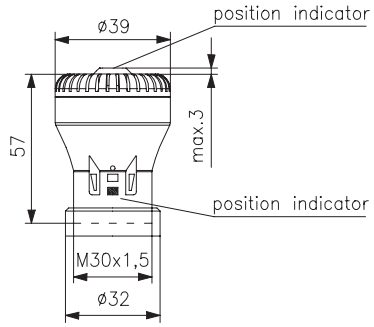
Type/image	Item no.	Features	PG
ZBOOA-010.100 	H 9100010	**Operating voltage:** 230 V~, 50 Hz **Max. power consumption:** 70 W **Max. starting current:** approx. 0.3 A	I
ZBOOA-040.100 	H 9100000	**Operating voltage:** 24 VDC or 24 VAC **Max. power consumption:** 12 W **Max. starting current:** approx. 0.5 A	I

Thanks to their M 30 x 1.5 fastening and their characteristics (normally closed), the actuators are suitable for the following valve and distributor makes: Beulco, Empur, Heimeier, Kamo, Purmo, SBK, SKV, Strawa, Taconova, Watts

Brief description:
The drive features a compact, space-saving design.
The device can be mounted easily thanks to the narrowed shape, especially in the fastening area of the nut.
The fastening cable is not located near the fastening nut. This reduces the probability of contact with equipment carrying hot water.
Since the fastening nut allows continuous screwing onto the thread, by unscrewing the nut by two or three turns, it is possible to open the valve in an electrically de-energised state – something that cannot be done with bayonet couplings and impulse couplings.
Discharged water is dissipated via a draining system.
Gaskets are not required thanks to the careful design.

The double position display has the following advantages:
The upper display provides the option of a visual or, in conditions of bad visibility, tactile function test of the drive.
The lower viewing window allows an additional check to determine whether the valve to be actuated follows the lifting movement of the drive.
At the beginning of the heating period, it can sometimes happen that the valve plungers get “stuck”. Therefore, with the additional display, it is possible to determine whether the cause lies with the actuator or with the valve in the event the valve does not open. However, that is not possible when mounted in a suspended manner.

Valve actuator



Valve actuator with extended push rod

Terminal strip for heating manifold

for 5 or 8 room thermostats

Technical data

Surface finish:	matt
Housing colour:	light grey, like RAL 7035
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz or 24 VAC, 50 Hz (only usable without pump module WUSRE)
Ambient temperature:	–10…+50 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	spring-cage terminals 0.2 mm² to 1.5 mm²; if end sleeves are used, 0.25 mm² to 0.75 mm²
Mounting / attachment:	Surface / wall mounting with 4 fastening screws included in delivery or using optional JZ-24 magnetic fastening set
Protection class:	II, if properly mounted
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz, only usable without pump module (WUSRE)
Control function:	heating or cooling

Application

Wiring strip for heating controllers with or without ECO function, also for heating / cooling controllers with integrated heating / cooling switch, and for use with “normally closed” valve actuators.

If timer regulators are used, up to 3 master-slave time zones can be defined.

As soon as a channel registers a heating request, the optional pump module is switched on.

Type / image	Item no.	Features	PG
VOOPL-215.000 	DA 480500	**General features:** terminal strip in housing for wiring up to 5 room thermostats and up to 20 actuators, up to 4 actuators per channel are possible, T4A / 250 V device fuse, installation dimensions Ø 5 x 20 mm (also secures the circuits of the connected controllers, the pump and the valve gears) **Protection rating:** IP 20	I
VOOPD-215.000 	DA 480200	like VOOPL-215.000, but with protection rating: IP 65	I
VOOPL-318.000 	DA 480400	**General features:** terminal strip in housing for wiring up to 8 room thermostats and up to 32 actuators, up to 4 actuators per channel are possible, T6,3A / 250 V device fuse, installation dimensions Ø 5 x 20 mm (also secures the circuits of the connected controllers, the pump and the valve gears) **Protection rating:** IP 20	I
VOOPD-318.000 	DA 480300	like VOOPL-318.000, but with protection rating: IP 65	I
WUSRE-212.100 	DA 800000	**General features:** plug-in pump module for 5-channel terminal strip VOOPx-215.000, energy saving because pump switches on only when needed **Protection rating:** IP 00, after installation the protection class of the terminal strip is decisive **Max. switching current:** 0.78 A **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 180 W **Switching element:** relay **Switching contact:** NO contact **Control function:** The pump output of the terminal strip is activated by the pump module every time there is a heating or cooling request without a switch-on or switch-off delay.	I

Terminal strip for heating manifold

for 5 or 8 room thermostats

Type / image	Item no.	Features	PG
WUSRE-213.100 	DA 800100	**General features:** plug-in pump module for 8-channel terminal strip VO-OPx-318.000, energy saving because pump switches on only when needed **Protection rating:** IP 00, after installation the protection class of the terminal strip is decisive **Max. switching current:** 0.78 A **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 180 W **Switching element:** relay **Switching contact:** NO contact **Control function:** The pump output of the terminal strip is activated by the pump module every time there is a heating or cooling request without a switch-on or switch-off delay.	I

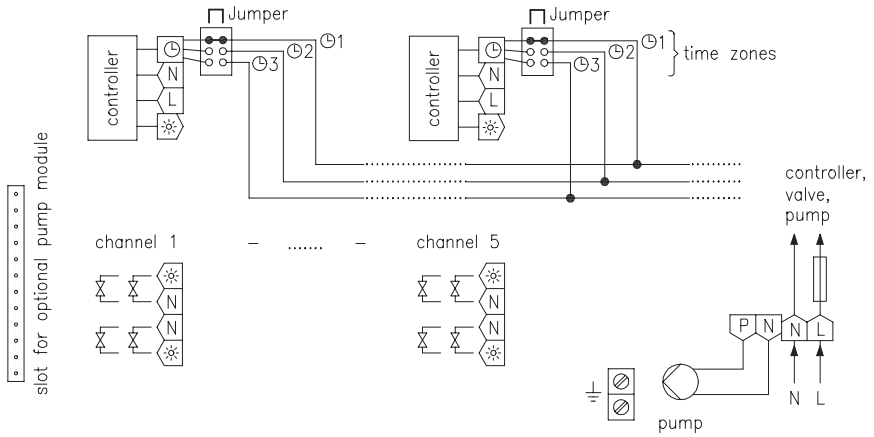
other / similar items: VOORL terminal strip for heating and cooling
Accessories: suitable ZBOOA valve actuators

It is permissible to connect an operating voltage of 24 V AC as well as to use controllers and electrothermal valve actuators with an operating voltage of 24 V AC at the VOOPx wiring strips. Connect the 24 V AC power supply to terminals L and N.

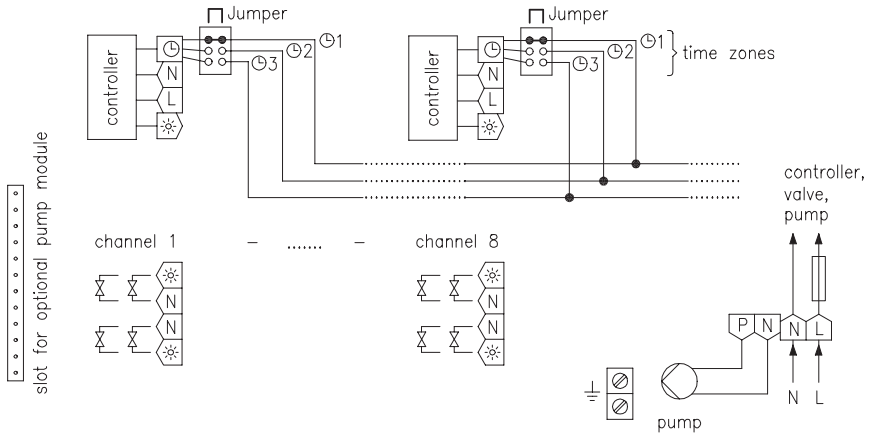
Note that the optional WUSRE pump modules are not suitable for operation at 24 V AC and may thus not be used.

Accessories	Item no.	Features	PG
JZ-24 	BN 990002	**General features:** magnetic fastening set for simple and safe fastening of the terminal strip on a metallic underground (for example, heating manifold)	II

VOOPx-215.000



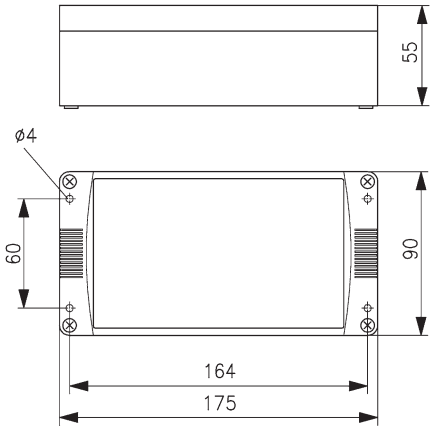
VOOPx-318.000



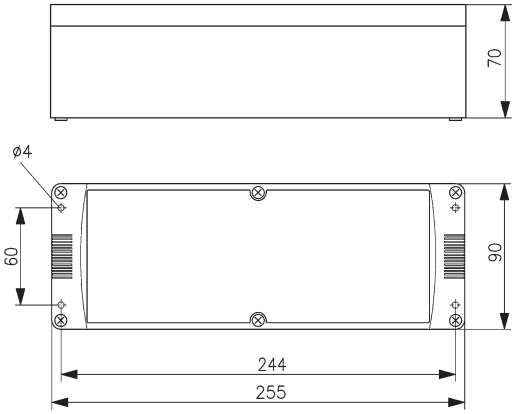
Terminal strip for heating manifold

for 5 or 8 room thermostats

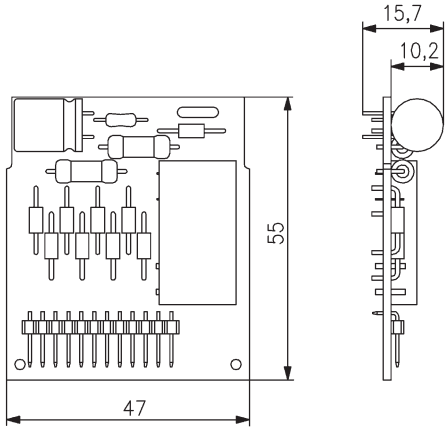
VOOPx-215.000



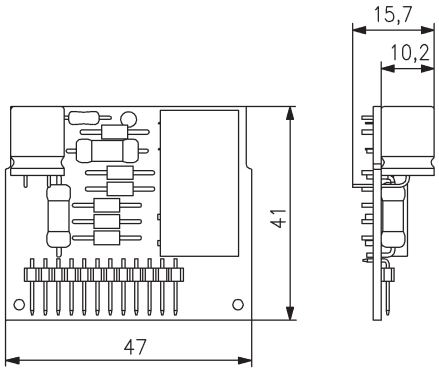
VOOPx-318.000



WUSRE-213.100



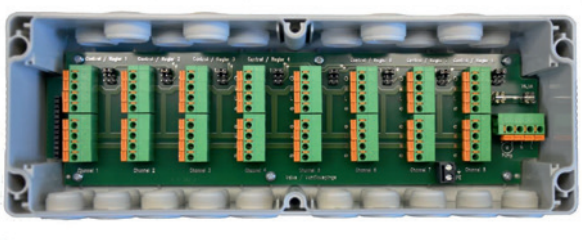
WUSRE-212.100



VOOPL-215.000 (IP 20)

VOOPD-215.000 (IP 65)

Internal view VOOPD-318.000 (IP 65)



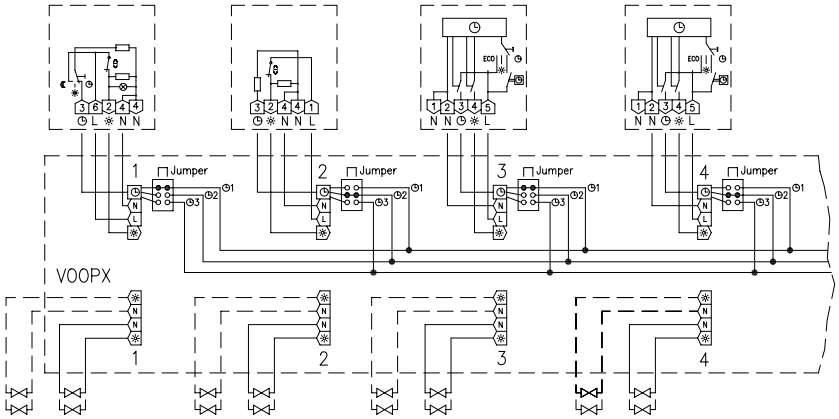
Notes and examples of wiring for VOOPx terminal strips

1 Heating system with master-slave time zones

Office	Children's room	Living room	Bedroom
RTBSB-201.075/ FTR 101.075 (slave time zone 1)	RTBSB-201.002/ FTR 101.002 (slave time zone 2)	HTRRBu 110.121 (master time zone 1)	HTRRBu 110.121 (master time zone 2)

The controllers, valve actuators and pump are supplied with power via the wiring strip.

The equipment and features of the individual controller types can be found in the controller matrix on page 38. The information listed in this matrix applies for normally closed valve actuators.



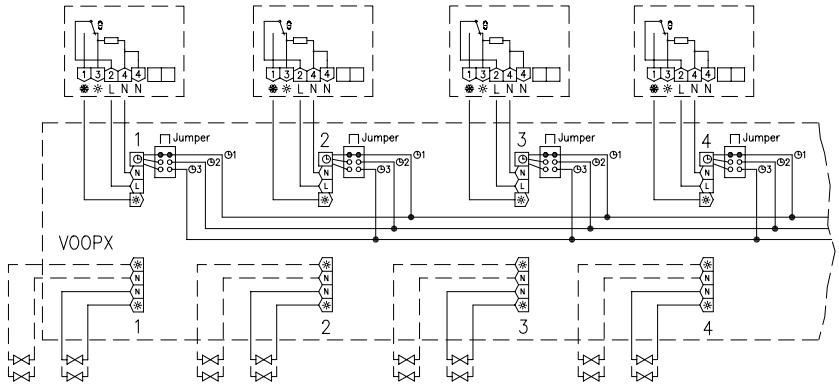
Jumpers for master and corresponding slaves must always be plugged into the same time zone. No specific sequence needs to be observed.

2 Cooling system

Office	Children's room	Living room	Bedroom
RTBSB-201.010/ FTR 101.010	RTBSB-201.010/ FTR 101.010	RTBSB-201.010/ FTR 101.010	RTBSB-201.010/ FTR 101.010

The controllers, valve actuators and pump are supplied with power via the wiring strip.

The equipment and features of the individual controller types can be found in the controller matrix on page 38. The information listed in this matrix applies for normally closed valve actuators.

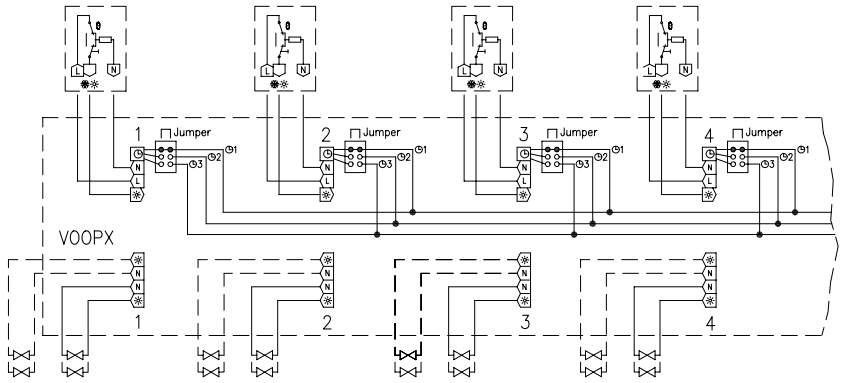


3 Heating/cooling systems with heating/cooling switches at the controllers

Office	Children's room	Living room	Bedroom
RTBSB-201.065/ FTR 101.065	RTBSB-201.065/ FTR 101.065	RTBSB-201.065/ FTR 101.065	RTBSB-201.065/ FTR 101.065

The controllers, valve actuators and pump are supplied with power via the wiring strip.

The equipment and features of the individual controller types can be found in the controller matrix on page 38. The printing on the heating/cooling changeover switches on the FTR 101.065 applies to normally closed valve actuators. The medium status "hot" or "cold" must always correspond to the switch settings.



AIR-CONDITIONING TECHNOLOGY

When it gets too hot,
you can rely on our help.

AIR CONDITIONING
The perfect climate for your comfort.




Office buildings, hotel rooms and living rooms require efficient control technology for the perfect climate. The key parameters in this context are temperature, humidity and air quality. The optimum combination of these provides an ambient temperature tailored to individual needs.

Safe and comfortable operation is what sets our controllers apart. Our devices offer numerous additional functions to continue to control the temperature in an economical and environmentally friendly manner–also in the evening and at night. This means that any energy not required is saved, which reduces the impact on the environment and your wallet.

Comfort thanks an ideal indoor climate.

Air conditioning overview:
Climate controllers

Dew point monitoring

Hygrostats / Hygro-thermostats

Terminal strips for heating / cooling manifold / valve actuators

Climate controller overview

	Type	KTRTB-211.108	KTRTB-251.108	KTBSB-112.000	KTBSB-113.500	KTRRB-112.070	KTRRB-117.128	KTRRB-117.163	KTRRB-117.169	KTRRB-042.211	KTRRB-040.112	KTRRB-040.213	KTRRB-052.244	KTRRB-052.245	KTRRU-052.244	KTRRU-052.245	KTRRUu-217.456	KTRRUu-257.456	KTRVB-048.100	KTRVB-048.200	KTRVB-042.100	KTRVB-042.205	KTRVB-042.206	KTRVB-042.207	KTRVB-040.209	KTRVB-052.244	KTRVB-052.245	PTR 02.802
	Page	91	91	92	92	92	94	94	94	97	96	96	97	97	99	100	103	105	110	110	109	109	110	110	109	111	111	112
Housing design	Berlin 1000	x	x																									
	Berlin 2000									x	x	x	x	x					x	x	x	x	x	x	x	x	x	
	Berlin 3000			x	x	x	x	x	x																			
	Berlin flush-mounted kit														x	x	x	x										
	Pikolo																											x
Sensor	Bimetal (toggler)			x	x	x																						x
	NTC internal	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x		
	NTC external						x	x	x				x	x	x	x	x	x						x		x	x	
	Floor monitor (NTC)																											
	Dew point sensor (external)									x	x	x	x	x	x	x	x	x								x	x	
Control type	Cooling controller with fan output																											
	Climate controllers	x	x							x	x	x																
	Climate controller (0 ... 10 V)								x								x	x			x	x	x	x	x	x	x	
	Climate controller with fan output			x	x												x	x										x
	Climate controller with neutral zone							x		x			x	x	x	x	x	x								x	x	
	Climate controller with neutral zone and fan output					x	x		x								x	x										
	Mixing chamber controller (0 ... 10 V)																		x	x								
Pipe system	Air conditioning controller as a 2-pipe system	x	x		x		x	x	x		x	x	x	x	x	x	x	x							x	x	x	x
	Air conditioning controller as a 4-pipe system			x		x	x	x	x	x			x	x	x	x	x	x			x	x	x	x		x	x	
Application examples	Hot water floor heating												x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Fan coil			x	x	x	x		x																			x
	Air distribution systems			x		x	x																					x
	Partial air conditioner	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Cooling ceiling	x	x							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
	Heat pump				x																							
	AC split unit				x																							x
Features	Input “ECO”	x	x				x	x	x		x	x	x	x	x	x	x	x				x	x			x	x	
	Input “changeover – heating/cooling”	x	x										x	x	x	x	x	x								x	x	
	Input “off with frost protection monitoring”						x	x	x				x	x			x	x				x	x					
	Switch “on/off”			x	x	x																						
	Switch “on/off with frost protection monitoring”						x	x	x																			
	Switch “heating/cooling”										x														x		x	
	Switch “heating/ ventilation/cooling”				x																							
	Switch “ECO/comfort/off with frost protection monitoring”											x		x		x							x				x	
	Switch “ventilator”			x	x	x	x		x																			x
	Indicator lamp “ON/OFF”				x					x													x					
	Indicator lamp “heating mode”				x																							
	Indicator lamp “heating”	x	x							x	x	x	x	x	x	x	x	x								x	x	
	Indicator lamp “cooling”	x	x							x	x	x	x	x	x	x	x	x								x	x	
	Indicator lamp “heating/cooling”				x																							
	Indicator lamp "ECO"										x	x											x					
	Indicator lamp “cooling interruption due to condensate”									x	x	x	x	x	x	x										x	x	
Miscellaneous	230 V~	x		x	x	x	x	x	x								x											x
	24 V~		x							x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	

Electronic climate controller with triac output (soundless)

Surface-mounted superflat – Design Berlin 1000

Technical data

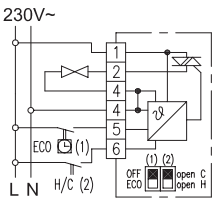
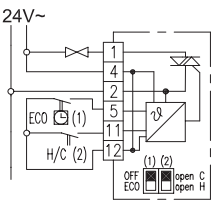
Design:	Berlin 1000
Surface finish:	glossy
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Ambient temperature:	0…40 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.5 mm² to 1.5 mm²
Mounting / attachment:	Surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Safety and EMC:	according to DIN EN 60730
Max. power consumption:	< 0.8 W
Switching power:	15 W
Switching element:	triac
Switching contact:	NC contact
Sensor:	NTC, internal
Control function:	heating or cooling
Control range:	5…30 °C
Hysteresis:	0 K since control is practically continuous
Proportional range:	approx. 1 K
General features:	ECO function; “heating / cooling” display; “off with frost protection monitoring” operating mode; mechanical range restriction; scale: degrees Celsius; external setting

Application

This controller was specifically designed for heating / cooling regulation of 2-pipe systems used in hotels, homes and offices and can control up to 5 valve actuators (normally closed).

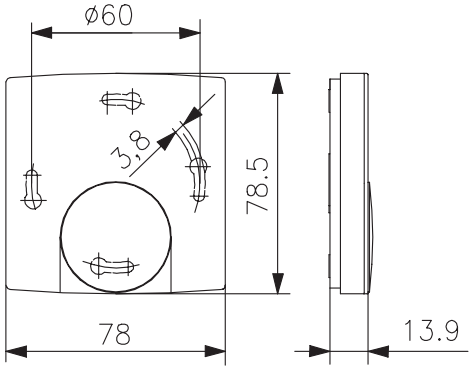
The KTRTB’s internal sensor measures the room temperature and activates heating or cooling depending on the deviation from the configured setpoint temperature. As the switching element used is a triac rather than a relay or bimetal, the system operates without bothersome switching sounds.

ECO function: Selecting this mode enables to adjust to a temperature value that is by 3K lower while heating and to adjust to a temperature value that is by 3K higher while cooling.

Type / image	Item no.	Features	Circuit diagram	PG
KTRTB-211.108 	MA 700300	**Operating voltage:** 230 VAC, 50 Hz **Protection class:**II, if properly mounted **Max. switching current:** 65 mA **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Output signal:** switching PWM (230 VAC, 50 Hz) **ECO contact:** 230 VAC, 50 Hz, optionally configurable as ECO or OFF function		I
KTRTB-251.108 	MA 700400	**Operating voltage:** 24 VAC, 50 Hz **Protection class:** III, protective low voltage **Max. switching current:** 625 mA **Max. switching voltage:** 24 VAC, 50 Hz **Min. switching voltage:** 24 VAC, 50 Hz **Output signal:** switching PWM (24 VAC, 50 Hz) **ECO contact:** optionally configurable as ECO or OFF function		I

Accessories: suitable valve actuators ZBOOA

KTRTB



Mechanical climate controllers KTBSB

Surface-mounted installation – Design Berlin 3000

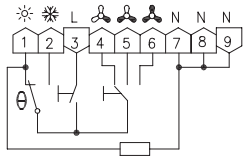
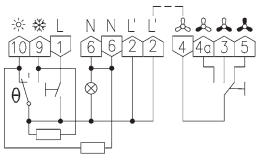
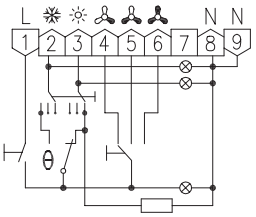
Technical data

Design:	Berlin 3000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	surface- / wall-mounting or by means of an adapter plate on a flush-mounted socket
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching current:	6 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	1380 W
Switching element:	bimetallic contact
Switching contact:	changeover
Output signal:	switching (230 VAC, 50 Hz)
Sensor:	bimetal
Control function:	heating or cooling
Control range:	5 … 30 °C
General features:	mechanical range restriction; thermal feedback; scale: degrees Celsius; on / off switch; external setting

Application

Control and monitoring of temperatures in closed, dry spaces. Remote control of air conditioners, climate chests, fan coil systems in living and office spaces and doctors' practices. Individual room optimisation in central air conditioning systems (hotels, hospitals etc.).

Suitable for all heating systems. (Please note the maximum switching current.)

Type / image	Item no.	Features	Circuit diagram	PG
KTBSB-112.000 	MA 200100	**General features:** 3-stage fan output; **3-stage fan switch; "on / off" switch** **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h		I
KTBSB-112.070 	MA 200202	**General features:** single-room climate controller with neutral zone for 4-pipe systems; 3-stage fan output; 2x auxiliary output "on / off"; **"on / off" display, 3-stage fan switch; "on / off" switch** **Hysteresis:** heating approx. 1 K, cooling approx. 2 K, at a temperature change of max. 4 K / h **Neutral zone:** approx. 2 K		I
KTBSB-113.500 	MA 200000	**General features: "on / off" display; "heating" display; "cooling" display;** for 4-pipe systems; 3-stage fan output; **heating / ventilation / cooling switch; 3-stage fan switch; "on / off" switch** **Hysteresis:** approx. 0.5 K at a temperature change of max. 4 K / h		I

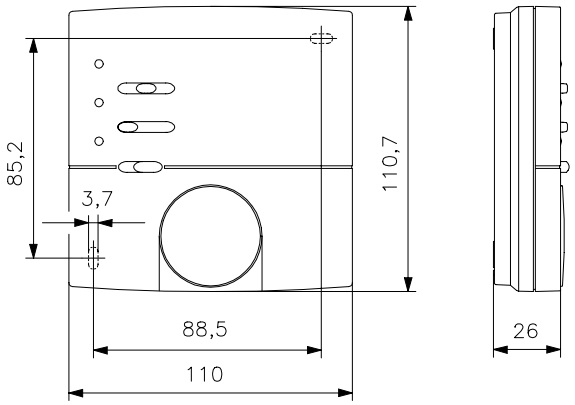
Accessories: Terminal strips VOOxx, suitable valve actuators ZBOOA-010.100, adapter plates to mount in flush-mounted socket JZ-17
You can find other controllers with outputs for heating / cooling in the "Heating technology" section (RTBSB / FTR).

Mechanical climate controllers KTBSB

Surface-mounted installation – Berlin 3000

Accessories	Item no.	Features	PG
JZ-17	MN 990001	**General features:** adapter plate for mounting devices on flush-mounted sockets (including fastening screws for mounting the controller on the adapter plate) **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic	II

KTBSB



JZ-17

Electronic climate controller, KTRRB

Surface-mounted installation – Design Berlin 3000

Technical data	
Design:	Berlin 3000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 40 °C
Storage temperature:	– 20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	surface- / wall-mounting or by means of an adapter plate on a flush-mounted socket
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	NO contact
Output signal:	switching (230 VAC, 50 Hz)
Sensor:	internal NTC, optional external NTC („Sensor 2“)
ECO contact*:	reduction by 3 K; alternatively, this input can be configured as a frost protection contact
Control function:	heating and / or cooling
Control range:	5 … 30 °C
Neutral zone:	approx. 2 K
General features:	operating mode “off with frost protection monitoring”; mechanical range restriction; scale: degrees Celsius; external setting

Application

Single-room temperature controller with neutral zone for 2-pipe or 4-pipe air conditioners.

External flow sensor (H / C sensor):
for automatic switching of the controller to heating or cooling mode in 2-pipe operation depending on the inflow temperature; alternatively, this input can be used as an H / C changeover contact.

Sensor rupture and short-circuit safeguarding:
In case of a sensor rupture or sensor short-circuit, the heating is activated with a power-on time of 30% to prevent cooling or frost damage in the room.

Type / image	Item no.	Features	PG
KTRRB-117.128 	MA 601300	**General features:** single-room climate controller, 3-stage fan output, fan operation in neutral zone ON / OFF selectable; **on / off switch; 3-stage fan switch** **Max. switching current:** heating 5 (1) A, cooling 5 (1) A, fan 3 (1) A **Switching power:** heating 1150 W, cooling 1150 W, fan 230 W **Hysteresis:** approx. 1 K	I
KTRRB-117.163 	MA 601400	like KTRRB-117.128 but without 3-stage fan output and 3-stage fan switch	I
KTRRB-117.169 	MA 601500	**General features:** single-room climate controller;**“off / manual fan / automatic fan” switch; “ventilator 3-stage 0 – 10 V” switch;** button “parameterisation 3-stage fan output”;**“heating, cooling,** frost protection, sensor break or short circuiting of the external sensor” display; 3-stage fan output 0 – 10 V with adjustment to individual fan stages or dynamic 0 – 10 V to activate **EC fans**; ON / OFF: ventilator use in neutral zone selectable **Max. switching current:** heating 5 (1) A, cooling 5 (1) A **Switching power:** heating 1150 W, cooling 1150 W **Output signal:** analogue 0 – 10 V (5 mA) for activating an rpm-controlled fan **Hysteresis:** approx. 0.5 K	I

Accessories: Adaptor plate for mounting on flush-mounted socket JZ-17, terminal strips VOOxx, suitable valve actuators ZBOOA, suitable external sensors (sensor 2) see “Sensor technology”.
You can find other / similar controllers with outputs for heating / cooling in the “Heating technology” section (RTBSB / FTR).

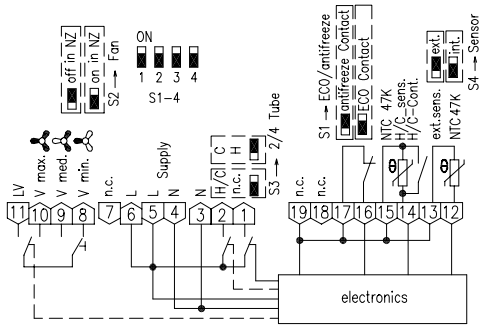
*With ECO operation, the neutral zone (2 K) is extended by the ECO zone (+ / - 3 K). ECO operation is a savings mode that should be controlled, for example, via a window contact and / or a timer.

Electronic climate controller, KTRRB

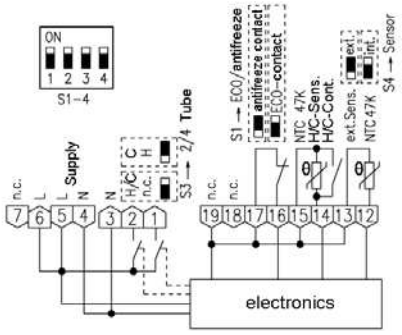
Surface-mounted installation – Design Berlin 3000

Accessories	Item no.	Features	PG
JZ-17 	MN 990001	**General features:** adapter plate for mounting devices on flush-mounted sockets (including fastening screws for mounting the controller on the adapter plate) **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic	II

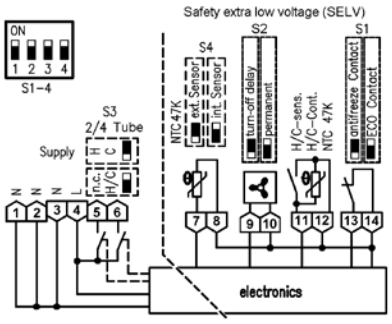
Circuit diagram KTRRB-117.128



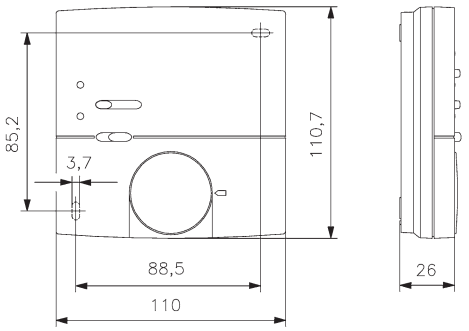
Circuit diagram KTRRB-117.163



Circuit diagram KTRRB-117.169



Housing design – Berlin 3000



Electronic climate controller for cooling ceilings, KTRRB

Surface-mounted installation – Design Berlin 2000

Technical data

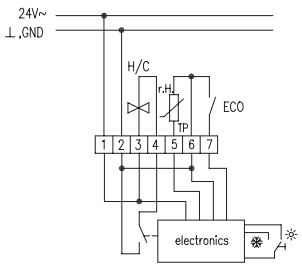
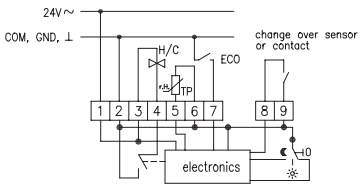
Design:	Berlin 2000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Ambient temperature:	0 … 40 °C
Operating voltage:	24 VAC / 50 Hz, 24 VDC
Storage temperature:	– 20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	Surface- / wall-mounting
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Max. switching current:	1 A
Max. switching voltage:	24 VAC / 50 Hz, 24 VDC
Min. switching voltage:	24 VAC / 50 Hz, 24 VDC
Switching power:	24 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	switching, 24 VAC / 50 Hz, 24 VDC
Hysteresis:	approx. 1 K
General features:	external dew point sensor; mechanical range restriction; external setting

Application

Temperature controller for cooling ceilings / walls and all kinds of hot water heaters in 2- and 4-pipe systems for hotels, offices and private homes. As the KTRRB features dew point monitoring, it is highly suited for controlling ceiling cooling systems.

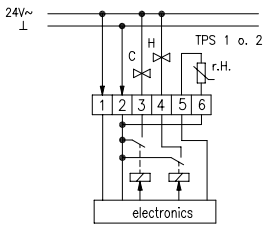
The unit can control up to 5 valve actuators (24 V~ normally closed) per output. The types KTRRB-052.24x can be adapt to the actuator type normally open (up to 5 actuators / 24 V~).

Room temperature controller for continuous control of valve actuators: KTRVB-052.24x

Type / image	Item no.	Features	Circuit diagram	PG
KTRRB-040.112	DA 420100	**General features:** ECO function; ECO value adjustable; **“heating / cooling display; “ECO / cooling interruption due to condensation” display;** scale: degrees Celsius; **“heating / cooling” switch** **Sensor:** NTC internal **ECO contact:** upon closing the contact, the ECO function is actuated **Control function:** heating or cooling, cooling interruption of the dew point sensor upon condensation **Control range:** 5 … 30 °C **Pipe system compatibility:** 2-pipe		I
KTRRB-040.213	DA 420200	**General features:** ECO function; ECO value adjustable; **“heating / cooling” display; “ECO / cooling interruption due to condensation” display;** operating mode “off with frost protection monitoring”; relative scale; **off / comfort / ECO switch** **Sensor:** NTC internal **External flow sensor (H / C sensor):** for automatic switching of the controller in heating or cooling mode depending on the inflow temperature (“Sensor 2”); alternatively, this input can be used as an H / C changeover contact **Eco contact:** upon closing the contact, the ECO function is actuated **Control function:** heating or cooling, cooling interruption of the dew point sensor upon condensation, room frost protection at switch position “OFF” **Control range:** 13 … 29 °C **Setting range:** – 3 … +3 °C **Pipe system compatibility:** 2-pipe		I

Electronic climate controller for cooling ceilings, KTRRB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
KTRRB-042.211 	DA 420000	**General features: "heating / cooling" display; "on / cooling interruption due to condensation" display;** relative scale **Sensor:** NTC internal **Control function:** heating and cooling, cooling interruption of the dew point sensor upon condensation **Control range:** 13 … 29 °C **Setting range:** – 3 … + 3 °C **Neutral zone:** 0.25 … 3 K adjustable **Pipe system compatibility:** 4-pipe		I
KTRRB-052.244 	DA 420600	**General features:** ECO function; **"heating / cooling / cooling interruption due to condensation / off" display; "sensor break,** sensor short-circuit, frost protection" display; relative scale **Sensor:** NTC internal, optional external ("Sensor 2") **External flow sensor (H / C sensor):** for automatic switching of the controller in heating or cooling mode depending on the inflow temperature ("Sensor 2"); alternatively, this input can be used as an H / C changeover contact **Eco contact:** upon closing the contact, the ECO function is actuated **Forced switch-off contact:** external switch-off function with frost protection function **Control function:** heating and / or cooling, cooling interruption upon condensation of the dew point sensor, frost protection function in the switched-off condition **Control function:** 13 … 29 °C **Setting range:** – 8 … + 8 °C **Neutral zone:** approx. 2 K **Pipe system compatibility:** 2-pipe and 4-pipe	see next page	I
KTRRB-052.245 	DA 420700	**General features:** ECO function; **"heating / cooling / cooling interruption due to condensation / off" display; "sensor break, sensor short-circuit, frost protection" display;** operating mode "off with frost protection monitoring"; relative scale; **off / comfort / ECO switch** **Sensor:** NTC internal, optional external ("Sensor 2") **External flow sensor (H / C sensor):** for automatic switching of the controller in heating or cooling mode depending on the inflow temperature ("Sensor 2"); alternatively, this input can be used as an H / C changeover contact **ECO contact:** upon closing the contact, the ECO function is actuated **Forced switch-off contact:** external switch-off function with frost protection function **Control function:** heating and / or cooling, cooling interruption upon condensation of the dew point sensor, frost protection function in the switched-off condition **Control range:** 13 … 29 °C **Setting range:** – 8 … + 8 °C **Neutral zone:** approx. 2 K **Pipe system compatibility:** 2-pipe and 4-pipe	see next page	I

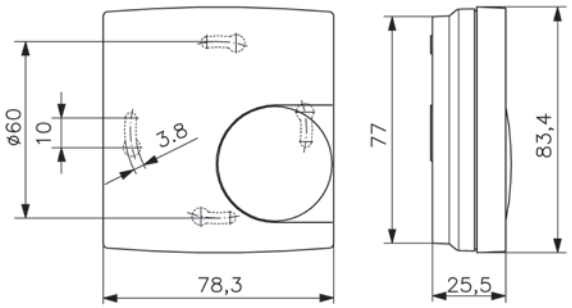
* The internal trimming potentiometer enables to select whether the control operations shall be performed based on the data delivered by the internal sensor (left limit) or the data delivered by the externals sensor (right limit). Any position between these limits determines the importance relation between them when using both sensors. This setting option allows to balance the influences of structural conditions, such as large window areas or to counterpoise other influences from all directions. With controlled systems that react very slowly, we recommend increasing the importance of the radiation sensor in relation to the internal sensor.

Electronic climate controller for cooling ceilings, KTRRB

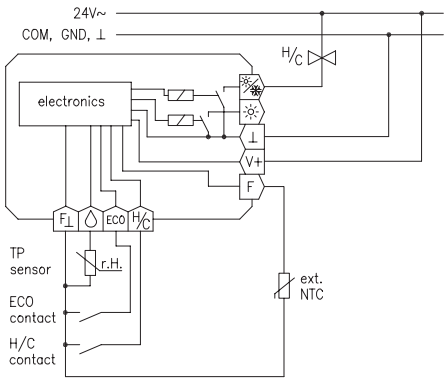
Surface-mounted installation – Design Berlin 2000

Accessories	Item no.	Features	PG
TPS 1 	G 8000299	**Mounting / Attachment:** using clips on cooling ceiling capillary pipe **Use:** drywall cooling ceiling (plasterboard) with hung up capillary pipe mat, metal ceiling cooling ceiling with integrated capillary pipe system **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Box contents:** sensor, 2 clips for cooling pad	I
TPS 2 	G 8000300	**Mounting / Attachment:** using clips on cooling ceiling capillary pipe or cable tie **Use:** pipe systems transporting cold water, plaster cooling ceiling with capillary tube system **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Box contents:** sensor, 2 clips for cooling pad, 2 cable ties	I
TPS 3 	SN 120000	**Mounting / Attachment:** attach to pipe by means of cable ties **Use:** pipe systems transporting cold water **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Box contents:** sensor, 2 cable ties	I

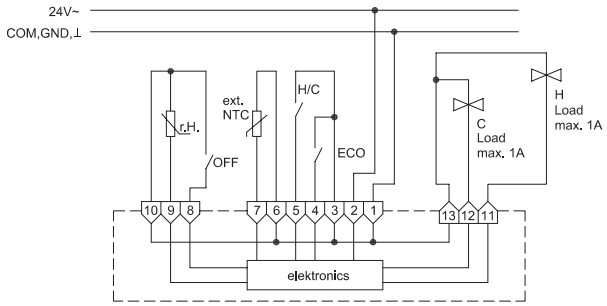
KTRRB



KTRRB-052.24x connection in a 2-pipe system

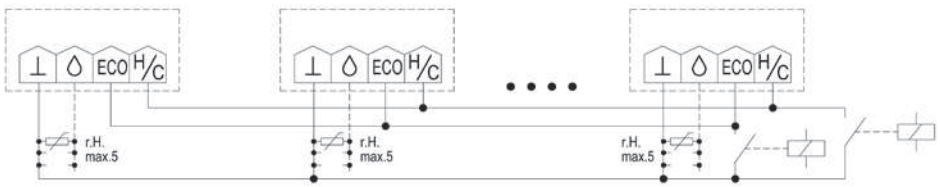


KTRRB-052.24x connection in a 4-pipe system



Important note: The infl ow ducts of TPS-1 and TPS-2 are closed before shipping to avoid dirtying during assembly. After assembly, they must be shortened with a knife until they are fl ush with the wall to ensure air circulation. The air ducts should be arranged such that soiling during operation is avoided. It is important that the air surrounding the sensor has the same temperature as the room air to be cooled. If the humidity and temperature of the air to be cooled (ceiling cooling system) is different from that of the air surrounding the sensor, condensation may be detected prematurely or too late. As regards TPS-3, contact with the PCB paths must be avoided to prevent longterm corrosion.

Attention in case of sensor extension: Parallel laying to conductors carrying a mains voltage can result in faults. The use of shielded conductors reduces sensitivity to electromagnetic fi elds.



Wiring of several controllers for heating/cooling changeover and/or operation in ECO mode (max. 20 controllers)

Electronic climate controller for cooling ceilings, KTRRU

– with internal and external (optional) temperature sensor – flush-mounted installation – Design Berlin UP

Technical data

Design:	Berlin UP (flush-mounted)
Housing material:	PC plastic
Operating voltage:	24 VAC/50 Hz, 24 VDC
Ambient temperature:	0…40 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Average power consumption:	approx. 0.6 W (1 VA)
Max. switching current:	1 A
Max. switching voltage:	24 VAC/50 Hz, 24 VDC
Min. switching voltage:	24 VAC/50 Hz, 24 VDC
Switching power:	24 W
Switching element:	relay
Switching contact:	NO contact
Output signal:	switching, 24 VAC/50 Hz, 24 VDC
Sensor:	NTC, internal, optional external (“Sensor 2”)
ECO contact:	when the contact is closed, the ECO function is actuated (+/- 3 K)
Control function:	heating and/or cooling, cooling interruption upon condensation of the dew point sensor, frost protection function in the switched-off condition
Control range:	13 ... 29 °C
Setting range:	–8 ... +8 °C
Hysteresis:	approx. 1 K
Neutral zone:	approx. 2 K
General features:	single-room climate controller; optional external dew point sensor; ECO function; “heating/cooling/cooling interruption due to condensation/off” display; mechanical range restriction; relative scale; external setting
Pipe system compatibility:	2-pipe and 4-pipe

Application

For heating/cooling control of 2- and 4-pipe systems used in hotels, homes and offices.

The unit can control up to 5 valve actuators (24 V~ normally closed) per output. The controllers are configured for 2-pipe or 4-pipe operation by means of a jumper. In 2-pipe operation, the controller is operated with a common heating/cooling output, whose mode of operation action can be toggled by means of an external contact (changeover contact). Connection of TPS dew point sensors is possible (max. 5 of them in parallel). Condensate formation at the TPS can result in the cooling valve getting closed.

It is possible to actuate the energy saving (ECO) function via an external contact.

With type KTRRU-052.245, in the “off” switch position, the room frost protection function is activated (when the temperature drops below 5 °C, all valves are forced open).

External flow sensor (H/K sensor): for automatic switching of the controller in heating or cooling mode depending on the inflow temperature (“Sensor 2”); alternatively, this input can be used as an H/C changeover contact.

Type/image	Item no.	Features	PG
KTRRU-052.244#00 	UA 210301	**Surface finish:** depending on the cover set selected **Housing colour:** depending on the cover set selected **Mounting/Attachment:** in flush-mounted socket – adaptable with cover set 50 x 50 mm or 55 x 55 mm in almost all rocker switch ranges (deep flush-mounted socket) **Accessories:** cover sets are offered in several design variants (see “Overview”, page 99) and are not included in the scope of delivery. **Matching set no.:** JZ-008.xxx, for example: cover set 50 x 50 mm, pure white, glossy: JZ-008.000 cover set 55 x 55 mm, pure white, glossy: JZ-008.100 **Scope of delivery:** controller, protective cap	I
KTRRU-052.244#21 	UA 210300	like KTRRU-052.244#00, but with scope of delivery: controller, alre frame “Berlin”, cover 50 x 50 mm, pure white (like RAL 9010), glossy	I

Electronic climate controller for cooling ceilings, KTRRU

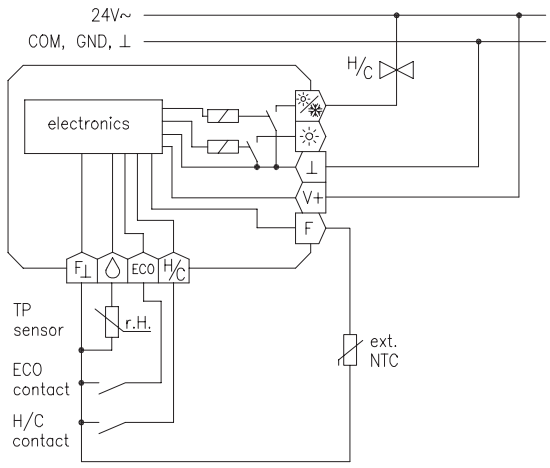
– with internal and external temperature sensor – flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	PG
KTRRU-052.245#00 	UA 210401	**General features:** operating mode “off with frost protection monitoring”; **off / comfort / ECO switch** **Surface finish:** depending on the cover set selected **Housing colour:** depending on the cover set selected **Mounting / Attachment:** in flush-mounted socket – adaptable with cover set 50 x 50 mm or 55 x 55 mm in almost all rocker switch ranges (deep flush-mounted socket) **Accessories:** cover sets are offered in several design variants (see “Overview”, p. 99) and are not included in the delivery scope. **Matching set no.:** JZ-007.xxx, for example: cover set 50 x 50 mm, pure white, glossy: JZ-007.000 cover set 55 x 55 mm, pure white, glossy: JZ-007.100 **Scope of delivery:** controller, protective cap	I
KTRRU-052.245#21 	UA 210400	like KTRRU-052.245#00, but with scope of delivery: controller, alre frame “Berlin”, cover 50 x 50 mm, pure white (like RAL 9010), glossy	I

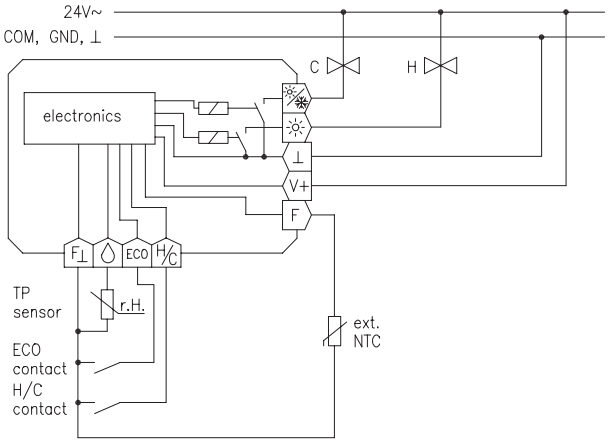
Accessories: suitable valve actuators ZBOOA-040.100, dew point sensors TPS 1 / TPS 2 / TPS 3, external sensors (“Sensor 2”) see sensor technology
For model #21, the protective cap is not included in the delivery.

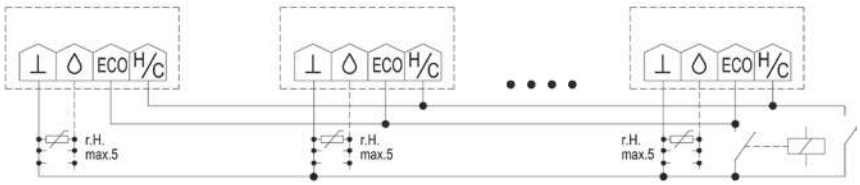
Accessories	Item no.	Features	PG
JZ-090.900 	VV 000025	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Housing material:** PC plastic	I
JZ-090.910	VV 000010	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pearl white like RAL 1013 **Housing material:** PC plastic	I

Circuit diagram KTRRU-052.24x in 2-pipe system



Circuit diagram KTRRU-052.24x in 4-pipe system





Wiring of several controllers for heating/cooling changeover and/or operation in ECO mode (max. 20 controllers)

alre flush-mounted range (cover sets)

all basic types and suitable cover sets **50 x 50 mm**

Basic type	Cover set 50 x 50 mm, pure white (like RAL 9010), glossy (JZ-xxx.000)		Cover set 50 x 50 mm, pure white (like RAL 9010), matt (JZ-xxx.001)		Cover set 50 x 50 mm, pearl white (like RAL 1013), glossy (JZ-xxx.010)		Cover set 50 x 50 mm, traffic white (like RAL 9016), glossy (JZ-xxx.020)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	
KTRRU-052.244#00	JZ-008.000	UN 990021	JZ-008.001	UN 990023	JZ-008.010	UN 990025	JZ-008.020	UN 990079	I
KTRRU-052.245#00	JZ-007.000	UN 990022	JZ-007.001	UN 990024	JZ-007.010	UN 990026	JZ-007.020	UN 990080	I
RFHSU-101.060#00	JZ-021.000	UN 990039	JZ-021.001	UN 990044	JZ-021.010	UN 990049	JZ-021.020	UN 990081	I

Frames									
alre frame	JZ-090.900	VV 000025			JZ-090.910	VV 000010			I

In a flush-mounted socket, it can be adapted to fit virtually any rocker switch range.

alre frame “Berlin” (JZ-090.900)

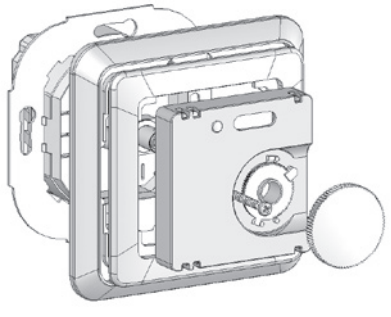
Cover set (example), individually foil-wrapped

all basic types and suitable cover sets **55 x 55 mm**

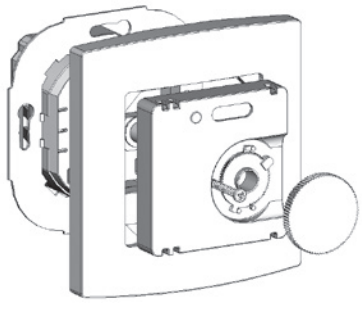
Basic type	Cover set 55 x 55 mm, pure white (like RAL 9010), glossy (JZ-xxx.100)		Cover set 55 x 55 mm, pure white (like RAL 9010), matt (JZ-xxx.101)		Cover set 55 x 55 mm, pearl white (like RAL 1013), glossy (JZ-xxx.110)		Cover set 55x55 mm traffic white (like RAL 9016), glossy (JZ-xxx.120)		PG
	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	Cover set	Item no.	
KTRRU-052.244#00	JZ-008.100	UN 990027	JZ-008.101	UN 990029	JZ-008.110	UN 990031	JZ-008.120	UN 990094	I
KTRRU-052.245#00	JZ-007.100	UN 990028	JZ-007.101	UN 990030	JZ-007.110	UN 990032	JZ-007.120	UN 990095	I
RFHSU-101.060#00	JZ-021.100	UN 990054	JZ-021.101	UN 990059	JZ-021.110	UN 990064	JZ-021.120	UN 990096	I

In flush-mounted sockets, it can be adapted to fit many push switch systems (for a current overview of the suitable frames and insert frames, see next page).

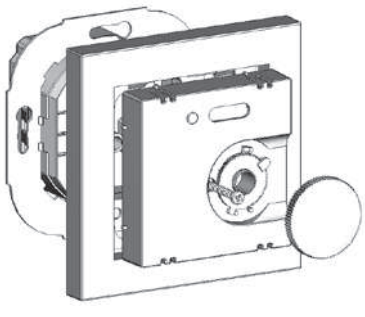
KTRRU with 50 x 50 insert frame



KTRRU with alre frame “Berlin” (#21)



KTRRU without 55 x 55 insert frame



Adaptation of alre flush-mounted controllers

Manufacturer	Range	Colour RAL 9010 (surface finish)	Adaption possible using “55 x 55” cover set (without insert frame)	Only adaptation with “50 x 50” cover set requires an insert frame from the manufacturer
BERKER	S.1	polar white (matt)	✓	1109 19 19
BERKER	S.1	polar white (glossy)	✓	1109 90 89
BERKER	Arsys	polar white (glossy)		1108 01 69
BERKER	B.3	aluminium / polar white (matt)	✓	1109 19 19
BERKER	B.3	aluminium / polar white (glossy)	✓	1109 90 89
BERKER	B.7	glass / polar white (matt)	✓	1109 19 19
BERKER	B.7	glass / polar white (glossy)	✓	1109 90 89
BERKER	Q.1/Q.3	polar white (velvet)		1109 60 79
BERKER	K.1	polar white (glossy)		1108 71 09
BUSCH-JAEGER	Reflex SI/SI Linear	alpine white (glossy)		1746-214-101
BUSCH-JAEGER	Busch-balance SI	polar white (glossy)	✓	1746-914-101
BUSCH-JAEGER	impuls	alpine white (glossy)		1746/10-74
BUSCH-JAEGER	solo / future / axcent etc.	studio white – see RAL 9016 below		
ELSO	Joy	pure white (glossy)	✓	3630 84
ELSO	Fashion/Riva/Scala	pure white (glossy)		2030 84
GIRA	rocker switch	pure white (glossy)		0282 112
GIRA (System 55)	Standard/E 2	pure white (semi-gloss)	✓	0282 27
GIRA (System 55)	Standard/E 2	pure white (glossy)	✓	0282 03
GIRA (System 55)	E 22	pure white (glossy)	✓	0282 03
GIRA (System 55)	Event	pure white (semi-gloss) + opaque...	✓	0282 27
GIRA (System 55)	Event	pure white (glossy) + opaque...	✓	0282 03
GIRA (System 55)	Esprit	pure white (semi-gloss) + glass, aluminium...	✓	0282 27
GIRA (System 55)	Esprit	pure white (glossy) + glass, aluminium...	✓	0282 03
GIRA	S-Color	pure white (high-gloss)		0282 40
JUNG	CD 500/CD plus	alpine white (glossy)		CD 590 Z WW
JUNG	A 500/AS 500/A plus	alpine white (glossy)	✓	A 590 Z WW
JUNG	LS 990	alpine white (glossy)		LS 961 Z WW
JUNG	LS plus	alpine white (glass)		LS 961 Z WW
JUNG	A creation	alpine white (glossy)	✓	A 590 Z WW
JUNG	LS Design	alpine white (glossy)		LS 961 Z WW
MERTEN (System M)	M-Smart, M-Plan, M-Pure	polar white (matt)	✓	5181 19
MERTEN (System M)	M-Smart, M-Plan, M-Pure	polar white (glossy)	✓	5185 19
MERTEN (System Basis)	1-M/Atelier-M	polar white (glossy)	✓	5185 19
MERTEN (System Design)	Artec/Antik	polar white (glossy)		5160 99
MERTEN	1-M/M-Smart/M-Plan/M-Pure/D-Life	active white – see RAL 9016 below		
PEHA	Standard	pure white (glossy)		80.670.02 ZV
PEHA	Dialog	pure white (glossy)		95.670.02 ZV
PEHA	Aura	pure white (matt) / glass		20.670.02 ZV
PEHA	Badora	pure white (glossy)		11.670.02 ZV

Manufacturer	Range	Colour RAL 9016 (surface finish)	Adaption possible using “55 x 55” cover set (without insert frame)	Only adaptation with “50 x 50” cover set requires an insert frame from the manufacturer
BUSCH-JAEGER	solo/future/future linear	studio white (RAL 9016, glossy)		1746/10-84
BUSCH-JAEGER	future linear	studio white (RAL 9016 matt)		1746/10-884
BUSCH-JAEGER	impuls	studio white (RAL 9016 matt)		1746/10-774
BUSCH-JAEGER	axcent	studio white (RAL 9016, glossy)		1746/10-84
BUSCH-JAEGER	carat (glass, bronze, gold)	studio white (RAL 9016)		1746/10-84
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016, glossy)		1746/10-24G
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016 matt)		1746/10-24
MERTEN	M-Smart, M-Plan, M-Pure	active white (RAL 9016, glossy)		5185 25
MERTEN	1-M/Atelier-M	active white (RAL 9016, glossy)		5185 25
MERTEN	D-Life	lotos white (RAL 9016)		MEG4500-6035
PEHA	Standard	arctic		D 80.670 ZV AW

*) During assembly, you need to remove four plastic tabs located at the rear of the frame

NOTE: Most light switches are designed in the colour “like RAL 9010”, although different switch manufacturers use different designations for this colour. Coloured, glass and aluminium frames are also combined with white jacks or plugs so that controllers with white covers can also be integrated into these frames. Check the precise application in each individual case. The frames have different surface qualities (matt/glossy). For design reasons, the cover of the controller should have the same quality as the frame. We accept no liability for slight variations in colour and surface finish or for accuracy of fit. When installing devices into multi frames, always assemble the temperature controllers at the lowermost position.

“50 x 50 controller”: The housing covers of the 50 x 50 controllers are 50 x 50 mm in size. Using a 50 x 50-mm insert frame, the 50 x 50 controllers can be integrated into nearly all light switch ranges in accordance with DIN 49075. The 50 x 50-mm insert frames must be ordered from the light switch manufacturer or from a wholesaler. The order number of the insert frame corresponding to the switch range in question can be found in the column “Only for adaptation with ‘50 x 50’ cover set”.

“55 x 55 controller”: The housing covers of the 55 x 55 controllers are 55 x 55 mm in size. Many light switch ranges have inner dimensions of 55 x 55 mm. Therefore, the 55 x 55 controllers can be installed directly in these light switch frames without the use of an insert frame. See the column “Adaptation with 55 x 55 cover set” to determine whether the 55 x 55 controller fits in the given light switch model (✓).

All information regarding switch manufacturers’ product lines and item numbers was last updated in 12/2017 | No liability is assumed for the information provided. | Technical specifications subject to change. An adaptation list for RAL 1013 switch ranges is available from our website at www.alre.de.

Electronic climate controller with timer KTRRUu – 230 VAC

Flush-mounted installation – Design Berlin UP

Technical data

Design:	Berlin UP (flush-mounted)
Housing material:	PC, PMMA, ABS plastic
Ambient temperature:	0 … 40 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Protection rating:	IP 30
Safety and EMC:	according to DIN EN 60730
Max. power consumption:	approx. 1 W (2.2 VA)
Max. switching current:	each relay 3 (0.5) A
Switching element:	2 relay
Switching contact:	2 NO contacts
Output signal:	switching, analogue 0–10 V (max 5 mA) for activating an rpm-controlled fan
Sensor:	NTC, internal, optional external (“Sensor 2”)
External flow sensor (H/C sensor):	for automatic switching of the controller to heating or cooling mode depending on the inflow temperature (“Sensor 2”); alternatively, this input can be used as an H/C changeover contact
ECO contact:	upon closing the contact, the ECO function is actuated
Control range:	5 … 40 °C
Setting range:	Standard setting range for heating (5 … 30 °C), second setting range for cooling (18 … 40 °C)
Hysteresis:	approx. 1 K
Neutral zone:	adjustable
Display type:	illuminated graphical display
Pipe system compatibility:	2-pipe and 4-pipe

Application

Flush-mounted controller with timer function for heating/cooling regulation of 2- and 4-pipe systems used in hotels, homes and offices. The adaptation takes place in a menu.

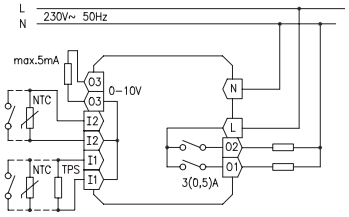
The unit can control up to 5 valve actuators (normally open or normally closed) per output. In 2-pipe operation, the operating mode can be changed via an external changeover contact or temperature sensor. The timer can serve as a master for other controllers for switching to ECO mode.

It is possible to activate the energy saving (ECO) or frost protection (OFF) functions via an external contact. Alternatively, the controller’s inputs can be configured to connect with an external temperature sensor or dew point sensor (TPS).

A 0–10 V interface can be used to control the fan speed (EC fans).

General features:
Digital rocker switch single-room climate controller with timer; optional external dew point sensor; ECO function, ECO value adjustable; “ECO” display; “on/off” display; “heating” display; “cooling” display; “cooling interruption due to condensation”; digital actual value display; backlighting; operating mode “off with frost protection monitoring”; child-safe features; facilities; power-reserve (3 days); actual value correction/measured value correction; learning function; emergency operating mode; valve protection; holiday setting; party setting; automatic adjustment to standard/daylight savings time; external setting; intuitive operation by touch keys.

Special colours for projects on request.

Type/image	Item no.	Features	Circuit diagram	PG
KTRRUu-217.456#21 (230 VAC) 	UA 220000	**Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Operating voltage:**230 VAC, 50 Hz **Electrical connection:** pluggable screw-type terminals, voltage supply side 0.75–2.5 mm², low-voltage side 0.08–1.5 mm² **Mounting/Attachment:** in flush-mounted socket–adaptable with cover 50 x 50 mm in almost all rocker switch ranges (deep flush-mounted socket recommended) **Protection class:** II **Max. switching voltage:** 230 VAC, 50 Hz **Min. switching voltage:** 230 VAC, 50 Hz **Switching power:** 690 W **Output signal:** switching heating, cooling, heating/cooling, ECO, OFF, 230 VAC, 50 Hz; analogue 0–10 V (0.5 mA) for activating an rpm-controlled fan **Scope of delivery:** controller, cover **50 x 50** mm, **pure white** (like RAL 9010), **glossy**, alre frame “Berlin”		I

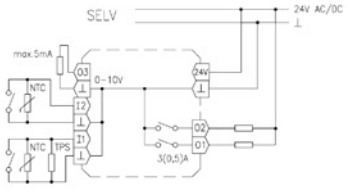
Electronic climate controller with timer KTRRUu – 230 VAC

Flush-mounted installation – Design Berlin UP

Type / image	Item no.	Features	Circuit diagram	PG
KTRRUu-217.456#07 (230 VAC) 	UA 220002	like KTRRUu-217.456#21, but with delivery scope: controller, cover **50 x 50** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-217.456#09 (230 VAC) 	UA 220003	like KTRRUu217.456#21 but with delivery scope: controller, cover **50 x 50** mm, **pearl white** (like RAL 1013), **glossy,** without frame		I
KTRRUu-217.456#27 (230 VAC) 	UA 220004	like KTRRUu-217.456#21, but with delivery scope: controller, cover **50 x 50** mm, **traffic white / studio white** (like RAL 9016), **glossy,** without frame		I
KTRRUu-217.456#28 (230 VAC) 	UA 220007	like KTRRUu-217.456, but with delivery scope: controller, cover for use with **BUSCH-JAEGER Reflex SI / SI Linear, pure white** (similar to RAL 9010), **glossy**, without frame		I
KTRRUu-217.456#55 (230 VAC) 	UA 220005	like KTRRUu-217.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-217.456#56 (230 VAC) 	UA 220009	like KTRRUu-217.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-217.456#57 (230 VAC) 	UA 220006	like KTRRUu-217.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pearl white** (like RAL 1013), **matt,** without frame		I
KTRRUu-217.456#59 (230 VAC) 	UA 220008	like KTRRUu-217.456#21, but with delivery scope: controller, cover **55 x 55** mm, **traffic white / studio white** (like RAL 9016), **glossy,** without frame		I

Electronic climate controller with timer KTRRUu – 24 VAC/VDC

Flush-mounted installation – Design Berlin UP

Type/image	Item no.	Features	Circuit diagram	PG
KTRRUu-257.456#21 (24 VAC/VDC) 	UA 220100	like KTRRUu-217.456#21, but: **Operating voltage:** 24 VAC/50 Hz, 24 VDC **Protection class:** III **Max. switching voltage:** 24 VAC/50 Hz, 24 VDC **Min. switching voltage:** 24 VAC/50 Hz, 24 VDC **Switching power:** 72 W **Output signal:** switching heating/cooling heating/cooling, ECO, OFF, 24 VAC/50 Hz, 24 VDC; analogue 0–10 V (0.5 mA) for controlling an rpm-controlled fan		I
KTRRUu-257.456#07 (24 VAC/VDC) 	UA 220103	like KTRRUu-257.456#21, but with delivery scope: controller, cover **50 x 50** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-257.456#09 (24 VAC/VDC) 	UA 220104	like KTRRUu-257.456#21, but with delivery scope: controller, cover **50 x 50** mm, **pearl white** (like RAL 1013), **glossy,** without frame		I
KTRRUu-257.456#27 (24 VAC/VDC) 	UA 220105	like KTRRUu-257.456#21, but with delivery scope: controller, cover **50 x 50** mm, **traffic white/studio white** (like RAL 9016), **glossy,** without frame		I
KTRRUu-257.456#28 (24 VAC/VDC) 	UA 220108	like KTRRUu-257.456#21, but with delivery scope: controller, cover suitable for **BUSCH-JAEGER Reflex SI/SI Linear, pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-257.456#55 (24 VAC/VDC) 	UA 220106	like KTRRUu-257.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pure white** (like RAL 9010), **glossy,** without frame		I
KTRRUu-257.456#56 (24 VAC/VDC) 	UA 220110	like KTRRUu-257.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pure white** (like RAL 9010), **matt,** without frame		I
KTRRUu-257.456#57 (24 VAC/VDC) 	UA 220107	like KTRRUu-257.456#21, but with delivery scope: controller, cover **55 x 55** mm, **pearl white** (like RAL 1013), **glossy,** without frame		I
KTRRUu-257.456#59 (24 VAC/VDC) 	UA 220109	like KTRRUu-257.456#21, but with delivery scope: controller, cover **55 x 55** mm, **traffic white** (like RAL 9016), **glossy,** without frame		I

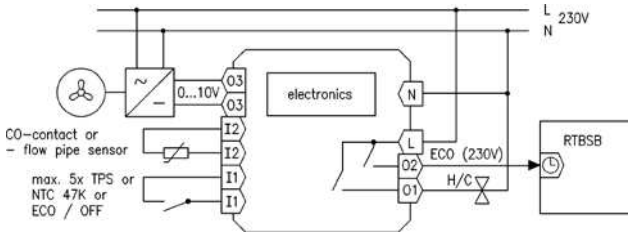
Accessories: suitable valve actuators ZBOOA, dew point sensor TPS 1/TPS 2/TPS 3, single frame JZ-090.900 (pure white, glossy) / JZ-090.910 (pearl white, glossy)

Electronic climate controller with timer KTRRUu

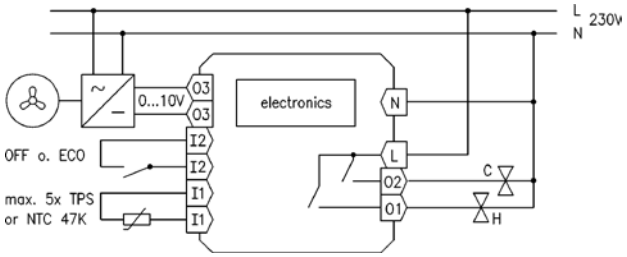
Flush-mounted installation – Design Berlin UP

Accessories	Item no.	Features	PG
JZ-090.900 	VV 000025	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pure white like RAL 9010 **Housing material:** PC plastic	I
JZ-090.910	VV 000010	**General features:** alre frame “Berlin” (neutral) for all flush-mounted controllers with cover 50 x 50 mm **Design:** Berlin **Surface finish:** glossy **Housing colour:** pearl white like RAL 1013 **Housing material:** PC plastic	I

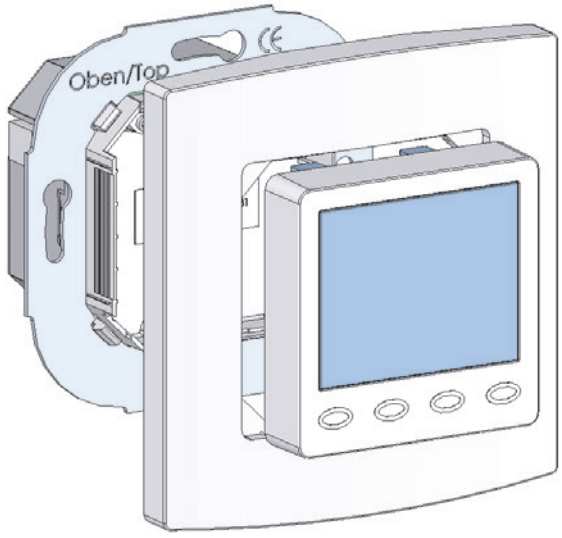
KTRRUu application example – 2-pipe system (230-V version)



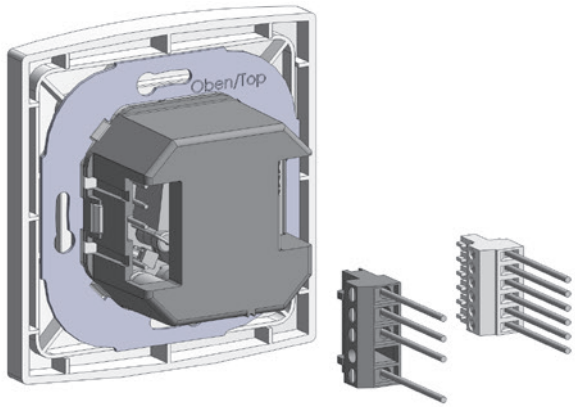
KTRRUu application example – 4-pipe system (230-V version)



KTRRUu with alre frame “Berlin”



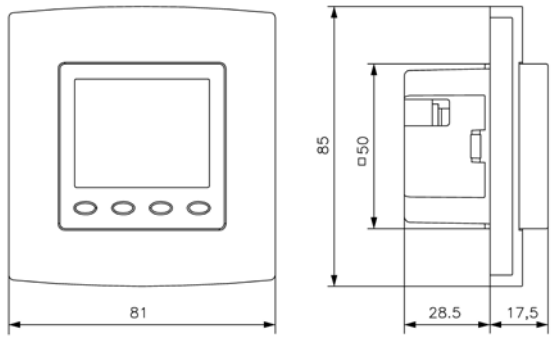
pluggable screw-type terminals



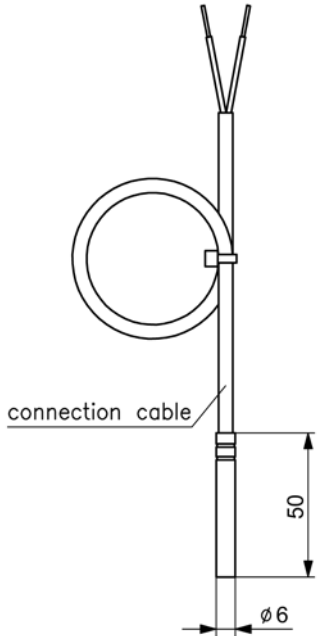
Electronic climate controller with timer KTRRUu

Flush-mounted installation – Design Berlin UP

KTRRUu with alre frame "Berlin"



KF-2



Other benefits:

- Pluggable screw-type terminals facilitate quick and easy assembly
- Illuminated, graphics-capable display
- Automatic adjustment to standard/daylight savings time
- Learning function
- Correction of measurement values
- Configurable display content
- Choice of various languages during installation: German, English, French, Dutch, Polish, Spanish, Czech, Russian
- Configurable inputs and outputs, for example:
  - OFF circuit with frost protection
  - ECO input
  - Dew point sensor input
  - Output: heating/cooling/timer master
- Fan control 0–10 V
- Key lock
- Valve protection function
- Configurable control method (PI-PWM or 2-point control)
- Holiday and party function
- Power reserve
- "Heating operation" indication (LED orange)
- "Cooling operation" indication (LED blue)

Adaptation of alre flush-mounted controllers KTRRUu-2x7.456

Manufacturer	Range	Colour RAL 9010 (surface finish)	Adaptation in switch range “55 x 55” possible using...	“50 x 50” adaptation possible with ... (insert frame from manufacturer required)
BERKER	S.1	polar white (matt)	KTRRUu-2x7.456#56	not required
BERKER	S.1	polar white (glossy)	KTRRUu-2x7.456#55	not required
BERKER	Arsys	polar white (glossy)		KTRRUu-2x7.456#07 + 1108 01 69
BERKER	B.3	aluminium/polar white (matt)	KTRRUu-2x7.456#56	not required
BERKER	B.3	aluminium/polar white (glossy)	KTRRUu-2x7.456#55	not required
BERKER	B.7	glass/polar white (matt)	KTRRUu-2x7.456#56	not required
BERKER	B.7	glass/polar white (glossy)	KTRRUu-2x7.456#55	not required
BERKER	K.1	polar white (glossy)		KTRRUu-2x7.456#07 + 1108 71 09
BUSCH-JAEGER	Reflex SI/SI Linear	alpine white (glossy)	KTRRUu-2x7.456#28	not required
BUSCH-JAEGER	Busch-balance SI	polar white (glossy)	KTRRUu-2x7.456#55	not required
BUSCH-JAEGER	impuls	alpine white (glossy)		KTRRUu-2x7.456#07 + 1746/10-74
BUSCH-JAEGER	solo / future / axcent etc.	studio white–see RAL 9016 below		
ELSO	Joy	pure white (glossy)	HTRRUu-210.021#55	not required
ELSO	Fashion/Riva/Scala	pure white (glossy)		HTRRUu-210.021#07 + 203084
GIRA	rocker switch	pure white (glossy)		KTRRUu-2x7.456#07 + 0282 112
GIRA (System 55)	Standard/E 2	pure white (semi-gloss)	KTRRUu-2x7.456#56	not required
GIRA (System 55)	Standard/E 2	pure white (glossy)	KTRRUu-2x7.456#55	not required
GIRA (System 55)	E 22	pure white (glossy)	KTRRUu-2x7.456#55	not required
GIRA (System 55)	Event	pure white (semi-gloss) + opaque...	KTRRUu-2x7.456#56	not required
GIRA (System 55)	Event	pure white (glossy) + opaque...	KTRRUu-2x7.456#55	not required
GIRA (System 55)	Esprit	pure white (semi-gloss) + glass, aluminium...	KTRRUu-2x7.456#56	not required
GIRA (System 55)	Esprit	pure white (glossy) + glass, aluminium...	KTRRUu-2x7.456#55	not required
GIRA	S-Color	pure white (high-gloss)		KTRRUu-2x7.456#07 + 0282 40
JUNG	CD 500/CD plus	alpine white (glossy)		KTRRUu-2x7.456#07 + CD 590 Z WW
JUNG	A 500/AS 500/A plus	alpine white (glossy)	KTRRUu-2x7.456#55	not required
JUNG	LS 990	alpine white (glossy)		KTRRUu-2x7.456#07 + LS 961 Z WW
JUNG	LS plus	alpine white (glass)		KTRRUu-2x7.456#07 + LS 961 Z WW
JUNG	A creation	alpine white (glossy)	KTRRUu-2x7.456#55	not required
JUNG	LS Design	alpine white (glossy)		KTRRUu-2x7.456#07 + LS 961 Z WW
MERTEN (System M)	M-Smart, M-Plan, M-Pure	polar white (matt)	KTRRUu-2x7.456#56	not required
MERTEN (System M)	M-Smart, M-Plan, M-Creativ, M-Pure	polar white (glossy)	KTRRUu-2x7.456#55	not required
MERTEN (System Basis)	1-M/Atelier-M	polar white (glossy)	KTRRUu-2x7.456#55	not required
MERTEN (System Design)	Artec/Antik	polar white (glossy)		KTRRUu-2x7.456#07 + 5160 99
MERTEN	1-M/M-Smart/M-Plan/M-Pure/D-Life	active white–see RAL 9016 below		
PEHA	Standard	pure white (glossy)		KTRRUu-2x7.456#07 + 80.670.02 ZV
PEHA	Dialog	pure white (glossy)		KTRRUu-2x7.456#07 + 95.670.02 ZV
PEHA	Aura	pure white (matt) / glass		KTRRUu-2x7.456#07 + 20.670.02 ZV
PEHA	Badora	pure white (glossy)		KTRRUu-2x7.456#07 + 11.670.02 ZV

Manufacturer	Range	Colour RAL 9016 (surface finish)	Adaptation in switch range “55 x 55” possible using...	To adapt KTRRUu in size “50 x 50”, an insert frame from the manufacturer is required
BUSCH-JAEGER	solo/future/future linear	studio white (RAL 9016, glossy)		KTRRUu-2x7.456#27 + 1746/10-84
BUSCH-JAEGER	axcent	studio white (RAL 9016, glossy)		KTRRUu-2x7.456#27 + 1746/10-84
BUSCH-JAEGER	carat (glass, bronze, gold)	studio white (RAL 9016)		KTRRUu-2x7.456#27 + 1746/10-84
BUSCH-JAEGER	alpha (nea/exclusive*)	studio white (RAL 9016, glossy)		KTRRUu-2x7.456#27 + 1746/10-24G
MERTEN	M-Smart, M-Plan, M-Pure	active white (RAL 9016, glossy)	KTRRUu-2x7.456#59	not required
MERTEN	1-M/Atelier-M	active white (RAL 9016, glossy)	KTRRUu-2x7.456#59	not required
MERTEN	D-Life	lotos white (RAL 9016)		HTRRUu-210.021#27 + (3630 84)
PEHA	Standard	arctic		KTRRUu-2x7.456#27 + D 80.670 ZV AW

*) During assembly, you need to remove four plastic tabs located at the rear of the frame.

NOTE: Most light switch ranges are designed in the colour “like RAL 9010”, although different switch manufacturers use different designations for this colour. Coloured, glass and aluminium frames are also combined with white jacks or plugs so that controllers with white covers can also be integrated into these frames. Check the precise application in each individual case. The frames have different surface qualities (matt/glossy). For design reasons, the cover of the controller should have the same quality as the frame. We accept no liability for slight variations in colour and surface finish or for accuracy of fit. When installing devices into multi frames, always assemble the temperature controllers at the lowermost position.

“50 x 50 controller”: The housing covers of the 50 x 50 controllers are 50 x 50 mm in size. Using a 50 x 50-mm insert frame, the 50 x 50 controllers can be integrated into nearly all light switch ranges in accordance with DIN 49075. The 50 x 50-mm insert frames must be ordered from the light switch manufacturer or from a wholesaler. The order number of the insert frame corresponding to the switch range in question can be found in the column “For adaptation of KTRRUu into size ‘50 x 50’”.

“55 x 55 controller”: The housing covers of the 55 x 55 controllers are 55 x 55 mm in size. Many light switch ranges have inner dimensions of 55 x 55 mm. Therefore, the 55 x 55 controllers can be installed directly in the light switch frame without the use of an insert frame. See the column “Adaptation in switch range (55 x 55)” to determine whether the 55 x 55 controller fits in the given light switch range (KTRRUu-2x7.456#xx).

All information regarding switch manufacturers’ product lines and item numbers was last updated in 12/2017 | No liability is assumed for the information provided. | Technical specifications subject to change. An adaptation list for RAL 1013 switch ranges is available from our website at www.alre.de.

Continuous electronic climate controller, KTRVB

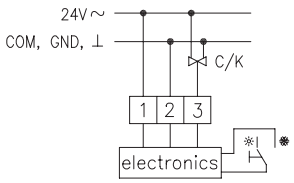
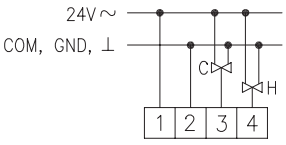
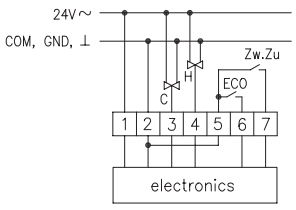
Surface-mounted installation – Design Berlin 2000

Technical data

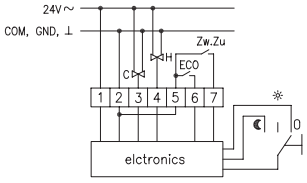
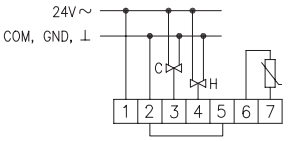
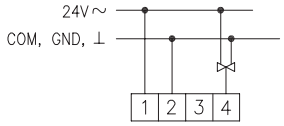
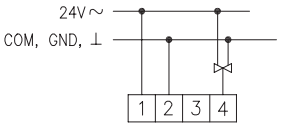
Design:	Berlin 2000
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Storage temperature:	–20 … +70 °C
Operating voltage:	24 VDC, 24 VAC, 50 Hz
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	Surface- / wall-mounting
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Switching element:	electronic with analogue output signal
General features:	climate controller for individual room control with proportionally controlled valve; mechanical range restriction; external setting

Application

Room temperature controller for continuous control of valve actuators. Controller for 2-pipe systems (1-duct), 4-pipe systems (2-duct) and mixing chambers.

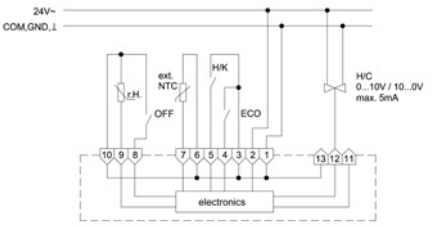
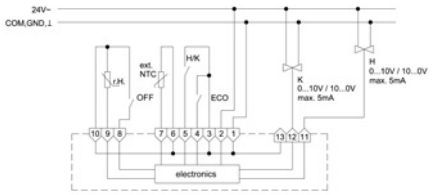
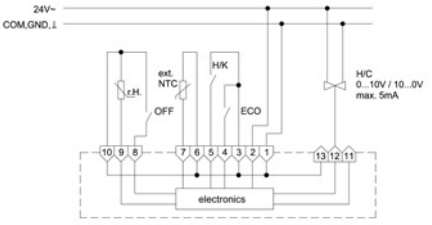
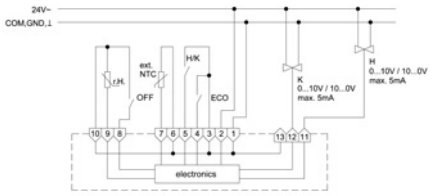
Type / image	Item no.	Features	Circuit diagram	PG
KTRVB-040.209 	DA 452200	**General features:** relative scale; heating / cooling switch **Ambient temperature:** 0 … 50 °C **Max. power consumption:** approx. 1.5 VA **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:**NTC internal **Control function:** heating or cooling with adjustable p-band **Control area:** 13 … 29 °C **Adjustment range:** –3 … +3 °C the preset “zero point” of approx. 21 °C can be adjusted in the machine by +/– 5 K **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K ... 3 K (adjustable) **Pipe system compatibility:** 2-pipe		I
KTRVB-042.100 	DA 451000	**General features:** scale: degrees Celsius **Ambient temperature:** 0 … 50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal **Control function:** heating and cooling with adjustable p-band: **Control range:** 5 … 30 °C **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K ... 3 K (adjustable) **Neutral zone:** –1 … +5 K (adjustable) **Pipe system compatibility:** 4-pipe		I
KTRVB-042.205 	DA 451200	**General features:** ECO function; operating mode “off with frost protection monitoring”; relative scale **Ambient temperature:** 0 … 50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal **ECO contact:** upon closing the contact, the ECO function is actuated (neutral zone is expanded by the ECO value that has been set (1 ... 5 K)) **Forced switch-off contact:** switching off the control **Control function:** heating and cooling with adjustable p-band: **Control range:** 13 … 29 °C **Adjustment range:** –3 … +3 °C (the preset “zero point” of approx. 21 °C can be adjusted in the device by +/– 5 K **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K … 3 K (adjustable) **Neutral zone:** –1 … +5 K (adjustable) **Pipe system compatibility:** 4-pipe		I

Continuous electronic climate controller, KTRVB

Type / image	Item no.	Features	Circuit diagram	PG
KTRVB-042.206 	DA 451300	**General features:** ECO function; **“ECO” display; “on / off” display;** operating mode “off with frost protection monitoring”; relative scale; **off / comfort / ECO switch** **Ambient temperature:** 0 … 50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal **ECO contact:** upon closing the contact, the ECO function is actuated (neutral zone is expanded by the ECO value that has been set (1 ... 5 K)) **Forced switch-off contact:** switching off the control (supersedes switch) **Control function:** heating and cooling with adjustable p-band: **Control range:** 13 … 29 °C **Adjustment range:** –3 … +3 °C (the preset “zero point” of approx. 21 °C can be adjusted in the device by +/– 5 K) **Hysteresis:** 0 K, since control is always via the p-band in the range from 0.5 K ... 3 K (adjustable) **Neutral zone:** –1 … +5 K (adjustable) **Pipe system compatibility:** 4-pipe		I
KTRVB-042.207 	DA 451400	**General features:** relative scale; without sensor **Ambient temperature:** 0 … 50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC external (“Sensor 2”) see “Sensor technology”. **Control function:** heating and cooling with adjustable p-band: **Control range:** 13 … 29 °C **Adjustment range:** –3 … +3 °C (the preset “zero point” of approx. 21 °C can be adjusted in the device by +/– 5 K **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K … 3 K (adjustable) **Neutral zone:** –1 … +5 K (adjustable) **Pipe system compatibility:** 4-pipe		I
KTRVB-048.100 	DA 450000	**General features:** scale: degrees Celsius **Ambient temperature:** 0 … 50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal **Control function:**Heating or cooling with adjustable p-band, aligned to 5 V at setpoint temperature **Control range:** 5 … 30 °C **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K … 3 K (adjustable) **Pipe system compatibility:** 2-pipe		I
KTRVB-048.200 	DA 450100	**General features:** relative scale **Ambient temperature:** 0–50 °C **Output signal:** consistently 0–10 V or 10–0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal **Control function:** heating or cooling with adjustable p-band, aligned to 5 V at setpoint temperature **Control range:** 13 … 29 °C **Adjustment range:** –3 … +3 °C (the preset “zero point” of approx. 21 °C can be adjusted in the device by +/– 5 K **Hysteresis:** 0 K, since control is always via the p-band in the range from +0.5 K ... 3 K (adjustable) **Pipe system compatibility:** 2-pipe		I

Continuous electronic climate controller, KTRVB

Surface-mounted installation – Design Berlin 2000

Type / image	Item no.	Features	Circuit diagram	PG
KTRVB-052.244 	DA 451500	**General features:** external dew point sensor; ECO function; **"heating / cooling / cooling interruption due to condensation / off" display; "sensor interruption / sensor short-circuit / frost protection" display;** operating mode "off with frost protection monitoring"; relative scale **Ambient temperature:** 0 … 40 °C **Output signal:** consistently 0 – 10 V or 10 – 0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal, optional external ("Sensor 2") see "Sensor technology". **External flow sensor (H / C sensor):** for automatic switching of the controller to heating or cooling mode depending on the inflow temperature; alternatively, this input can be used as an H / C changeover contact ("Sensor 2") **Eco contact:** upon closing the contact, the ECO function is actuated (in heating mode, the temperature is adjusted down by 3 K and in cooling mode it is adjusted up by 3 K) **Forced switch-off contact:** external switch-off function with frost protection function **Control function:** heating and / or cooling with p-band 1 K, cooling interruption upon condensation of the dew point sensor, frost protection function in "off" state **Control range:** 13 … 29 °C **Adjustment range:** 21 °C ± 8 K **Hysteresis:** 0 K, since control is always via the p-band in the range from 1 K **Neutral zone:** approx. 2 K **Pipe system compatibility:** 2-pipe and 4-pipe	 	I
KTRVB-052.245 	DA 451600	**General features:** external dew point sensor; ECO function; **"heating / cooling / cooling interruption due to condensation / off" display; "sensor interruption / sensor short-circuit / frost protection" display;** operating mode "off with frost protection monitoring"; relative scale; **"off / comfort / ECO" switch** **Ambient temperature:** 0 … 40 °C **Output signal:** consistently 0 – 10 V or 10 – 0 V (can be switched using a jumper), max. 5 mA **Sensor:** NTC internal, optional external ("Sensor 2") see "Sensor technology". **External flow sensor (H / C sensor):** for automatic switching of the controller to heating or cooling mode depending on the inflow temperature ("Sensor 2"); alternatively, this input can be used as an H / C changeover contact **Eco contact:** upon closing the contact, the ECO function is actuated (in heating mode, the temperature is adjusted down by 3 K and in cooling mode it is adjusted up by 3 K) **Forced switch-off contact:** external switch-off function with frost protection function **Control function:** heating and / or cooling with p-band 1 K, cooling interruption upon condensation of the dew point sensor, frost protection function in "off" state **Control range:** 13 … 29 °C **Adjustment range:** 21 °C ± 8 K **Hysteresis:** 0 K, since control is always via the p-band in the range from 1 K **Neutral zone:** approx. 2 K **Pipe system compatibility:**2-pipe and 4-pipe	 	I

Mechanical climate controller, PTR 02

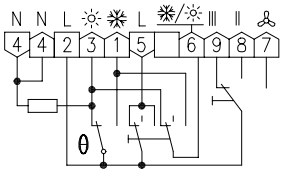
Surface-mounted – Design Pikolo 2

Technical data

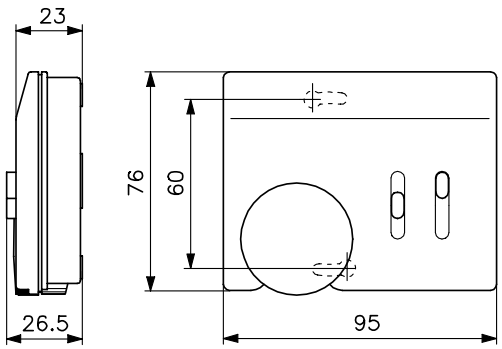
Design:	Pikolo 2
Surface finish:	matt
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	0 … 30 °C
Storage temperature:	– 20 … + 70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals
Mounting / attachment:	Surface- / wall-mounting
Protection rating:	IP 30
Protection class:	II, if properly mounted
Safety and EMC:	according to DIN EN 60730
Average power consumption:	< 0.5 W
Max. switching current:	3 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching power:	690 W
Switching element:	bimetallic contact
Sensor:	bimetal
Hysteresis:	approx. 0.5 K at a temperature change of max. 4 K / h
General features:	3-stage fan output; mechanical range restriction; thermal feedback; external setting
Pipe system compatibility:	2-pipe

Application

Control or monitoring of temperatures in closed, dry spaces. Suitable for air conditioning systems (fan coils).

Type / image	Item no.	Features	Circuit diagram	PG
PTR 02.802 	A 201154	**General features:** scale: degrees Celsius; **3-stage fan switch; heating / off / cooling switch** **Switching contact:** changeover (toggler) **Output signal:** switching (230 VAC, 50 Hz) **Control function:** heating or cooling **Control range:** 5 … 30 °C		I

PTR 02



Electronic dew point monitor, WFRRN

Standard rail mounting

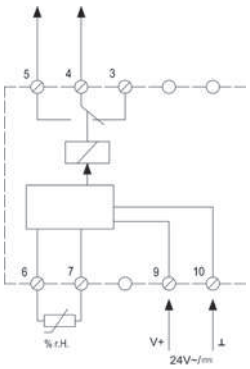
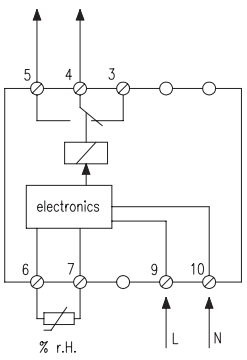
Technical data

Surface finish:	matt
Housing colour:	light grey, like RAL 7035
Housing material:	PC plastic
Ambient temperature:	0…55 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals up to 2.5 mm²
Mounting / attachment:	Standard rail mounting
Protection rating:	IP 20
Safety and EMC:	according to DIN EN 60730
Average power consumption:	approx. 1 VA
Min. switching current:	depending on the switching voltage (min. 0.3 W)
Min. switching voltage:	depending on the switching current (min. 0.3 W)
Switching element:	relay
Switching contact:	changeover (toggler), potential-free
Output signal:	switching
Control function:	dew point triggering
Hysteresis:	8 MΩ
Break point fixed:	approx. 98% relative humidity
General features:	“dew point triggering” display
Accessories:	dew point sensors (TPS)

Application

For interrupting the cooling, when the relative atmospheric humidity exceeds approx. 98%.

Method of operation:
If the surface temperature of the dew point sensor is equivalent to the dew point, a microscopic film of moisture forms on its surface. This film changes the resistance value of the dew point sensor to such an extent that the connected controller or monitor detects this change and disables the cooling. In this manner, dripping condensate water at maximum cooling, and hence moisture damage to the building, are avoided. When the dew point sensor dries off again, the resistance value increases and cooling is re-enabled. To ensure that a pending undershooting of the dew point is detected in time, the dew point sensor should be assembled at the point where the dew point is most likely to be reached first along the cooling circuit. Generally, these locations are at the inlet coming into the room and / or near windows. If the place where the dew point is most likely to occur cannot be unambiguously determined, it is possible to connect up to 5 dew point sensors in parallel to one controller or monitor.

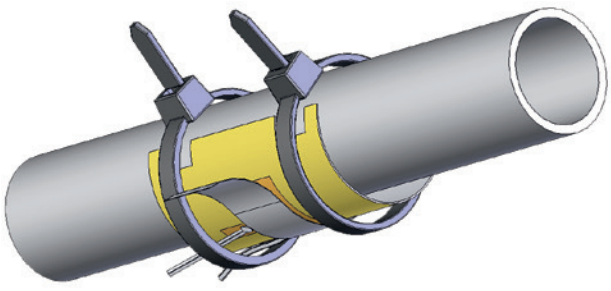
Type / image	Item no.	Features	Circuit diagram	PG
WFRRN-240.018 	D 4780587	**Operating voltage:** 24 VDC, 24 VAC, 50 Hz **Protection class:** III **Max. switching current:** 10 (3) A at 48 VAC, 10 A at 30 VDC, 1 A at 60 VDC **Max. switching voltage:** 48 VAC, 50 Hz / 60 VDC **Switching power:** 500 VA at 48 VAC, 300 W at 30 VDC, 60 W at 60 VDC		I
WFRRN-210.018 	D 4780572	**Operating voltage:** 230 VAC, 50 Hz **Protection class:** II, if properly mounted **Max. switching current:** 10 (3) A at 230 VAC, 10 A at 30 VDC, 1 A at 60 VDC **Max. switching voltage:** 230 VAC, 50 Hz / 60 VDC **Switching power:** 2300 VA at 230 VAC, 300 W at 30 VDC, 60 W at 60 VDC		I

Dew point sensor, TPS

Technical data		Application
Storage temperature:	–20…+70 °C	This dew point sensor has been developed in conjunction with an alre dew point monitor and cooling ceiling controller for the specific purpose of capturing and signalling the dew point. It thus prevents dripping condensation water from the cooling parts of the cooling circuit, if installed correctly.
Sensor wire extendable up to:	50 m with 2 x 0.5 mm²	
Connecting cable:	10 m	
Accessories:	For use with dew point sensors (e.g., WFRRN) or climate controllers with dew point monitoring (KTRRB, KTRRU, KTRRUu, KTRVB, KTFRL, KTFRD)	

Type / image	Item no.	Features	PG
TPS 1 	G 8000299	**Mounting / Attachment:** to the cooling ceiling capillary pipe using clips **Use:** drywall cooling ceiling (plasterboard) with hung up capillary pipe mat, metal ceiling cooling ceiling with integrated capillary pipe system **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Scope of delivery:** sensor, 2 clips for cooling pad	I
TPS 2 	G 8000300	**Mounting / Attachment:** to the cooling ceiling capillary pipe using clips or cable ties **Use:** pipe systems transporting cold water, plaster cooling ceiling with capillary tube system **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Scope of delivery:** sensor, 2 clips for cooling pad, 2 cable ties	I
TPS 3 	SN 120000	**Mounting / Attachment:** to the pipe using cable ties **Use:** pipe systems transporting cold water, plaster cooling ceiling with capillary tube system **Sensor line extendable up to:** 50 m with 2 x 0.5 mm² **Scope of delivery:** sensor, 2 cable ties	I

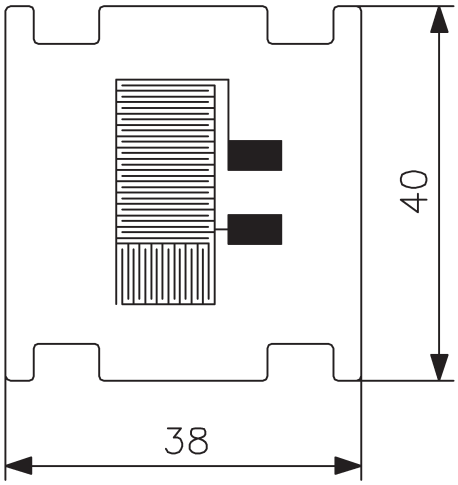
TPS 3



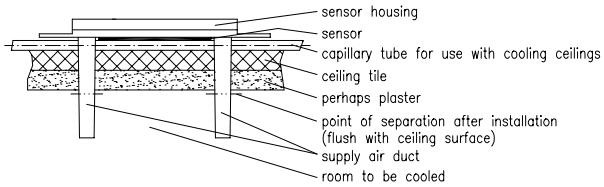
Important note: The inflow ducts of TPS-1 and TPS-2 are closed before shipping to avoid dirtying during assembly. After assembly, they must be shortened with a knife until they are flush with the wall to ensure air circulation. The air ducts should be arranged such that soiling during operation is avoided. It is important that the air surrounding the sensor has the same temperature as the room air to be cooled. If the humidity and temperature of the air to be cooled (ceiling cooling system) is different from that of the air surrounding the sensor, condensation may be detected prematurely or too late. As regards TPS-3, contact with the PCB paths must be avoided to prevent long-term corrosion.
Attention in case of sensor extension: Parallel laying to conductors carrying a mains voltage can result in faults. The use of shielded conductors reduces sensitivity to electromagnetic fields.

Dew point sensor, TPS

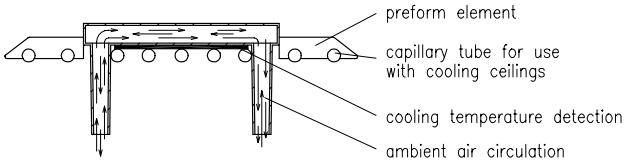
TPS 3



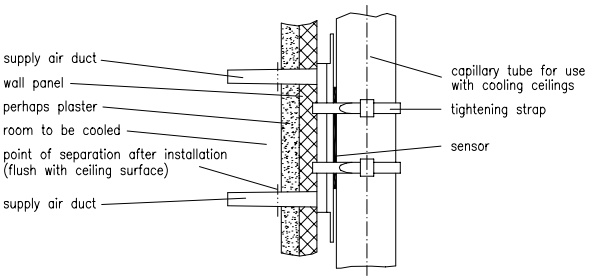
TPS 1



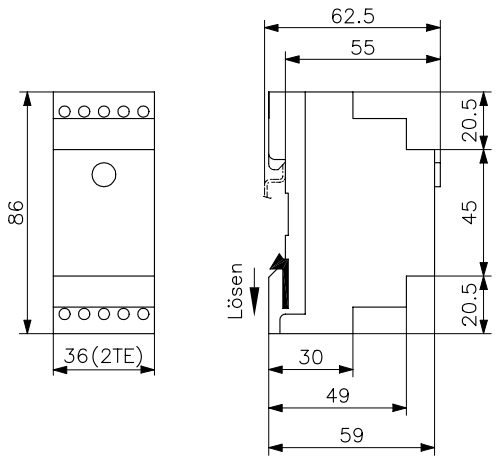
TPS 1



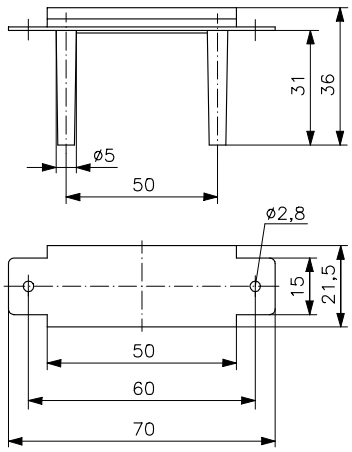
TPS 2



WFRRN



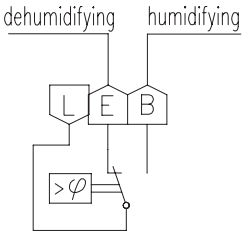
TPS 1/2



Mechanical room hygrostats / hygro-thermostats, RFHSB, RFHSU, RKDSB

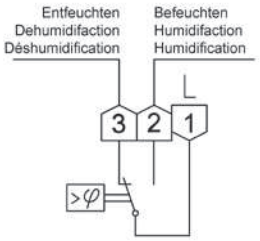
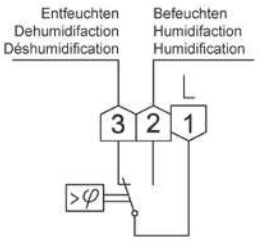
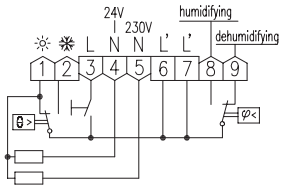
Surface-mounted installation – Design Berlin 2000 / 30, flush-mounted installation – Berlin UP

Technical data		Application
Storage temperature:	–20 … +70 °C (RKDSB-171.000 –20 … +60 °C)	Hygrostat: The room hygrostat is used to monitor and control the relative humidity, e.g., in offices, homes, winter gardens, baths, swimming pools and data centres. The action of the relative humidity on a measuring tape is made to actuate a potential-free changeover contact. The desired value is set by means of the adjusting knob on the front panel. The setting range can be limited.
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing	
Electrical connection:	screw-type terminals	
Protection rating:	IP 30	
Protection class:	II, if properly mounted	
Safety and EMC:	according to DIN EN 60730	
Min. switching current:	100 mA	
Max. switching voltage:	230 VAC, 50 Hz	
Min. switching voltage:	24 VAC, 50 Hz	
General features:	mechanical range restriction	
Other / similar items:	for duct and control cabinet hygro-stats, see Plant engineering	Hygro-thermostat: Monitoring and control of the relative humidity and the temperature in one device.
		Note: Observe the wet room distance according to DIN VDE 0100-701!

Type / image	Item no.	Features	Circuit diagram	PG
RFHSU-101.060#00 	UA 040000	**General features:** external setting; protective cap; contact hazard protection cover plate **Design:** Berlin UP **Surface finish:** according to selected cover set **Housing colour:** according to selected cover set **Housing material:** PC plastic **Operating voltage:** no auxiliary energy necessary **Ambient temperature:** 0 … 60 °C **Mounting / Attachment:** in flush-mounted socket – adaptable with cover set 50 x 50 mm or 55 x 55 mm in almost all switch ranges (deep flush-mounted socket recommended) **Max. switching current:** dehumidifying (terminal E) 5 (0.2) A, humidifying (terminal B) 2 (0.2) A **Switching power:** terminal E: 1150 W, terminal B: 460 W **Switching element:** microswitch **Switching contact:** changeover switch (toggler) **Output signal:** switching **Sensor:** plastic fibres **Control function:** humidifying or de-humidifying **Control range:** 35 … 85% rel. humidity **Hysteresis:** approx. 7% rel. humidity **Accessories:** Cover sets are offered in various designs (see the separate overview on page 99) and are not included in the delivery. **Suitable set no:** JZ-021.xxx, e.g.: cover set 50 x 50 mm, pure white, glossy: JZ-021.000 cover set 55 x 55 mm, pure white, glossy: JZ-021.100 **Scope of delivery:** controller, protective cap		I

Mechanical room hygrostats / hygro-thermostats, RFHSB, RFHSU, RKDSB

Surface-mounted installation – Design Berlin 2000 / 30, flush-mounted installation – Berlin UP

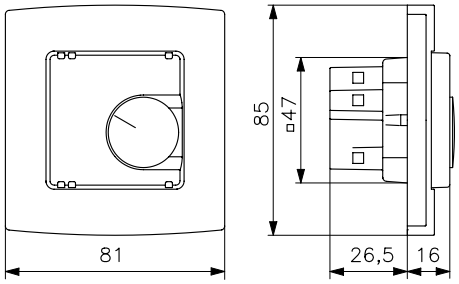
Type / image	Item no.	Features	Circuit diagram	PG
RFHSU-101.060#21 	UA 040001	like RFHSU-101.060#00, but with delivery scope: controller, alre frame “Berlin”, cover 50 x 50 mm, pure white (like RAL 9010), glossy		I
RFHSB-060.010 	MA 020202	**General features:** external setting **Design:** Berlin 2000 **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic **Operating voltage:** no auxiliary energy necessary **Ambient temperature:** 0 … 60 °C **Mounting / Attachment:** surface- / wall-mounting (4-hole assembly on flush-mounted socket) **Max. switching current:** dehumidifying (terminal 4) 5 (0.2) A, humidifying (terminal 2) 2 (0.2) A **Switching power:** terminal 4: 1150 W, terminal 2: 460 W **Switching element:** microswitch **Switching contact:** changeover switch (toggler) **Output signal:** switching **Sensor:** plastic fibres **Control function:** humidifying or de-humidifying **Control range:** 35 … 85% rel. humidity **Hysteresis:** approx. 7% rel. humidity		I
RFHSB-060.011 	MA 020203	like RFHSB-060.010, but with internal setting		I
RKDSB-171.000 	MA 220000	**General features:** external setting **Design:** Berlin 3000 **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic **Operating voltage:** 24 VAC or 230 VAC selectable **Ambient temperature:** 0 … 50 °C **Mounting / Attachment:** surface / wall-mounting or by means of adapter plate on flush-mounted socket **Max. switching current:** dehumidifying (terminal 9) 5 (0.2) A, humidifying (terminal 8) 3 (0.2) A, heating (terminal 1) 10 (4) A at 230 VAC / 1 (1) A at 24 VAC, cooling (terminal 2) 5 (2) A at 230 VAC / 1 (1) A at 24 VAC **Switching power:** terminal 9: 1150 W, terminal 8: 690 W, terminal 1: 2300 W at 230 VAC / 24 W at 24 VAC, terminal 2: 1150 W at 230 VAC / 230 W at 24 VAC **Switching element:** microswitch (hygrostat) / bimetal (thermostat) **Switching contact:** 2x changeover switches (togglers) **Output signal:** switching **Sensor:** plastic fibres for humidity, bimetal for temperature **Control function:** humidifying or de-humidifying, heating or cooling **Control range:** temperature 10 … 35 °C, humidity 30 … 00 % rel. humidity **Setting range:** 10 … 35 °C **Hysteresis:** approx. 4% rel. humidity, approx. 1 K at a temperature change of max. 4 K / h **Accessories:** adapter plate flush-mounted socket mounting: JZ-17		I

Mechanical room hygrostats / hygro-thermostats, RFSB, RFHSU, RKDSB

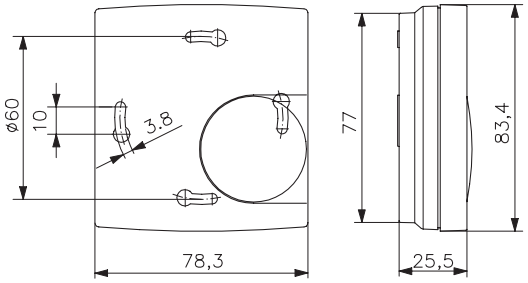
Surface-mounted installation – Design Berlin 2000 / 30, flush-mounted installation – Berlin UP

Accessories	Item no.	Features	PG
JZ-17 	MN 990001	**General features:** adapter plate for mounting devices on flush-mounted sockets (including fastening screws for mounting the controller on the adapter plate) **Surface finish:** matt **Housing colour:** pure white like RAL 9010 **Housing material:** ABS plastic	II

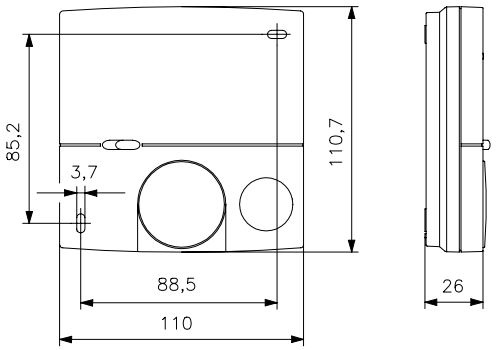
RFHSU



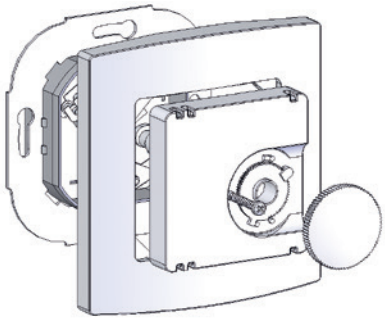
RFHSB



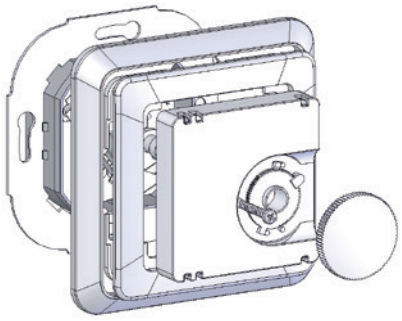
RKDSB



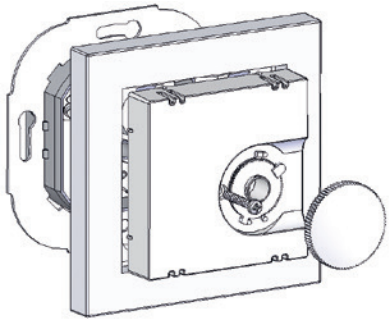
RFHSU with alre frame “Berlin” (#21 type)



RFHSU with insert frame



RFHSU without 55 x 55 insert frame



Terminal strip for heating / cooling manifold, VOORL

for 5 or 8 room thermostats

Technical data

Surface finish:	matt
Housing colour:	light grey, like RAL 7035
Housing material:	ABS plastic
Operating voltage:	230 VAC, 50 Hz
Ambient temperature:	–10 … +50 °C
Storage temperature:	–20 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	spring-cage terminals 0.2 mm² to 1.5 mm²; if end sleeves are used, 0.25 mm² to 0.75 mm²
Mounting / attachment:	Surface- / wall-mounting
Protection rating:	IP 20
Protection class:	II, if properly mounted
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Accessories:	suitable valve actuators: ZBOOA-010.100 optional magnetic fastening set for simple installation in heating manifold: JZ-24

Application

This device is specifically designed for fixed wiring of 230 VAC single-room temperature controllers and the associated valve actuators for fixed-location attachment. Switching between heating / cooling is performed via a central contact.

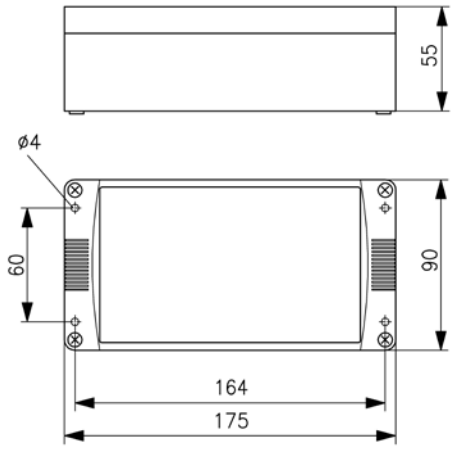
Type / image	Item no.	Features	PG
VOORL-215.008 	DA 490100	**General features:** terminal strip in housing for wiring up to 5 room thermostats and up to 10 actuators; up to 2 actuators per channel can be connected **Max. switching current:** output 1–5: 4 (1) A **Total of all the outputs (5 channels):** 4 (1) A **Switching power:** total of 920 W **ECO-contact:** if timer regulators are used, up to 2 master-slave time zones can be defined; time zone 2 can be switched to ECO function via an external switching contact on terminal U **Control function:** heating or cooling	I
VOORL-215.052 	DA 490300	As VOORL-215.008, but including an additional pump module (max. 0,75 A)	I
VOORL-318.008 	DA 490000	**General features:** terminal strip in housing for wiring up to 8 room thermostats and up to 16 actuators; up to 2 actuators per channel can be connected **Max. switching current:** output 1–8: 6 (1) A **Total of all outputs (8 channels):** 6 (1) A **Switching power:** total of 1380 W **ECO-contact:** if timer regulators are used, up to 3 master-slave time zones can be defined; time zone 3 can be switched to ECO function via an external switching contact on terminal U **Control function:** heating or cooling	I
VOORL-318.052 	DA 490200	As VOORL-318.008, but including an additional pump module (max. 0,75 A)	I

Accessories	Item no.	Features	PG
JZ-24 	BN 990002	Magnetic fastening set for simple and safe fastening of the multi-channel receiver on a metallic underground (for example, heating manifold)	II

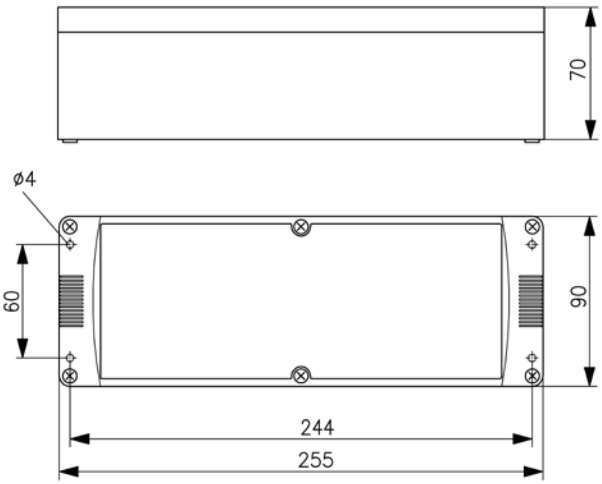
Terminal strip for heating manifold, VOORL

for 5 or 8 room thermostats

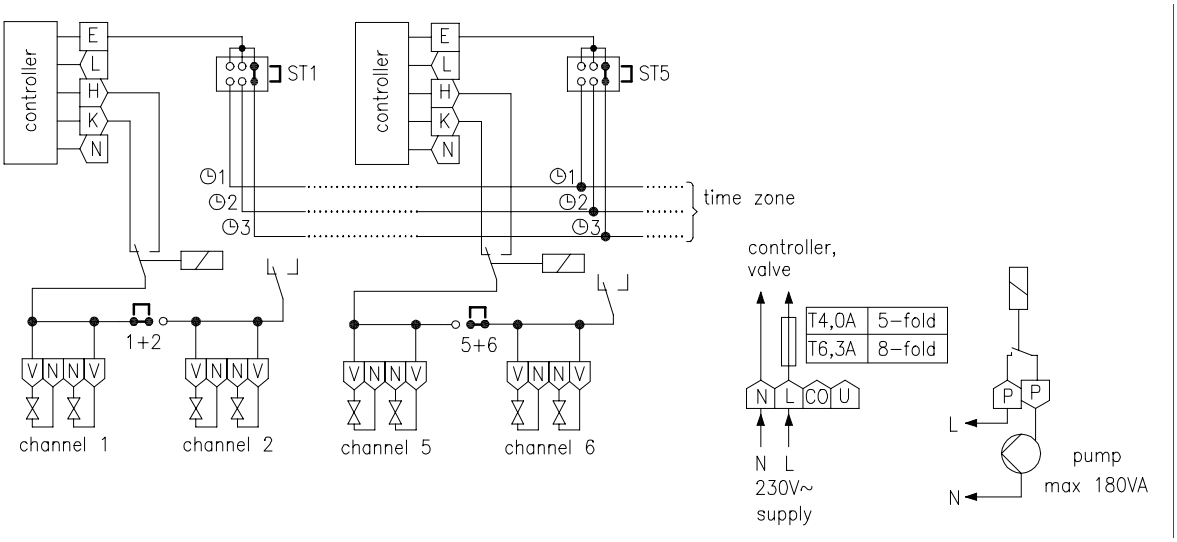
VOORL-215.xxx



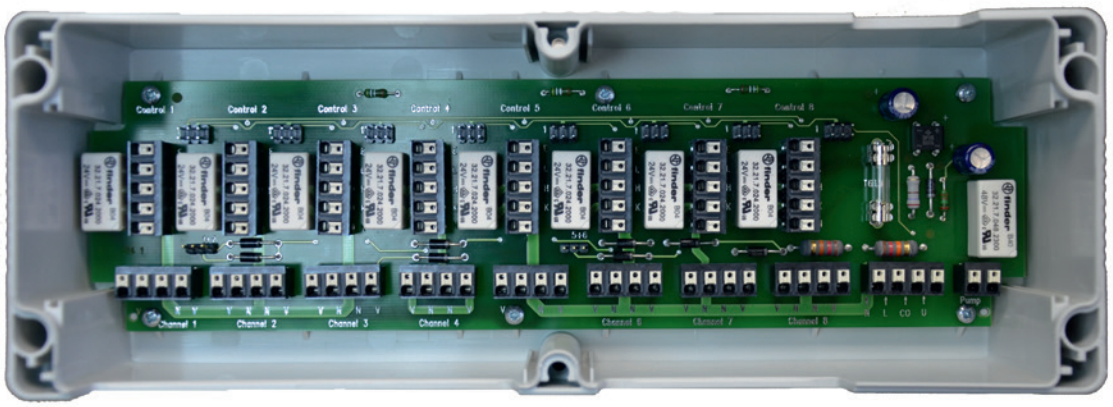
VOORL-318.xxx



VOORL-318.xxx

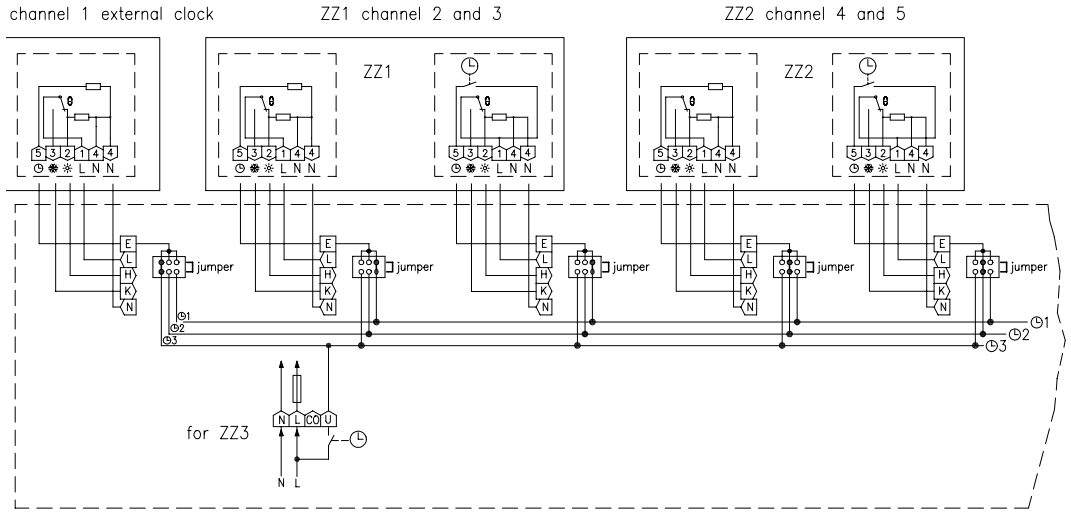


Internal view VOORL-318.xxx



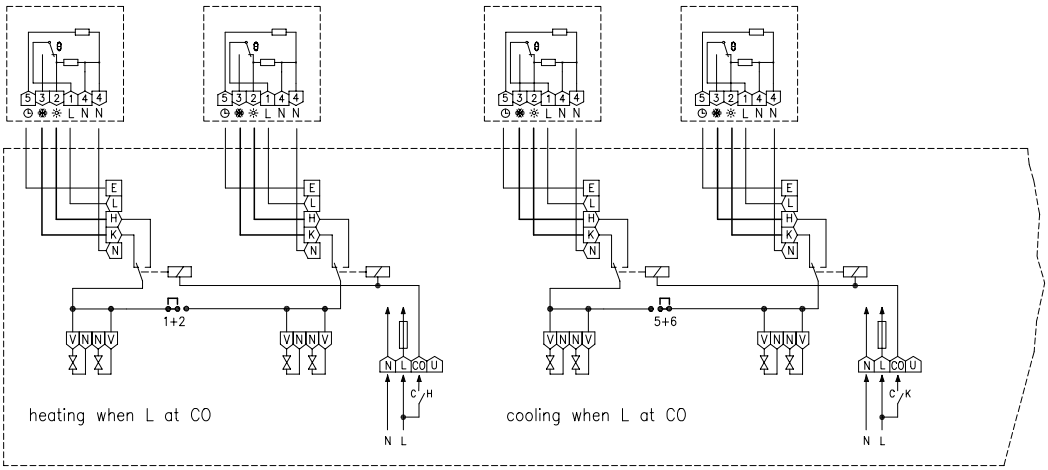
Notes and examples of wiring for VOORL terminal strips

Setting up time zones

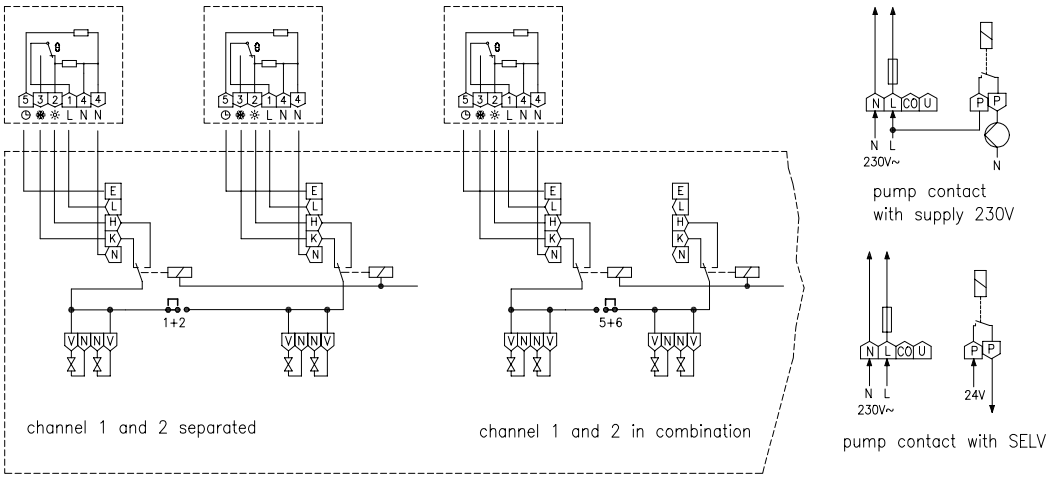


TZ = time zone

Inversion of the CO contact



Standard wiring and combination of channel 1/2



Electrothermal valve actuators

for heating, ventilation and air conditioning technology

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PC plastic, GF (20%)
Ambient temperature:	0…50 °C
Storage temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Mounting/attachment:	M 30 x 1.5
Protection rating:	IP 42
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Average power consumption:	approx. 3 W
Opening/closing time:	approx. 4 min
Nominal stroke:	3 mm
Function type:	normally closed
Nominal closing force:	90 N
Connecting cable:	0.8 m/2 x 0.5 mm²
Valve position indicator:	2X (at the top and the side)

Application

Extremely compact design:
Can be fitted quickly and comfortably thanks to the slim shape in the area around the fastening nut.

Can be fitted in any position:
Lateral drainage holes carry off any leakage water that from the valve plunger into the open, thus avoiding damage to the drive.

Additional valve monitoring:
Two additional viewing windows at the side allow users to visually check the respective valve position with ease; this does not work when mounted in a suspended manner.

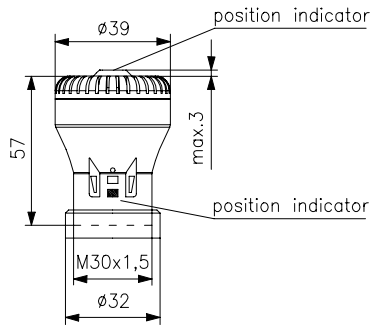
Type/image	Item no.	Features	PG
ZBOOA-010.100 	H 9100010	**Operating voltage:** 230 V~, 50 Hz **Max. power consumption:** 70 W **Max. starting current:** approx. 0.3 A	I
ZBOOA-040.100 	H 9100000	**Operating voltage:** 24 VDC or 24 VAC **Max. power consumption:** 12 W **Max. starting current:** approx. 0.5 A	I

Thanks to their M 30 x 1.5 fastening and their characteristics (normally closed), the actuators are suitable for the following valve and distributor makes:
Beulco, Empur, Heimeier, Kamo, Purmo, SBK, SKV, Strawa, Taconova, Watts

Brief description:
The drive features a compact, space-saving design.
The device can be mounted easily thanks to the narrowed shape, especially in the fastening area of the nut.
The fastening cable is not located near the fastening nut. This reduces the probability of contact with equipment carrying hot water.
Since the fastening nut allows continuous screwing onto the thread, by unscrewing the nut by two or three turns, it is possible to open the valve in an electrically de-energised state–something that cannot be done with bayonet couplings and impulse couplings.
Discharged water is dissipated via a draining system.
Gaskets are not required thanks to the careful design.

The double position display has the following advantages:
The upper display provides the option of a visual or, in conditions of bad visibility, tactile function test of the drive.
The lower viewing windows allow an additional check to determine whether the valve to be actuated follows the lifting movement of the drive.
At the beginning of the heating period, it can happen off and on that the valve plungers get “stuck”. Therefore, with the additional display, it is possible to determine whether the cause lies with the actuator or with the valve in the event the valve does not open. However, that is not possible when mounted in a suspended manner.

Valve actuator



Valve actuator with extended push rod

PLANT ENGINEERING

Technology for professionals,
versatile and robust.

PLANT ENGINEERING
The most modern and reliable technology for your systems.




Plant engineering must be robust and fail-safe. The most modern industrial plants and production halls have high demands: a raw environment and the most intense of usage.

Capillary, damp room and frost-resistant thermostats, as well as electronic temperature controllers, digital controllers and displays control the processes within your plant. Here you can also find humidity, flow, and pressure monitoring devices to equip your air intake systems, greenhouses or wind tunnels.

The most secure technology for perfect working systems.

Overview of plant engineering products:
Capillary, wet room and frost protection thermostats

Electronic temperature controllers, digital controllers / displays

Humidity, flow, pressure monitoring

Overview of plant engineering 1:

Industrial room thermostats, wet room thermostats

Industry, capillary, wet room and double thermostats for indoor and outdoor use		JET-40	JET-40 F	JET-41	JET-41 F	JET-110 R	JET-110 RF	JET-120 R	JET-120 RF	JMT-211	JMT-211 F	JET-30	JET-31	PTR 40.000	JET-110 X	JET-110 XF	JET-120 XF	JET-120 X	JET-120 XG	JET-130 X	JET-130 XF	JET-130 XG	JET-133 X	JET-133 XF	JET-140 X	JET-140 XF	JET-143 XF	JET-150	JET-150 F	JET-153	JET-153 F	WR 81.029-1	WR 81.129-1	WR 81.101-1	WR 81.009-2	WR 81.109-2	JMT-206 X
	Page	132	132	132	132	132	132	132	132	133	133	134	134	135	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	138	138	138	138	138	139
Devices	Bimetal													x																							
	Industrial room thermostat	x	x	x	x	x	x	x	x	x	x																										
	Capillary thermostat														x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Wet room thermostat													x																							
	Double thermostat											x	x																								
Capillary length	Capillary 0.5 m																															x	x				
	Capillary 1.5 m																																		x	x	x
	Capillary 1.8 m														x	x	x	x		x	x		x	x	x	x	x	x	x	x	x						
	Capillary 2 m																																	x			
	Capillary 4.5 m																		x			x															
Control range	–35 … +30 °C					x	x								x	x																					
	–20 … +30 °C													x																							
	–15 … +30 °C																																				
	–10 … +40 °C																																				
	0 … 35 °C	x	x									x	x																			x	x	x			
	0 … 60 °C							x	x								x	x	x																		
	0 … 70 °C			x	x																														x	x	
	10 … 45 °C											x	x																								
	10 … 55 °C									x	x																										
	20 … 80 °C																																				x
	40 … 100 °C																			x	x	x	x	x													
	50 … 120 °C																																				
	70 … 130 °C																								x	x	x										
	100 … 280 °C																											x	x	x	x						
Output	Microswitch (potential-free changeover contact)	1	1	1	1	1	1	1	1	2	2	2	2		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	Switching steps	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
Switching power	15 (8) A, 24–250 V~	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	15 (4) A, 24–250 V~																																				
	10 (4) A, 250 V~, 50 Hz, heating													x																							
	5 (2) A, 250 V~, 50 Hz, cooling													x																							
Supply voltage	None	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	230 V~, 50 Hz													x																							
Degree of protection	IP 43																															x	x	x	x	x	
	IP 54	x	x	x	x																																
	IP 54 (with screw connection)																															x	x	x	x	x	
	IP 65					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						x
Miscellaneous	External setting	x		x		x		x		x		x			x			x	x	x		x	x		x			x		x		x			x		x
	Internal setting		x		x		x		x		x	x	2	x		x	x				x			x		x	x		x		x			x	x		x	
	Temperature controller	x		x		x		x		x		x			x			x	x	x		x			x			x				x			x		x
	Temperature monitor		x		x		x		x		x	x	2	x		x	x				x					x			x					x	x		x	
	Temperature limiter																						x	x				x			x	x						

Overview of plant engineering 2:
Boiler controllers

Boiler, rod thermostats, function without supply voltage		KR 80.003-1	KR 80.108-1	KR 80.109-1	KR 80.027-5	KR 80.035-2	KR 80.028-2	KR 80.116-2	KR 80.029-2	KR 80.111-3	KR 80.011-1 V4A	KR 80.120-1	KR 80.206	KR 80.206 IP54	KR 80.000-5	KR 80.001-5	KR 80.001-5 V4A	KR 80.100-5	KR 80.100-5 IP54	KR 80.101-5	KR 80.124-5	KR 80.112-5	KR 80.102-8	KR 80-008-8	KR 80.006-8	KR 80.106-8	KR 80.207	KR 80.208	KR 80.202	KR 80.309	KR 80.310	KR 80.312	KR 80.318	KR 85.406-2	KR 85.109-2	KR 85.100-5	KR 85.400-5	KR 85.102-5	KR 85.204-8	KR 85.312-2	KR 85.314-5	KR 85.315-5
	Page	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	141	141	141	141	141	141	141	141	141	141	144	144	144	144	145	145	145	145	145	145	147	147	147
Capillary length	Rod 100 mm				x	x		x		x			x	x	x			x	x				x	x	x	x	x	x	x		x		x	x	x	x	x	x		x	
	Rod 120 mm	x	x								x																															
	Rod 200 mm			x			x					x				x	x			x											x		x							x		x
	Rod 280 mm								x												x																					
	Rod 600 mm																					x																				
Control range	0…35 °C	x	x	x																													2	2					x		
	0…70 °C				x	x	x	x	x																															x		
	0…80 °C									x																																
	10…45 °C										x	x																														
	30…65 °C												x	x																												
	35…90 °C																																							x	x	
	35…95 °C														x	x	x	x		x	x	x													2	2	x					
	40…110 °C																						x	x																		
	50…130 °C																								x	x												x	x			
	60…95 °C																										x															
	75 °C +0/–8 K fixed (STB)																													x	x								x		
	85…120 °C																											x													
	95…110 °C																																								
	95…130 °C																											x											x		
	100 °C +0/–9 K fixed (STB)																														x	x								x	x
Output	Microswitch (potential-free changeover contact)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
Switching power	15 (8) A, 24–250 V~	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					x	x	x	x	x	x			
	10 (3) A, 24–250 V~																												x	x	x	x							x	x	x
Degree of protection	IP 43	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	IP 54													x					x																							
Miscellaneous	Type testing by TÜV in accordance with DIN EN 14597	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
	Temperature controller	x			x	x	x		x		x				x	x	x							x	x									x	x		x	x	x	x	x
	Temperature monitor		x	x				x		x		x						x	x	x	x	x			x								2	x	x	2	x				
	Temperature limiter												x	x													x	x	x											x			
	Safety temperature limiter																													x	x	x	x							x	x	x
	External setting	x			x	x	x		x		x				x	x	x							x	x										x	x		x	x	x	x	x
	Internal setting		x	x				x		x		x	x	x				x	x	x	x	x	x			x	x	x					2	x	x	2	x				

Overview of plant engineering 3:
Ventilation controllers, air heater thermostats

	Duct rod sensors with capillary system, function without supply voltage	LR 80.003-1	LR 80.108-1	LR 80.109-1	LR 80.028-2	LR 80.116-2	LR 80.207	LR 80.203	LR 80.312	LR 80.318	LR 85.312-2	JTL-2	JTL-8	JTL-11	JTL-8 NR	JTL-17 NR	JTU-50	JTU-1	JTU-3	JTU-20	JTU-5	JTU-6
	Page	143	143	143	143	143	143	143	144	144	147	155	155	155	155	155	157	157	157	157	157	157
Devices	Duct rod thermostat	x	x	x	x	x	x	x	x	x	x											
	Duct thermostat																x	x	x	x	x	x
	Air heater thermostat											x	x	x	x	x						
Capillary length	Capillary 350 mm											x	x		x		x	x	x		x	x
	Capillary 1,250 mm													x		x				x		
	Coil 100 mm					x	x		x													
	Coil 120 mm	x	x																			
	Coil 200 mm			x	x			x		x	x											
	Coil 280 mm																					
Control range	–25…65 °C																x					
	0…35 °C	x	x	x																		
	0…70 °C				x	x					x											
	10…45 °C																					
	20…70 °C											x	x	x	x	x						
	20…100 °C																	x	x	x		
	35…90 °C																					
	35…95 °C																					
	70…90 °C																					
	60…95 °C						x															
	60…140 °C														x	x					x	x
	70…95 °C																					
	70…100 °C											x	x	x								
	75 °C rod fixed										x											
	95…130 °C							x														
	100 °C rod fixed								x	x					x	x						
Output	Microswitch (potential-free changeover contact)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Switching power	15 (8) A, 24–250 V~	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	x	x
	10 (3) A, 24–250 V~								x	x	x											
Degree of protection	IP 40											x	x	x	x	x	x	x	x	x	x	x
	IP 43	x	x	x	x	x	x	x	x	x	x											
Miscellaneous	Type testing by TÜV in accordance with DIN EN 14597	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			x	x		
	Temperature controller	x			x						x											
	Temperature monitor		x	x		x						x		x	x	x	x	x			x	
	Temperature limiter						x	x														x
	Safety temperature limiter								x	x	x		x		x	x			x	x		
	External setting	x			x						x											
	Internal setting		x	x		x	x	x				x	x	x	x	x	x	x	x	x	x	x

Overview of plant engineering 4:
Contact and frost protection thermostats

Contact and frost protection thermostats		ATR 83.000	ATR 83.100	ATR 83.001	ATR 83.101	WR 81.115-5	WR 81.117-5	JAT-110 F	JAT-120 F	JAT-130 F	JAT-140 F	JTF-1	JTF-1 / 12	JTF-1 W	JTF-2	JTF-2 W	JTF-3	JTF-3 W	JTF-4	JTF-5	JTF-21	JTF-21 / 12	JTF-21 W	JTF-22	JTF-22 / 12	JTF-25	JTF-101	JTF-103	JTF-105	JTF-112
	Page	149	149	149	149	149	149	149	149	149	149	151	151	151	151	151	151	151	151	151	152	152	152	152	152	152	154	154	154	154
Devices	Contact thermostat	x	x	x	x	x	x	x	x	x	x																			
	Frost protection thermostat											x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Capillary length	Capillary 1,800 mm																x	x	x									x		
	Capillary 3,000 mm																			x						x			x	
	Capillary 6,000 mm											x		x	x	x					x		x	x			x			
	Capillary 12,000 mm												x									x			x						x
Output	Microswitch (potential-free changeover contact)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	2	2	2	2	2	2	x	x	x	x
Control range	–35…+30 °C							x																						
	–10…+12 °C											x	x	x	x	x	x	x	x	x	x	x	x	x	x					
	–8…+8 °C																									x	x	x	x	x
	0…60 °C			x	x				x																					
	0…70 °C					x																								
	30…90 °C	x	x																											
	40…100 °C									x																				
	50…130 °C						x																							
	70…130 °C										x																			
Switching power	15 (8) A, 24–250 V~					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	16 (2) A, 24–250 V~	x	x	x	x																									
Supply voltage	None	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Degree of protection	IP 20	x	x	x	x																									
	IP 40											x	x		x		x		x	x	x	x		x	x	x				
	IP 43					x	x																							
	IP 54																										x	x	x	x
	IP 65							x	x	x	x			x		x		x					x							
Miscellaneous	Type testing by TÜV in accordance with DIN EN 14597											x	x	x	x	x	x	x	x	x										
	Temperature controller	x		x																										
	Temperature monitor		x		x	x	x	x	x	x	x	x	x	x			x	x		x	x	x	x			x	x	x	x	x
	Temperature limiter																							x	x					
	Safety temperature limiter														x	x			x											
	External setting	x		x								x	x		x		x		x	x	x	x		x	x	x				
	Internal setting		x		x	x	x	x	x	x	x			x		x		x					x				x	x	x	x

Overview of plant engineering 5:
Temperature controllers, electronic

	Electronic temperature controllers, digital controllers / displays	ITR 79.402	ITR 79.404	ITR 79.405	ITR 79.408	ITR 79.503	ITR 79.504	ITR 79.508	ITR 79.600	ITR 79.804	PTR 01.082	ETR 74.1	ETR 74.2	ETR 77.008-5	ETR 77.108-5	ETR 77.009-5	ETR 77.109-5	ETR 77.109-15	JDI-0	JDI-08	ITR 71.100	JDI-1	JDI-10	JDI-22	JDU-210	ETR 78.005	ETR 78.006	JBT-22 A	JBT-23 A	JBT-420 B
	Page	162	162	162	162	162	162	162	162	162	160	164	164	165	165	165	165	165	166	166	167	167	167	168	169	170	170	171	171	172
Devices	Differential temperature controllers																									x	x			
	Standard or top-hat rail controllers	x	x	x	x	x	x	x	x	x	x																			
	Universal controllers											x	x	x	x	x	x	x												
	Multi-stage controllers																											x	x	x
	Digital displays (front panel)																		x	x										
	Digital controllers (front panel)																				x	x	x							
	Microprocessor controllers (front panel)																							x	x					
Control range	–200 … +850 °C																								x					
	–50 … +200 °C																							x	x					
	–50 … +50 °C													x	x															
	–40 … +50 °C																													
	–40 … +120 °C																		x	x		x								
	–40 … +120 °C																						x							
	–35 … +15 °C	x																												
	–15 … +15 °C																													
	–15 … +25 °C																													
	–15 … +30 °C																													
	–10 … +40 °C				x			x																						
	–10 … +50 °C																													x
	0 … 11 °C					x																								
	0 … 50 °C											x	x																	
	0 … 60 °C		x				x			x																	x			
	0 … 100 °C															x	x	x			x									
	5 … 30 °C								2																					
	10 … 50 °C																											x		
	10 … 60 °C										x																			
	35 … 95 °C			x																						x			x	
	40 … 125 °C																													
	70 … 130 °C																													
Switching power	10 (3) A, 24 – 250 V~											x	x								x	x	x					x	x	x
	10 (2) A, 24 – 250 V~ changeover contact																							x	x					
	5 (1) A, 24 – 250 V~ NO contact																							x	x					
	10 (3) A, 250 V~																									x	x			
	10 (3) A, 250 V~, make contact	x	x	x	x	x	x	x	x	x																				
	5 (1.5) A / 250 V~, break contact	x	x	x	x	x	x	x	x	x																				
	10 (3) A, 250 V~, heating contact													x	x	x	x	x												
	5 (1) A, 250 V~, cooling contact													x	x	x	x	x												
	10 (4) A, 230 V~, heating contact										x																			
	5 (2) A, 230 V~, cooling contact										x																			
Degree of protection	IP 00																													
	IP 20	x	x	x	x	x	x	x	x	x	x																			
	IP 20 (front-side)																		x	x	x	x	x							
	IP 54											x	x		x		x	x												
	IP 54 (front-side)																							x	x					
	IP 65													x		x										x	x	x	x	x
Miscellaneous	Temperature controller	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x			x	x	x	x	x			x	x	
	Temperature monitor													x		x														x
	External setting										x	x	x		x		x	x			x	x	x	x	x			x	x	
	Internal setting													x		x										x	x			x
	LED heating (red)	x	x	x	x					x		x	2	x	x	x	x	x												
	LED cooling (green)						x	x																						
	Digital display, actual value											x	x						x	x	x									
	Digital display, actual / target																					x	x	x	x					
	Display (no output)																		x	x										
	230 V~, 50 Hz	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Overview of plant engineering 6:
Flow monitors and pressure switches

Flow and pressure monitoring		JSL-1 E	JSL-20	JSL-20/24 V	JSL-20 K	JSL-21	JSL-21/24 V	JDW-3/JDW-3Z	JDW-5/JDW-5Z	JDW-10	JDL-111	JDL-112	JDL-113	JDL-115	JDL-116	JDL-116 A	JSF-3 E	JSF-4 E	JSF-1 E	JSF-1 RE	JSF-2 E	JSF-2 RE	JSW-1/2	JSW-3/4	JSW-1
	Page	175	176	176	176	176	176	178	178	178	178	178	178	178	178	178	180	180	180	180	180	180	183	183	183
Devices	Wind indicator relays	x																							
	Airflow monitors		x	x	x	x	x																		
	Differential pressure switches							x	x	x	x	x	x	x	x	x									
	Flow monitors																x	x	x	x	x	x	x	x	x
Sensor element	Wind indicator	x																							
	Sensor rod (hot film anemometer)		x	x	x	x	x																		
	Pressure sensor (membrane)							x	x	x	x	x	x	x	x	x									
	Paddle																x	x	x	x	x	x	x	x	x
Output	Microswitch (potential-free changeover contact)	x						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Relay (potential-free changeover contact)		x	x	x	2	2																		
Switching range	0.2–10 m/s		x	x	x	x	x																		
	1–8 m/s switch-off value	x																							
	Dependent on the tube diameter																x	x	x	x	x	x	x	x	x
	20 Pa when shipped																								
	20–300 Pa										x														
	20–330 Pa							x																	
	30–500 Pa								x																
	40 Pa when shipped												x												
	40–600 Pa											x													
	100–1,000 Pa													x											
	250–5,000 Pa														x	x									
	400–1,600 Pa									x															
	3,000–15,000 Pa																								
Switching power	15 (8) A, 24–250 V~	x															x	x	x	x	x	x			
	10 (3) A, 24–250 V~		x	x	x	x	x																		
	1.5 (0.4) A, 12–250 V~							x	x	x															
	1 (0.2) A, 12–24 V~/ ⎓							x	x	x	x	x	x	x	x	x									
	5 (1) A, 12–250 V~										x	x	x	x	x	x									
	5 (1.5) A, 24–230 V~																						x	x	x
Operating voltage	None	x						x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	230 V~, 50 Hz		x		x	x																			
	24 V~, 50/60 Hz			x			x																		
Degree of protection	IP 20												x												
	IP 54							x	x	x	x	x		x	x	x									
	IP 65	x	x	x	x	x	x										x	x	x	x	x	x	x	x	x
Miscellaneous	Type tested by the TÜV according to the current 100 to 6".																x	x	x	x	x	x			
	External setting															x									
	Internal setting	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x

Single-stage industrial application thermostats JET-40/-41/-110/-120

Capillary system – external sensors

Technical data

Colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Electrical connection:	screw-type terminals
Mounting/attachment:	wall mounting
Protection class:	I
Protection rating:	**JET-40/-41:** IP 54 **JET-110 R/-120 R:** IP 65
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
Sensor material:	**JET-40/-41:** V2A (1.43 01) **JET-110 R/-120 R:** Cu
General features:	Scale: degrees Celsius

Application

Control or monitoring of the temperature in the industrial domain in a non-aggressive environment, for example, for controlling heating or cooling systems in greenhouses, industrial and sports halls, air-inflated domes, cold storage and refrigeration rooms.

JET-110 RF is particularly suitable as an external thermostat.

Type	Item no.	Control range	Max. sensor temperature	Hysteresis (approx.)	Ambient temperature	Features	PG
JET-40	C 1810605	0…35 °C	40 °C	1 K	–20…+40 °C	external setting, TR	II
JET-40 F	C 1810606	0…35 °C	40 °C	1 K	–20…+40 °C	internal setting, TW	II
JET-41	C 1810607	0…70 °C	80 °C	2 K	–20…+80 °C	external setting, TR	II
JET-41 F	C 1810608	0…70 °C	80 °C	2 K	–20…+80 °C	internal setting, TW	II
JET-110 R	JA 045100	–35…+30 °C	35 °C	2…20 K adjustable	–35…+35 °C	external setting with range restriction, TR	II
JET-110 RF	JA 045200	–35…+30 °C	35 °C	2…20 K adjustable	–35…+35 °C	internal setting with viewing window, TW	II
JET-120 R	JA 046100	0…60 °C	70 °C	2…20 K adjustable	–35…+70 °C	external setting with range restriction, TR	II
JET-120 RF	JA 046200	0…60 °C	70 °C	2…20 K adjustable	–35…+70 °C	internal setting with viewing window, TW	II

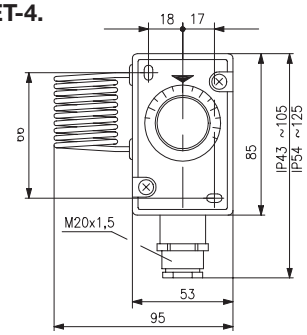
TR = temperature controller, TW = temperature monitor

JET-40 F

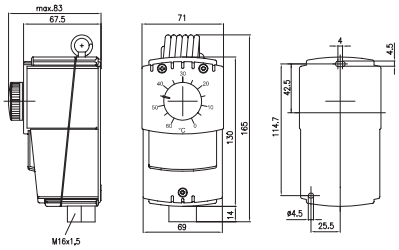
JET-120 R

JET-110 RF

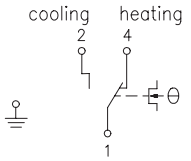
JET-4.



JET-1.



JET-1.



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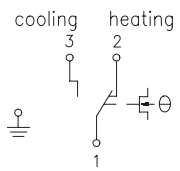


Multi-stage industrial room thermostats JMT-211

Capillary system – external sensors – 2-stage

Technical data

Housing colour:	(lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch, potential-free
Switching contact:	2 togglers
Control function:	2-stage heating, 2-stage cooling, heating and cooling with neutral zone
Hysteresis in the stage:	approx. 1 K
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting
Protection class:	I
Protection rating:	IP 65
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	Scale: degrees Celsius

Application

Control of temperatures in industrial areas in a non-aggressive environment.

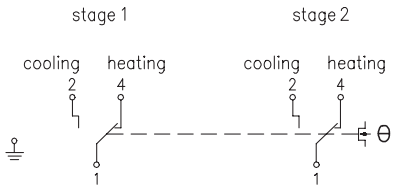
2-stage “heating or cooling” or “heating and cooling” with neutral zone.

Type	Item no.	Control range	Max. sensor temperature	Switching difference between the stages	Ambient temperature	Features	PG
JMT-211	E 6080049	10…55 °C	60 °C	1…7 K adjustable	–15…+60 °C	external setting, TR	II
JMT-211 F	E 6080138	10…55 °C	60 °C	1…7 K adjustable	–15…+60 °C	internal setting, TW	II

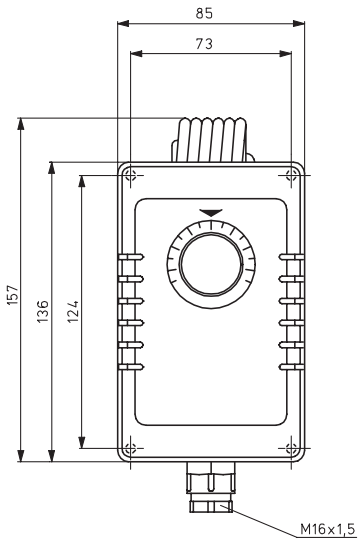
TR = temperature controller, TW = temperature monitor

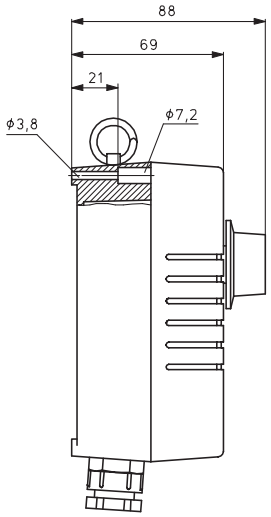
JMT-211 F

JMT-21.



JMT-21.





Industrial room thermostats JET-30/-31

Capillary system – external sensors – 2 separate setting ranges, 2-stage

Technical data	
Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	V2A (1.4301)
Ambient temperature:	–20 … +40 °C
Max. sensor temperature	40 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	2 x togglers, potential-free
Control function:	heating or cooling, heating and cooling
Hysteresis:	approx. 1 K
Electrical connection:	screw-type terminals
Mounting/attachment:	wall mounting
Protection rating:	IP 65
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	Scale: degrees Celsius

Application

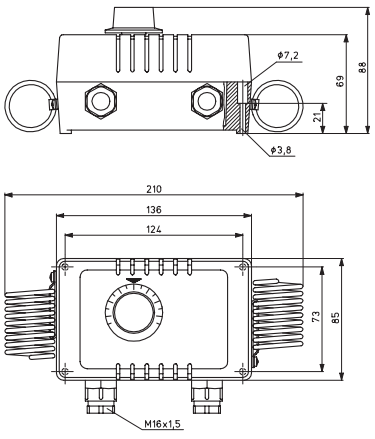
For external or internal fitting (non-aggressive environment), as a thermostat for temperature control in industrial buildings, trade fair halls and air-inflated domes or as cooling protection in greenhouses.

2 separate setting ranges, heating and/or cooling.

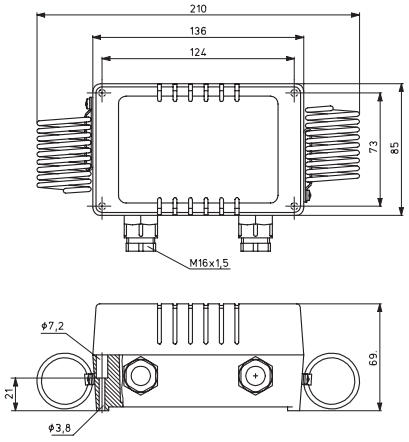
Type	Item no.	1st Control range	2nd Control range	Features	PG
JET-30	C 1820200	10 … 45 °C (external) TR	0 … 35 °C (internal) TW	external setting, internal setting	II
JET-31	C 1820201	10 … 45 °C (internal) TW	0 … 35 °C (internal) TW	internal setting	II

TR = temperature controller, TW = temperature monitor

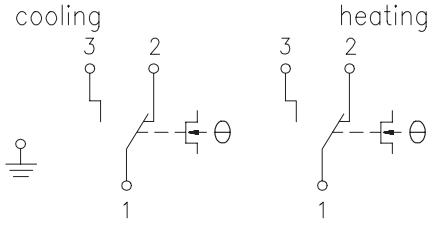
JET-30



JET-31



JET-30/JET-31



Wet room thermostat PTR 40

Bimetal

Technical data

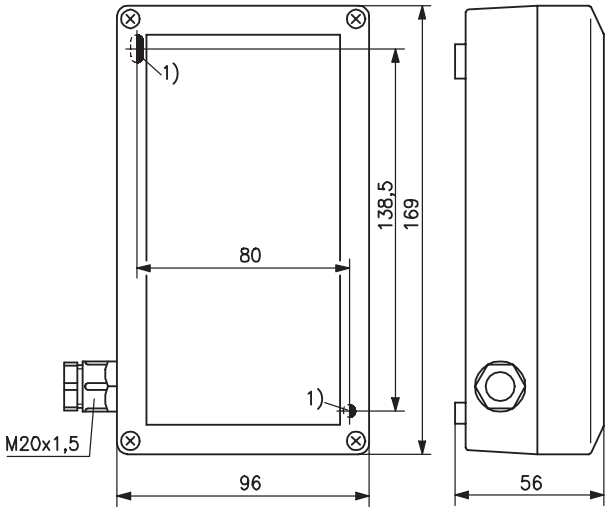
Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	–20 … +60 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	heating (terminal 3) 10 (4) A, cooling (terminal 1) 5 (2) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	230 VAC, 50 Hz
Switching element:	bimetallic contact
Control range:	–20 … +30 °C
Hysteresis:	approx. 2 K at a temperature change of max. 4 K/h
Electrical connection:	screw-type terminals 0.12 mm² to 2.5 mm²
Mounting/attachment:	wall mounting
Protection rating:	IP 65
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Sensor:	bimetal
Function type:	TW (temperature monitor)
General features:	thermal feedback, internal setting, scale: degrees Celsius

Application

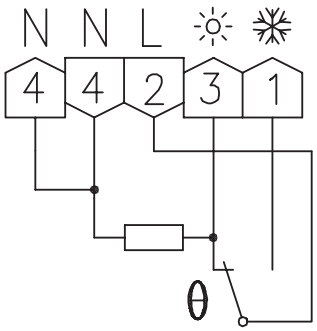
Control and monitoring of temperatures of certain open spaces, for example, driveways or damp rooms (greenhouses, sheds, warehouses and basements, garages etc.).

Type	Item no.	Features	PG
PTR 40.000	A 201410	switching contact changeover switch (toggler), control function heating or cooling, viewing window	II

PTR 40/45



PTR 40 …



Plant engineering

Single-stage capillary thermostats JET-1

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu (capillaries made from V2A)
Capillary length:	1.8 m (for types with “G” in the type specification: 4.5 m)
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Electrical connection:	screw-type terminals
Mounting/attachment:	wall mounting
Protection rating:	IP 65
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	scale: degrees Celsius, mechanical range restriction when external setting is used

Application

Monitoring or control of temperatures of non-aggressive, liquid and gaseous media. Particularly suitable for wall mounting. The SW-200-12 protecting coil is to be used for temperature control of non-aggressive gases in ducts; for temperature control in non-aggressive fluids, use the TH immersion sleeve, and in aggressive fluids, the NTH immersion sleeve.

Immersion sleeves or protecting coils are not a part of the scope of delivery.

Type	Item no.	Control range	Hysteresis adjustable (approx.)	Sensor a x l	Features	PG
JET-110X	JA 040100	–35…+30 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-110XF	JA 040200	–35…+30 °C	2…20 K	9.6 x 122 mm	internal setting/TW*	II
JET-120X	JA 041100	0…60 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-120XG	JA 041101	0…60 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-120XF	JA 041200	0…60 °C	2…20 K	9.6 x 122 mm	internal setting/TW*	II
JET-130X	JA 042100	40…100 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-130XG	JA 042101	40…100 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-130XF	JA 042200	40…100 °C	2…20 K	9.6 x 122 mm	internal setting/TW*	II
JET-133X	JA 042300	40…100 °C		9.6 x 122 mm	external setting/TB**	II
JET-133XF	JA 042400	40…100 °C		9.6 x 122 mm	internal setting/TB**	II
JET-140X	JA 043100	70…130 °C	2…20 K	9.6 x 122 mm	external setting/TR*	II
JET-140XF	JA 043200	70…130 °C	2…20 K	9.6 x 122 mm	internal setting/TW*	II
JET-143XF	JA 043400	70…130 °C		9.6 x 122 mm	internal setting/TB**	II
JET-150	JA 044100	100…280 °C	8…50 K	6 x 80 mm	external setting/TR*	II
JET-150F	JA 044200	100…280 °C	8…50 K	6 x 80 mm	internal setting/TW*	II
JET-153	JA 044300	100…280 °C		6 x 80 mm	external setting/TB**	II
JET-153F	JA 044400	100…280 °C		6 x 80 mm	internal setting/TB**	II

TR = temperature controller, TW = temperature monitor, TB = temperature limiter

* Control function heating or cooling
** Control function heating or cooling, gets locked when temperature rises, manual reset after temperature rise of at least 8 K

Accessories

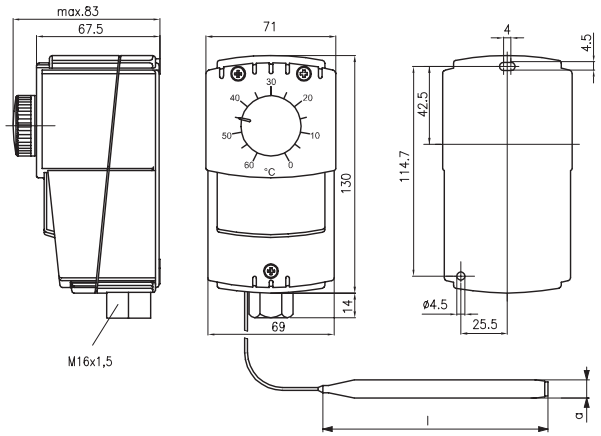
For protecting coils and immersion sleeves, see the “Accessories/miscellaneous” section.
Immersion sleeves are not included in the delivery.
for types with “X” in the type specification: TH/NTH-140
for types without “X” in the type specification: TH/NTH-100/200/280

Single-stage capillary thermostats JET-1

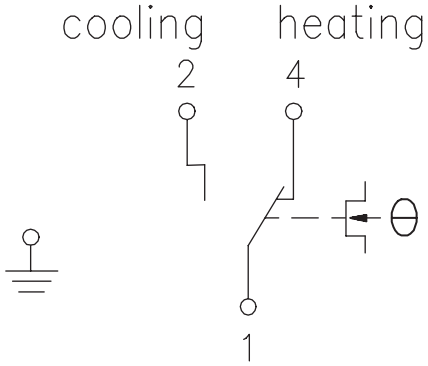
Temperature monitor (TW)

Temperature limiter (TB)

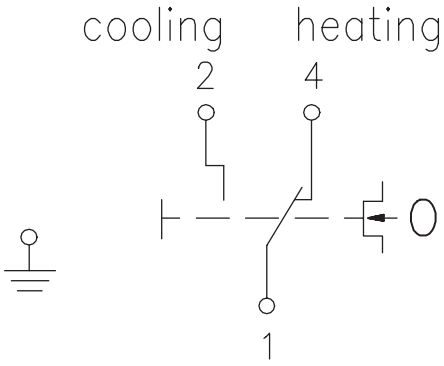
Temperature controller (TR)



TR / TW



TB



Single-stage capillary thermostats WR 81

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu (bulbs and capillaries)
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting
Protection rating:	IP 43
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	Scale: degrees Celsius

Application

Monitoring or control of temperatures of non-aggressive, liquid and gaseous media. Particularly suitable for wall mounting.

The protecting coil SW-200 is to be used for temperature control of non-aggressive gases in the duct; for temperature in non-aggressive fluids, the immersion sleeve TH, and in aggressive fluids, the immersion sleeve NTH.

Immersion sleeves or protecting coils are not a part of the scope of delivery.

When using screw joints instead of grommets protection rating IP 54.

Type	Item no.	Control range	Hysteresis (approx.)	Sensor Ø x L	Features	PG
WR 81.029-1	C 1810612	0…35 °C	0.5…1 K	7 x 135 mm	external setting, TR capillary length 0.5 m	II
WR 81.129-1	C 1810618	0…35 °C	0.5…1 K	7 x 135 mm	internal setting, TW capillary length 0.5 m	II
WR 81.101-1	C 1810610	0…35 °C	0.5…1 K	7 x 135 mm	internal setting, TW capillary length 2 m	II
WR 81.009-2	C 1810600	0…70 °C	1…2 K	7 x 90 mm	external setting, TR capillary length 1.5 m	II
WR 81.109-2	C 1810615	0…70 °C	1…2 K	7 x 90 mm	internal setting, TW capillary length 1.5 m	II

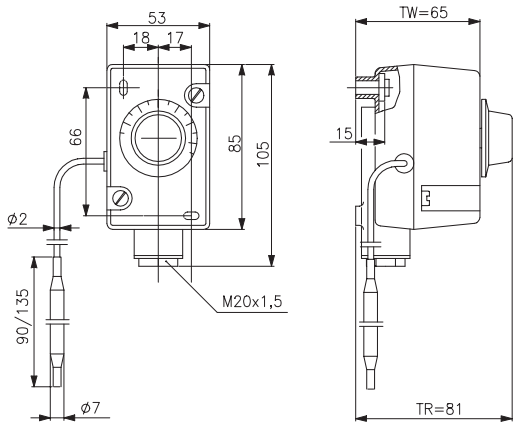
TR = temperature controller, TW = temperature monitor

Accessories

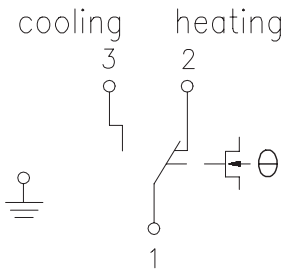
For immersion sleeves (TH-100/200/280, NTH-100/200/280) and protecting coils (SW-200), see the “Accessories/miscellaneous” section.

WR-81.109-2

WR-81



WR-81



Multi-stage capillary thermostat JMT-206 X

2 stages

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Capillary length:	1.5 m
Ambient temperature:	–15 … +55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	2 x togglers, potential-free
Control function:	2-stage heating, 2-stage cooling, heating or cooling with neutral zone
Hysteresis between the stages:	approx. 1 … 7 K, adjustable
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting
Protection rating:	IP 65
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	Scale: degrees Celsius

Application

Multi-stage control of the temperature of liquid or gaseous media, e.g., for activating two-stage burners or heating registers.

The SW-200-12 protecting coil is to be used for temperature control of non-aggressive gases in ducts; for temperature control in non-aggressive fluids, use the TH immersion sleeve, and in aggressive fluids, the NTH immersion sleeve.

Immersion sleeves or protecting coils are not a part of the scope of delivery.

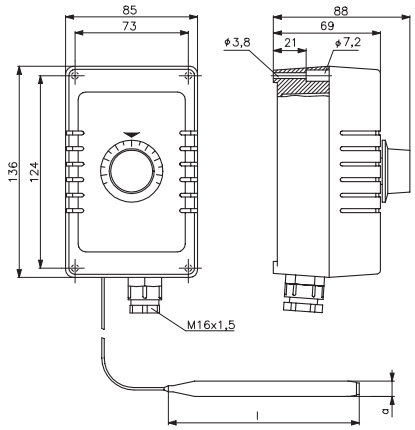
Type	Item no.	Control range	Hysteresis in the stage (approx.)	Sensor a x l (mm)	Features	PG
JMT-206 X	E 6060340	20 … 80 °C	1 K	9.6 x 122 mm	external setting, TR	II

TR = temperature controller

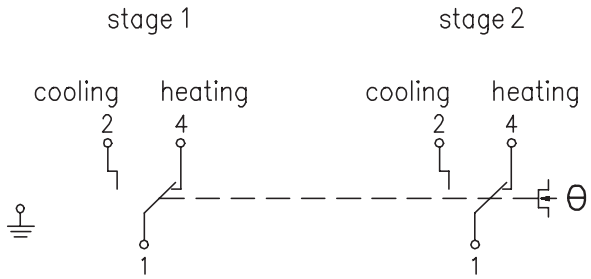
Accessories

For protecting coils and immersion sleeves, see the “Accessories / miscellaneous” section.

JMT-2..



JMT-2..



Capillary thermostats as boiler controller KR 80

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch
Switching contact:	changer, potential-free
Control function:	heating or cooling
Electrical connection:	screw-type terminals
Mounting / attachment:	on the installed immersion sleeve with a system connection
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	scale: degrees Celsius
Scope of delivery:	controller, immersion sleeve

Application

In heating technology, they are used in boiler systems or tanks, district heat transfer stations and heat transfer plants.

Immersion sleeve included in scope of delivery.

To order replacement immersion sleeves THK / NTHK, see the “Accessories / miscellaneous” section.

Type testing by TÜV in accordance with DIN EN 14597

Type	Item no.	Control range	Hysteresis (approx.)	Length / Material of immersion sleeve	Features	PG
KR 80.003-1	C 1801726	0…35 °C	1 K	120 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.108-1	C 1801707	0…35 °C	1 K	120 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.109-1	C 1801744	0…35 °C	1 K	200 mm / nickel-plated brass	internal setting, TW, IP 43	II
KR 80.027-5	C 1801731	0…70 °C	5 K	100 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.035-2	C 1801705	0…70 °C	2 K	100 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.028-2	C 1801732	0…70 °C	2 K	200 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.116-2	C 1801748	0…70 °C	2 K	100 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.029-2	C 1801733	0…70 °C	2 K	280 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.111-3	C 1801708	0…80 °C	3 K	100 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.011-1 V4A	C 1801730	10…45 °C	1 K	120 mm / V4A (1.4571)	external setting / TR, IP 43	II
KR 80.120-1	C 1801749	10…45 °C	1 K	200 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.206	C 1801720	30…65 °C		100 mm / nickel-plated brass	internal setting / external reset / TB, IP 43	II
KR 80.206 IP54	C 1801722	30…65 °C		100 mm / nickel-plated brass	internal setting / external reset / TB, IP 54	II
KR 80.000-5	C 1801700	35…95 °C	5 K	100 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.001-5	C 1801723	35…95 °C	5 K	200 mm / nickel-plated brass	external setting / TR, IP 43	II

Capillary thermostats as boiler controller KR 80

Capillary system – **TÜV-tested**

Type	Item no.	Control range	Hysteresis (approx.)	Length / Material of immersion sleeve	Features	PG
KR 80.001-5 V4A	C 1801725	35 … 95 °C	5 K	200 mm / V4A (1.4571)	external setting / TR, IP 43	II
KR 80.100-5	C 1801711	35 … 95 °C	5 K	100 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.100-5 IP54	C 1801738	35 … 95 °C	5 K	100 mm / nickel-plated brass	internal setting / TW, IP 54	II
KR 80.101-5	C 1801739	35 … 95 °C	5 K	200 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.124-5	C 1801750	35 … 95 °C	5 K	280 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.112-5	C 1801747	35 … 95 °C	5 K	600 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.102-8	C 1801706	40 … 110 °C	8 K	100 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.008-8	C 1801727	40 … 110 °C	8 K	100 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.006-8	C 1801704	50 … 130 °C	8 K	100 mm / nickel-plated brass	external setting / TR, IP 43	II
KR 80.106-8	C 1801743	50 … 130 °C	8 K	100 mm / nickel-plated brass	internal setting / TW, IP 43	II
KR 80.207	C 1801710	60 … 95 °C		100 mm / nickel-plated brass	internal setting / external reset / TB, IP 43	II
KR 80.208	C 1801721	85 … 120 °C		100 mm / nickel-plated brass	internal setting / external reset / TB, IP 43	II
KR 80.202	C 1801709	95 … 130 °C		100 mm / nickel-plated brass	internal setting / external reset / TB, IP 43	II

TR = temperature controller, TW = temperature monitor, TB = temperature limiter (manual reset after temperature drop of at least 8 K)

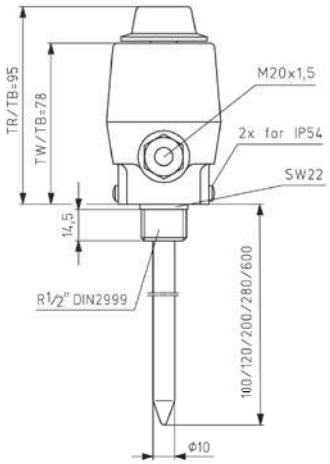
Capillary thermostats as boiler controller KR 80

Capillary system – **TÜV-tested**

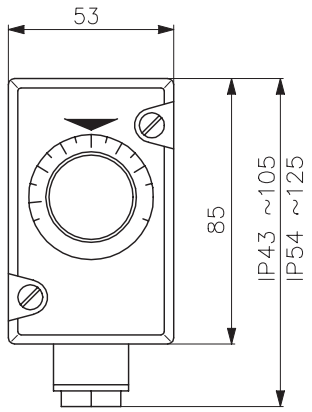
KR 80.108-1

KR 80.207

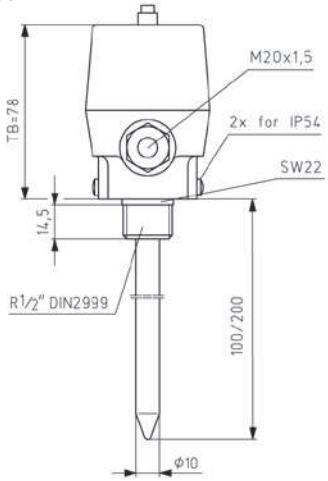
KR 80. ...



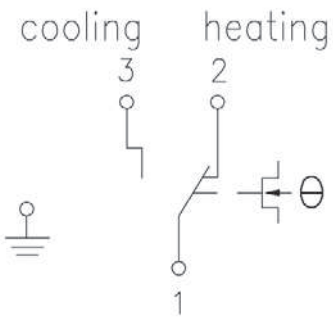
KR 80. ...



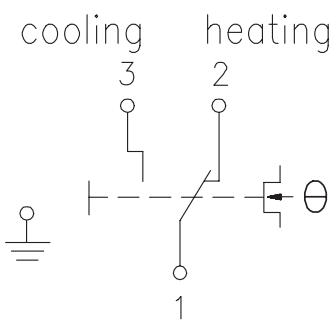
KR 80.2..



KR 80. ... (TR / TW)



KR 80.2.. (TB)



Capillary thermostats as ventilation controllers LR 80

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Material of protecting coil:	steel, nickel-plated
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch
Switching contact:	changer, potential-free
Control function:	heating or cooling
Electrical connection:	screw-type terminals
Protection rating:	IP 43
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	scale: degrees Celsius
Scope of delivery:	controller, protecting coil

Application

In ventilation technology, as inflow air monitoring or as a limiter of electric heating registers.

Protecting coil included in scope of delivery.

To order replacement protecting coil SWK, see the “Accessories / miscellaneous” section.

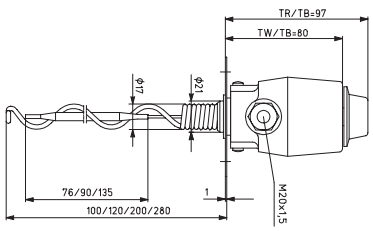
Mounting / attachment:
on the installed protecting coil with a system connection

Type testing by TÜV in accordance with DIN EN 14597

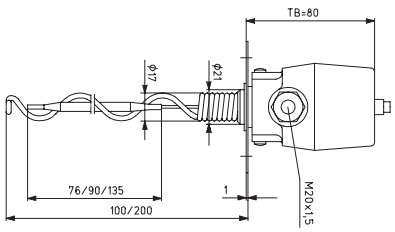
Type	Item no.	Control range	Hysteresis (approx.)	Length of protecting coil	Features	PG
LR 80.003-1	C 1801800	0…35 °C	1 K	120 mm	external setting, TR	II
LR 80.108-1	C 1801801	0…35 °C	1 K	120 mm	internal setting, TW	II
LR 80.109-1	C 1801810	0…35 °C	1 K	200 mm	internal setting, TW	II
LR 80.028-2	C 1801807	0…70 °C	2 K	200 mm	external setting, TR	II
LR 80.116-2	C 1801811	0…70 °C	2 K	100 mm	internal setting, TW	II
LR 80.207	C 1801805	60…95 °C		100 mm	internal setting / external reset / TB	II
LR 80.203	C 1801825	95…130 °C		200 mm	internal setting / external reset / TB	II

TR = temperature controller, TW = temperature monitor, TB = temperature limiter (manual reset after temperature drop of at least 8 K)

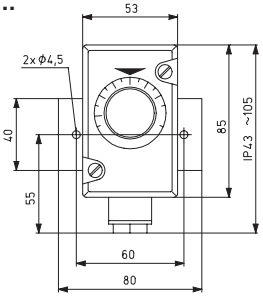
LR 80. ... (TR/TW)



LR 80.2.. (TB)

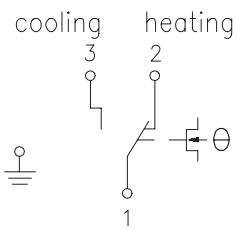


LR 80.…

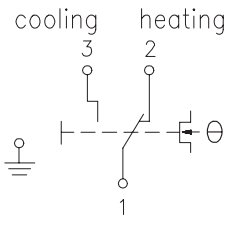


LR 80.108-1

LR 80.… (TR / TW)



LR 80.2.. (TB)



Capillary thermostats as safety temperature limiters KR 80.3/LR 80.3

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	V2A
Material of immersion sleeve:	nickel-plated brass
Material of protecting coil:	steel, nickel-plated
Ambient temperature:	–20 … +55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	10 (3) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	changer, potential-free
Control function:	heating or cooling, locked when the temperature is rising
Hysteresis:	manual reset after temperature drop of min. 20 K
Electrical connection:	screw-type terminals
Mounting/attachment:	on the installed immersion sleeve or protecting coil with a system connection
Protection rating:	IP 43
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
Function type:	STB (safety temperature limiter)
General features:	internal reset

Application

For limiting the temperature in boiler, tank and ventilation systems.

STB = safety temperature limiter, switch-off temperature set to a fixed value at the factory.

Immersion sleeve or protecting coil included in scope of delivery.

To order replacement immersion sleeves THK / NTHK or protecting coil SWK, see the “Accessories/miscellaneous” section.

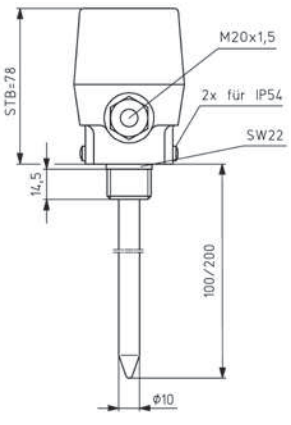
Sensor rupture safeguarding: Triggered at –15 °C

Scope of delivery: controller, KR immersion sleeve/LR protecting coil

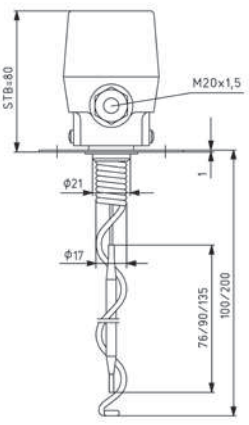
Type testing by TÜV in accordance with DIN EN 14597

Image	Type	Item no.	Cut-off temperature fixed/accuracy	Max. sensor temperature	Length of immersion sleeve/protecting coil	PG
	**KR 80.309**	C 1801590	75 °C +0/–8 K	115 °C	100 mm	II
	KR 80.310	C 1801591	75 °C +0/–8 K	115 °C	200 mm	II
	KR 80.312	C 1801592	100 °C +0/–9 K	135 °C	100 mm	II
	KR 80.318	C 1801593	100 °C +0/–9 K	135 °C	200 mm	II
	**LR 80.312**	C 1801823	100 °C +0/–9 K	135 °C	100 mm	II
	LR 80.318	C 1801817	100 °C +0/–9 K	135 °C	200 mm	II

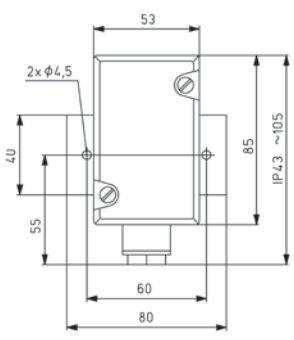
KR 80.3..



LR 80.3..

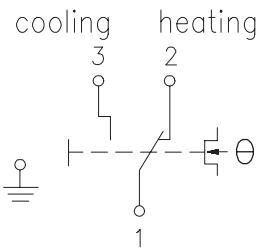


KR 80.3..*/LR 80.3..



*KR 80.3 without mounting plate

STB



Capillary thermostats as boiler dual controllers KR 85

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Material of immersion sleeve:	nickel-plated brass
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch
Switching contact:	2 togglers, potential-free
Electrical connection:	screw-type terminals
Mounting / attachment:	on the installed immersion sleeve with a system connection
Protection rating:	IP 43
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	scale: degrees Celsius
Scope of delivery:	controller, immersion sleeve

Type testing by TÜV in accordance with DIN EN 14597 except for KR 85.2xx

Application

In heating technology, they are used in boiler systems or tanks, district heat transfer stations and heat transfer plants.

Immersion sleeve included in scope of delivery.

To order replacement immersion sleeves THK 100x17 / NTHK 100x17, see the “Accessories / miscellaneous” section.

Type	Item no.	Control range / switch-off temperature	Hysteresis (approx.)	Length of immersion sleeve	Features	PG
KR 85.406-2	C 1850506	0…70 °C 0…70 °C	2 K 2 K	100 mm	internal setting, TW* internal setting, TW*	II
KR 85.109-2	C 1850518	0…70 °C 0…70 °C	2 K 2 K	100 mm	external setting, TR* internal setting, TW*	II
KR 85.100-5	C 1850502	35…95 °C 35…95 °C	5 K 5 K	100 mm	external setting, TR* internal setting, TW*	II
KR 85.400-5	C 1850521	35…95 °C 35…95 °C	5 K 5 K	100 mm	internal setting, TW* internal setting, TW*	II
KR 85.102-5	C 1850517	35…95 °C 50…130 °C	5 K 8 K	100 mm	external setting, TR* internal setting, TW*	II
KR 85.204-8	C 1850512	50…130 °C 95…130 °C	8 K	100 mm	external setting, TR* external reset, TB**	II

TR = temperature controller, TW = temperature monitor, TB = temperature limiter

* Control function heating or cooling

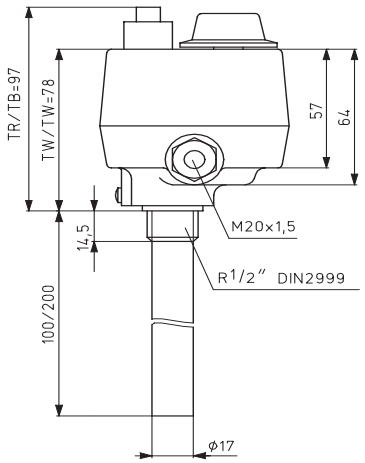
** Control function heating (prewired) or cooling, gets locked when temperature rises, manual reset after temperature drop of at least 8 K

Capillary thermostats as boiler dual controllers KR 85

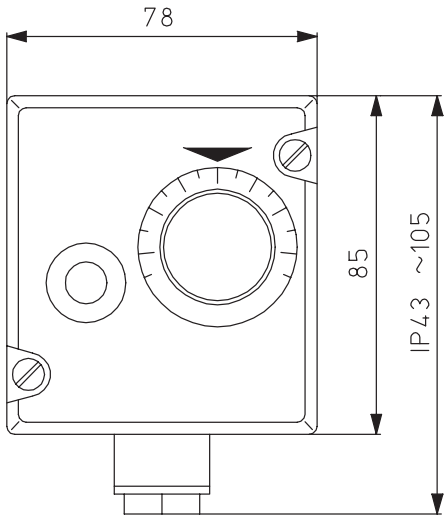
Capillary system – **TÜV-tested**

KR 85.4..

KR 85....



KR 85....



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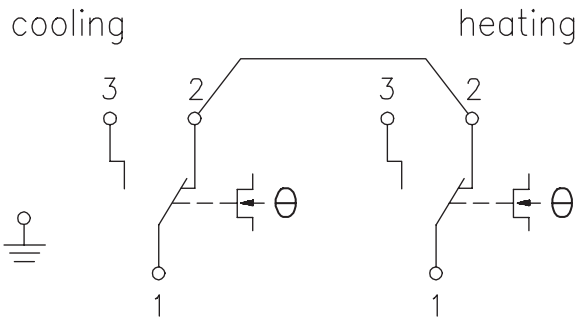
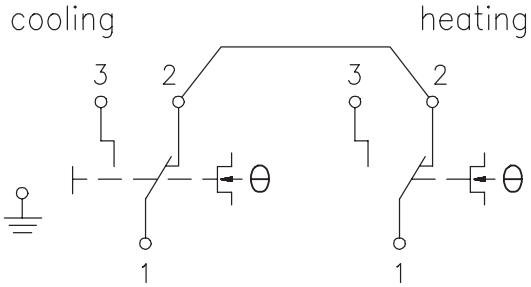


KR 85.2...



Capillary thermostats as boiler dual controllers / safety temperature limiters KR 85.3 / LR 85.3

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu (TR) und V2A (STB)
Ambient temperature:	–20…+55 °C
Max. sensor temperature	top scale value +15%
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	10 (3) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch
Switching contact:	2 x toggler, potential-free
Control function:	heating or cooling, locked when the temperature is rising
Hysteresis STB:	manual reset after temperature drop of min. 20 K
Electrical connection:	screw-type terminals
Mounting / attachment:	on the installed immersion sleeve (KR) / protecting coil (LR) with a system connection
Protection rating:	IP 43
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	scale: degrees Celsius
Scope of delivery:	controller, immersion sleeve (KR) or protecting coil (LR)

Type testing by TÜV in accordance with DIN EN 14597

Application

For limiting the temperature in boiler, tank and ventilation systems.

STB = safety temperature limiter, switch-off temperature set to a fixed value at the factory.

Immersion sleeve or protecting coil included in scope of delivery.

To order replacement immersion sleeves THK … x17 / NTHK … x17 or protecting coil SWK-200, see the “Accessories / miscellaneous” section.

Type	Item no.	Control range / cut-off temperature fixed / accuracy	Hysteresis (approx.)	Length / Material Immersion sleeve / protecting coil	Features	PG
KR 85.312-2	C 1850519	0…70 °C STB 75 °C +0/–8 K	2 K	200 mm Ms nickel-plated	external setting, TR internal reset, STB	II
KR 85.314-5	C 1850520	35…90 °C STB 100 °C +0/–9 K	5 K	100 mm nickel-plated brass	external setting, TR internal reset, STB	II
KR 85.315-5	C 1850505	35…90 °C STB 100 °C +0/–9 K	5 K	200 mm Ms nickel-plated	external setting, TR internal reset, STB	II
LR 85.312-2	C 1850531	0…70 °C STB 75 °C +0/–8 K	2 K	200 mm steel, nickel-plated	external setting, TR internal reset, STB	II

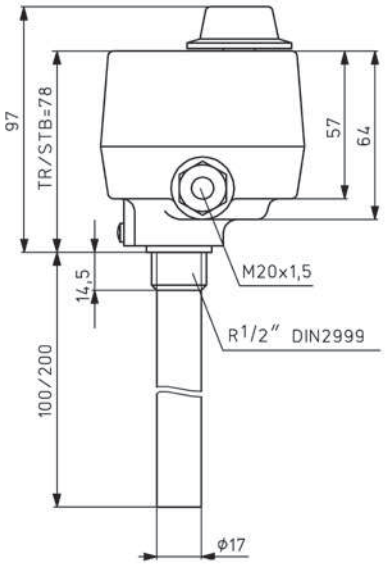
TR = temperature controller, STB = safety temperature limiter

Capillary thermostats as boiler dual controllers / safety temperature limiters, KR 85.3 / LR 85.3

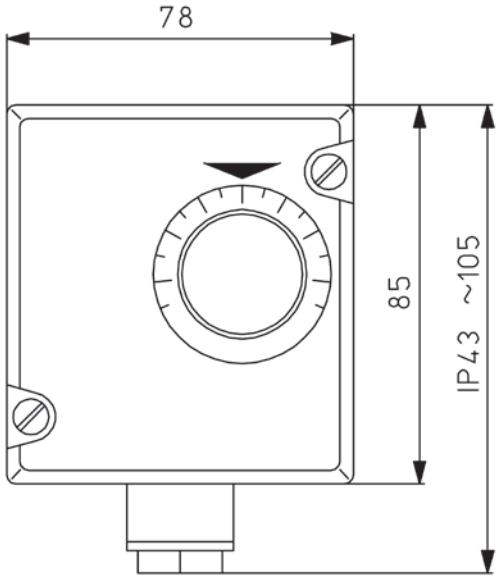
Capillary system – **TÜV-tested**

LR 85.3

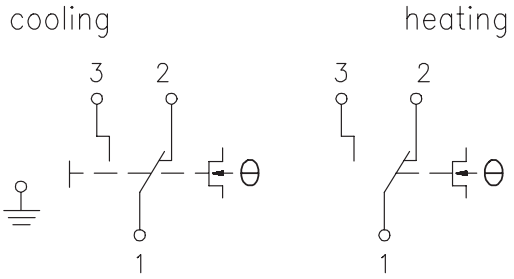
KR 85.3



KR 85.3.. / LR 85.3..



KR 85.3.. / LR 85.3..



Contact thermostats ATR 83, JAT-1, WR 81

Capillary system

ATR

WR

JAT

Technical data	
Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Ambient temperature:	**ATR / WR:** 0 … 80 °C **JAT:** –20 … +55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	none
Max. switching current:	**ATR:** 16 (2) A **JAT / WR:** 15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Hysteresis:	**ATR / WR:** approx. 4 K **JAT:** ca. 2 … 20 K, adjustable
Electrical connection:	screw-type terminals
Mounting / attachment:	**ATR:** on pipe by means of a cable tie (450 x 8.9 mm, easy to remove, heat-resistant up to 105 °C) **WR:** on pipe by means of 400 mm long metal fastening strap with lock **JAT:** on pipe by means of 260 mm long metal fastening strap
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary
General features:	Scale: degrees Celsius
Scope of delivery:	controller, cable tie (ATR) or metal fastening strap (JAT / WR)

Application

Control or monitoring of temperatures at heat registers, pipelines or tanks, for example, temperature-dependent pump control or control of motor valves.

Type	Item no.	Control range	Max. sensor temperature	Features	PG
ATR 83.000	C 1810492	30 … 90 °C	100 °C	external setting, TR, IP 20	II
ATR 83.100	C 1810493	30 … 90 °C	100 °C	internal setting, TW, IP 20	II
ATR 83.001	C 1810494	0 … 60 °C	80 °C	external setting, TR, IP 20	II
ATR 83.101	C 1810495	0 … 60 °C	80 °C	internal setting, TW, IP 20	II

Type	Item no.	Control range	Max. sensor temperature	Features	PG
WR 81.115-5	C 1810617	0 … 70 °C	85 °C	internal setting, TW, IP 43	II
WR 81.117-5	C 1810613	50 … 130 °C	150 °C	internal setting, TW, IP 43	II

Type	Item no.	Control range	Max. sensor temperature	Features	PG
JAT-110 F	JA 030200	–35 … +30 °C	35 °C	internal setting, TW, IP 65	II
JAT-120 F	JA 030500	0 … 60 °C	70 °C	internal setting, TW, IP 65	II
JAT-130 F	JA 030700	40 … 100 °C	115 °C	internal setting, TW, IP 65	II
JAT-140 F	JA 030900	70 … 130 °C	145 °C	internal setting, TW, IP 65	II

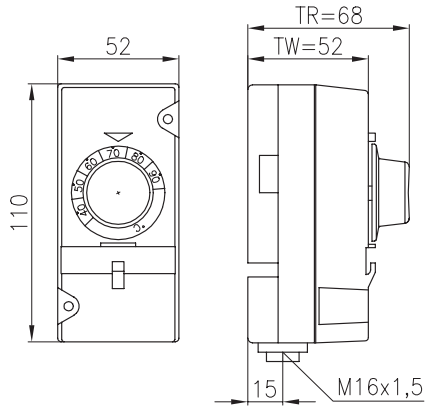
TR = temperature controller, TW = temperature monitor

Contact thermostats ATR 83, JAT-1, WR 81

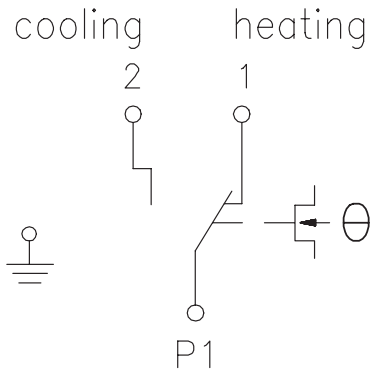
Capillary system

Accessories	Item no.	Features	PG
ATRS-1	C 1809518	temperature determination set for ATR with outside setting (ATR 83.000, ATR 83.001)	II
WP-01	G 9990180	heat conduction paste 2 ml	II

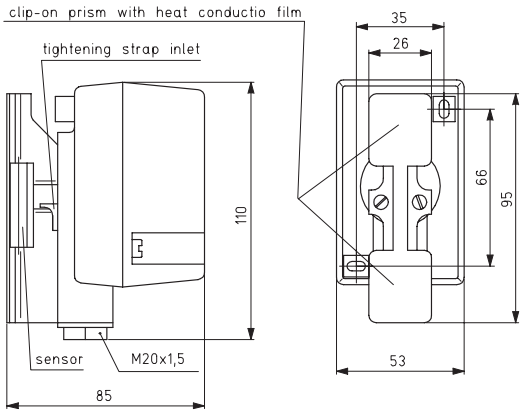
ATR 83.…



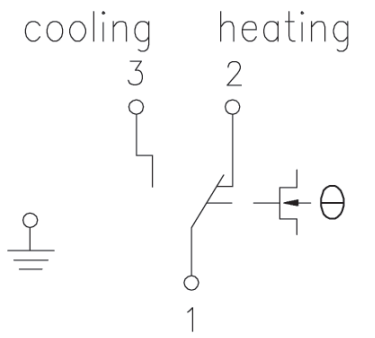
ATR 83.…



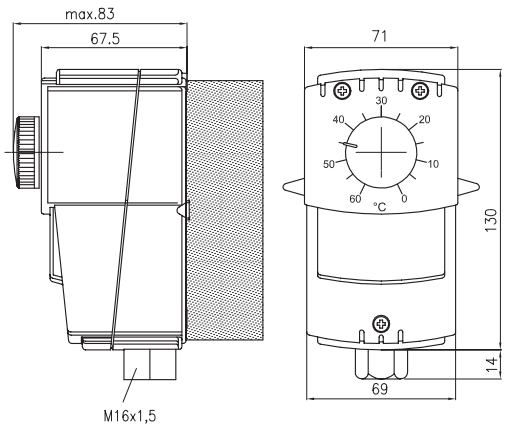
WR 81.11.



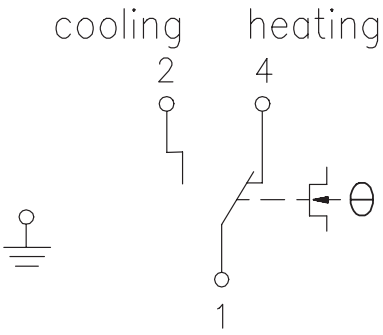
WR 81.11.



JAT-1..



JAT-1..



Frost protection thermostat JTF-1 … -25

Capillary system – 1 or 2 stages – **TÜV-tested** – switching

JTF

JTF-..W

JTF

Technical data

Housing colour:	grey
Sensor material:	Cu
Ambient temperature:	–10 … +55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	200 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control range:	–10 … +12 °C
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting, controller housing must be fitted in such a way that it is not subjected to any temperature that is less than the scale value that has been set
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	gas-filled capillary, active over its entire length (except for JTF-3, JTF-3 W und JTF-4)
General features:	intrinsic safety, scale: degrees Celsius

Note:
Mounting flanges, immersion sleeves and protecting coils are not part of the delivery scope and must be ordered separately as accessories.

Application

Securing hot water registers against freezing. The frost protection thermostats JTF-21 to JTF-25 have two switch outputs that allow for intervention in the system before the critical point is reached. All the devices are intrinsically safe and offer a sealable setpoint configuration.

The capillaries, with the exception of JTF-3/-4, are active over the entire length. The device gets actuated when about 30 cm of the capillary (or approx. 60 cm capillary in the case of 12-m variants) reach the defined value.

JTF-1 to -25:
For temperature measurement of non-aggressive gases. The mounting brackets JZ-05/6 M (metal) or JZ-05/6 K (plastic) should be used for bracing the capillaries against the heat register.

JTF-3/-4 (additional application):
The SW-200-12 protecting coil is to be used for temperature measurement of non-aggressive gases in the duct; for temperature measurement in non-aggressive fluids, the TH-140 immersion sleeve is to be used, and in aggressive fluids, the NTH-140 immersion sleeve.

Type testing by TÜV in accordance with DIN EN 14597

Type	Item no.	Capillary length	Features	PG
1-stage				
JTF-1 *	E 6090301	6 m	external setting, TR, IP 40, hysteresis approx. 1 K	II
JTF-1/12 *	E 6090328	12 m	external setting, TR, IP 40, hysteresis approx. 1 K	II
JTF-1 W *	E 6090014	6 m	internal setting, TW, IP 65, hysteresis approx. 1 K	II
JTF-2 **	E 6090308	6 m	external setting, external reset, TB, IP 40, hysteresis: manual reset after temperature rise of approx. 4 K	II
JTF-2 W**	E 6090287	6 m	internal setting, external reset, TB, IP 65, hysteresis: manual reset after temperature rise of approx. 4 K	II
JTF-3*	E 6090309	1.8 m	external setting, TR, IP 40, hysteresis approx. 1 K, sensor dimensions: 9.5 x 76 mm, also for use in applications exposed to water	II
JTF-3 W*	E 6090065	1.8 m	internal setting, TW, IP 65, hysteresis approx. 1 K, sensor dimensions: 9.5 x 76 mm, also for use in applications exposed to water	II
JTF-4**	E 6090310	1.8 m	external setting, external reset, TB, IP 40, hysteresis: manual reset after temperature rise of approx. 4 K, sensor dimensions: 9.5 x 76 mm, also for use in applications exposed to water	II
JTF-5*	E 6090311	3 m	external setting, TR, IP 40, hysteresis approx. 1 K	II

Frost protection thermostat JTF-1 … -25

Capillary system – 1 or 2 stages – **TÜV-tested** – switching

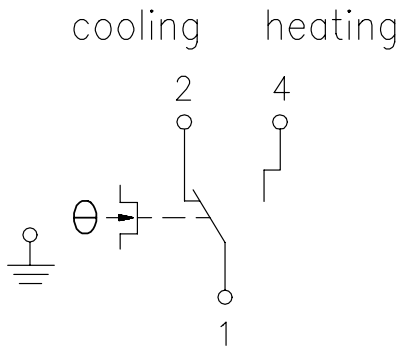
Type	Item no.	Capillary length	Features	PG
2-stage: 1st stage emits a signal 5 K before the switch-off point				
JTF-21* **	E 6090320	6 m	external setting, TR, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II
JTF-21/12* **	E 6090330	12 m	external setting, TR, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II
JTF-21 W* **	E 6090283	6 m	internal setting, TW, IP 65, hysteresis in the stage approx. 1K, hysteresis between the stages approx. 5 K	II
JTF-22** **	E 6090322	6 m	external setting, external reset, TB, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II
JTF-22/12** **	E 6090331	12 m	external setting, external reset, TB, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II
JTF-25* **	E 6090324	3 m	external setting, TR, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II

TR = temperature controller, TW = temperature monitor, TB = temperature limiter

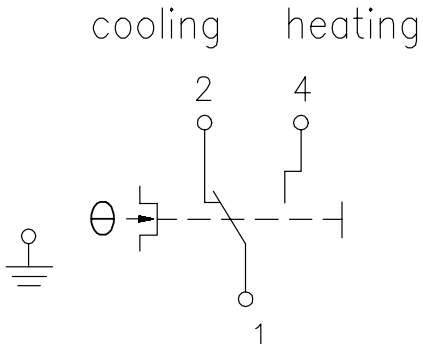
* Control function heating or cooling
** Control function heating or cooling, locked when the temperature is dropping
*** Control function heating or cooling, 1st stage emits a signal 5 K before the switch-off signal
**** Control function heating or cooling, 1st stage emits a signal 5 K before the switch-off signal, locks at dropping temperature (manual reset after temperature rise of approx. 4 K)

Accessories	Item no.	Features	PG
JZ-04	E 6160133	capillary tube leadthrough for air ducts with 30-cm protective hose	II
JZ-05/6 K	C 1809536	1 set of mounting brackets (6 pieces) for frost protection thermostat JTF, made of plastic (max. 145 °C)	II
JZ-05/6 M	C 1809474	1 set of mounting brackets (6 pieces) for frost protection thermostat JTF, made of metal	II
JZ-05/1 M	C 1809462	single mounting bracket for frost protection thermostat JTF, made of metal	II
JZ-07	E 6160145	mounting bracket for frost protection thermostat JTF	II
TH-140	C 1809409	immersion sleeve for JTF-3, JTF-4; material nickel-plated brass	II
NTH-140	C 1809435	immersion sleeve for JTF-3, JTF-4; material V4A (1.4571)	II
SW-200-12	C 1809220	protecting coil for JTF-3, JTF-4 to attach capillary in the air duct; made of nickel-plated steel	II

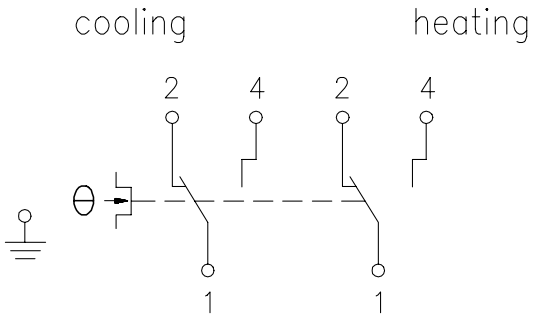
JTF-1/-3/-5



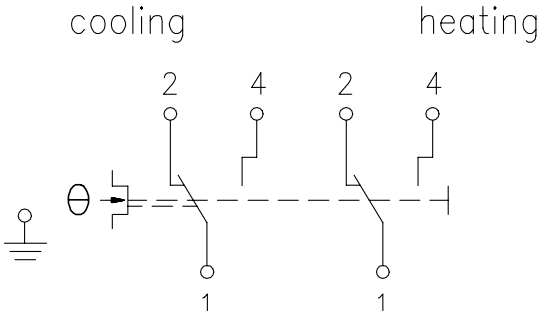
JTF-2/-4/-6



JTF-21/-25

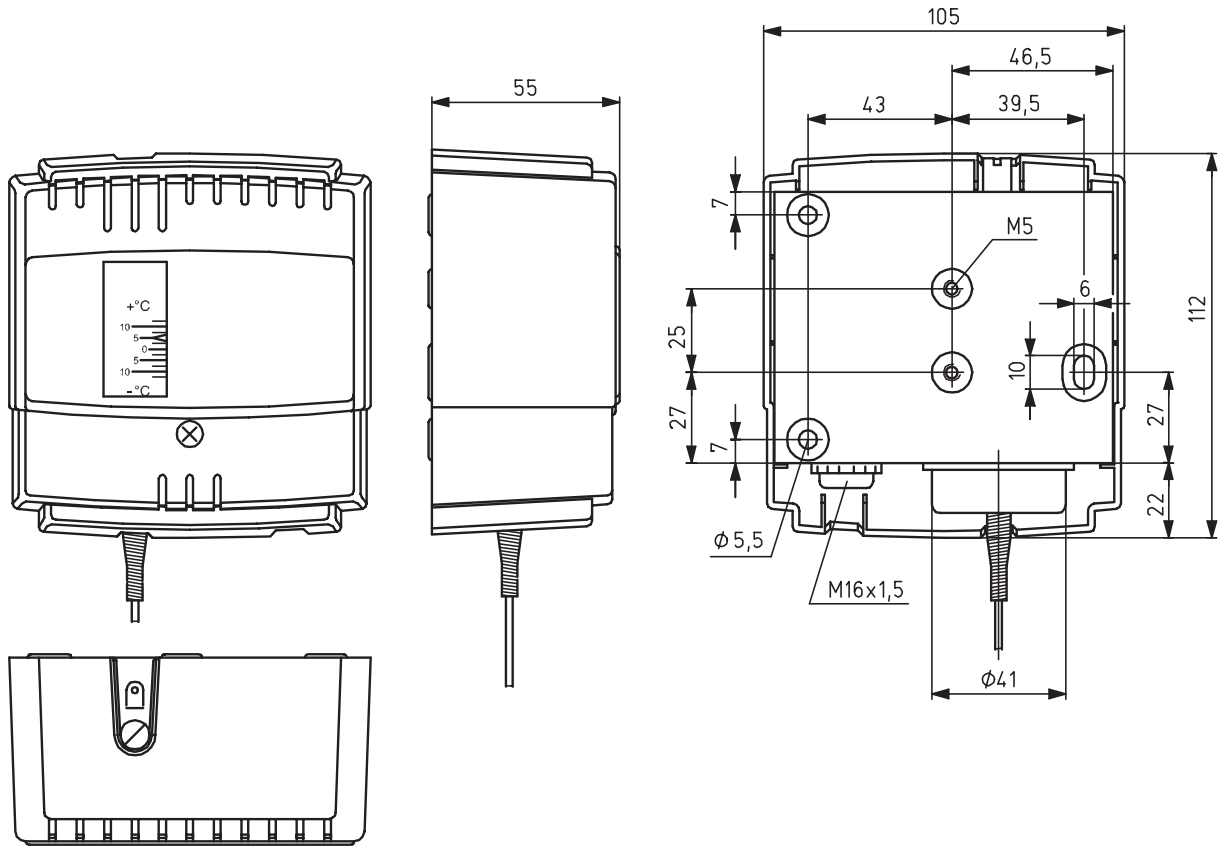


JTF-22

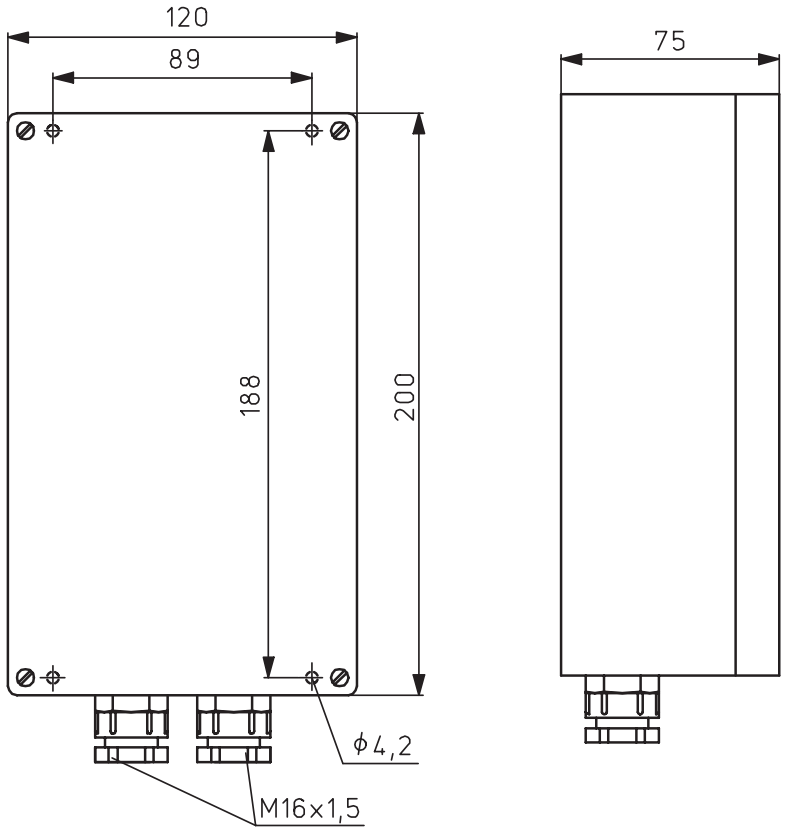


Frost protection thermostat JTF-1 … -25

Capillary system – 1 or 2 stages – **TÜV-tested** – switching



JTF-..W



Frost protection thermostat JTF-101 … -112

Capillary system – 1 stage – switching

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Sensor material:	Cu
Ambient temperature:	–7 … +55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	150 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Control range:	–8 … +8 °C
Hysteresis:	approx. 1 K
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting, controller housing must be fitted in such a way that it is not subjected to any temperature that is less than the scale value that has been set
Protection rating:	IP 54
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	gas-filled capillary, active over its entire length
Function type:	TW
General features:	internal setting, intrinsic safety, scale: degrees Celsius

Application

The JTF-1xx is an intrinsically safe frost protection thermostat, designed especially for ensuring air- or water-exposed frost protection of
hot-water heating registers and heat exchangers in ventilation, heating or air conditioning systems.

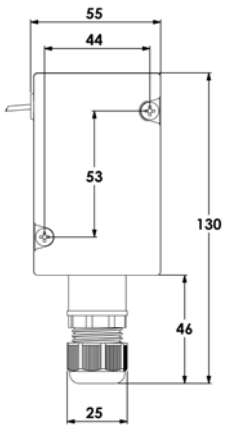
The capillary sensor is active over the entire length. If the ambient temperature falls below the set temperature (factory setting 3 °C) along at least 10% of the entire capillary length (type 105: 0.3 m, type 101: 0.6 m, type 112: 1.2 m), the contacts 1–2 will close. Contacts 1–3 are closed when switched off. The parts of the sensor triggered do not have to be consecutive – only the combined length is decisive. The frost protection monitor automatically switches off if the ambient temperature is higher than the set temperature + switching difference. Type 103 can be used as water-exposed frost protection by means of immersion sleeves. If the sensor breaks, the frost protection will be triggered permanently (contacts 1–2 closed).

Note:
Mounting flanges, immersion sleeves and protecting coils are not part of the delivery scope and must be ordered separately as accessories.

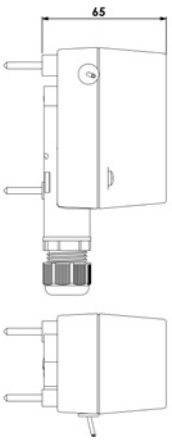
Type	Item no.	Capillary length	Features	PG
JTF-101	JA 044500	6 m	internal setting	II
JTF-103	JA 044600	1.8 m	sensor dimensions 9.5 x 93 mm, also for water-exposed use	II
JTF-105	JA 044700	3 m	internal setting	II
JTF-112	JA 044800	12 m	internal setting	II

Accessories	Item no.	Features	PG
JZ-04	E 6160133	capillary tube leadthrough for air ducts with 30-cm protective hose	II
JZ-05/6 K	C 1809536	1 set of mounting brackets (6 pieces) for frost protection thermostat JTF, made of plastic (max. 145 °C)	II
JZ-05/6 M	C 1809474	1 set of mounting brackets (6 pieces) for frost protection thermostats JTF, made of metal	II
JZ-05/1 M	C 1809462	single mounting bracket for frost protection thermostat JTF, made of metal	II
TH-140	C 1809409	immersion sleeve for JTF-103; material nickel-plated brass	II
NTH-140	C 1809435	immersion sleeves for JTF-103; material V4A (1.4571)	II
SW-200-12	C 1809220	protecting coil for JTF-103 to attach capillary in the air duct; made of nickel-plated steel	II

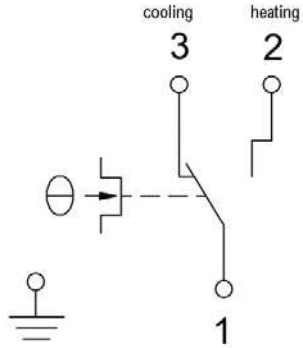
JTF-1xx



JTF-1xx



JTF-1xx



Air heater thermostat JTL-2…-11/JTL-8 NR…-17 NR

Capillary system – 2 functions or 3 functions – **TÜV-tested**

Technical data

Housing colour:	grey
Sensor material:	Cu
Ambient temperature:	–15…+80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	200 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch, toggler, potential-free
Control function:	heating or cooling
Control range ventilator:	20…70 °C
Hysteresis of fan:	adjustable approx. 8…30 K
Electrical connection:	screw-type terminals
Mounting/attachment:	mounting on air duct
Protection rating:	IP 20
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary, active over its entire length
General features:	intrinsic safety, protection against cold, internal setting, scale: degrees Celsius
Operating elements:	fan switch

Application

Minimum or maximum thermostat for inflow air monitoring and fan regulation in ventilation and air conditioning systems. Overheating protection thermostat for electrical heat registers and directly fired air heaters with oil and gas operation.

The “MAN – AUTO” switch allows the fan to be used for ventilation in summer.

Type…NR: Temperature-controlled fan regulation, burner monitoring and safety temperature limiter, 3 functions.

Attention: Assemble the device in a vibration-free manner in order to avoid malfunctions and/or sensor rupture.

Type-tested by TÜV according to DIN EN 14597
For hot air heaters in accordance with DIN 4794

Type	Item no.	Control range burner	Hysteresis of burner (approx.)	Capillary length	Features	PG
JTL-2	E 6110013	70…100 °C	8 K	350 mm	TW	II
JTL-8	E 6110049	70…100 °C	external reset	350 mm	STB, locked when the temperature is rising, overheating protection	II
JTL-11	E 6110064	70…100 °C	8 K	1250 mm	TW	II
JTL-8 NR	E 6120038	70…95 °C	8 K	350 mm	locked when the temperature is rising, TW/STB, tolerances: STB +0/–10 K, overheating protection, external reset STB, shut-off temperature STB fixed: 100 °C	II
JTL-17 NR	E 6120077	70…95 °C	8 K	1,250 mm	locked when the temperature is rising, TW/STB, tolerances: STB +0/–10 K, overheating protection, external reset STB, shut-off temperature STB fixed: 100 °C	II

* TW = temperature monitor, STB = safety temperature limiter

JTL-4 is replaced by JTL-8.
JTL-4 NR is replaced by JTL-8 NR.

Intrinsic safety/protection against cold: The devices are intrinsically safe, i.e., upon loss of the sensor medium owing to sensor rupture, for example, the burner is switched off. Since minus temperatures generate the same effect through volume reduction of the sensor medium, the devices are adjusted by means of the “cold screw” such that they switch off the burner only at temperatures below –15 °C. They can only be switched on again manually at temperatures above approx. –5 °C by means of the manual reset button.

Overheating protection: This device provides protection from uncontrolled overheating, which is caused, for example, by heat building up or by creeping capillary filling losses when there is invisible damage to the sensor or the capillary tube etc. Upon reaching a temperature of 220 °C, the safety slot in the sensor melts and, in reaction to losing the filling medium, the device switches off the burner towards the safe side. The burner cannot be switched on again. The device is then unusable and serves as evidence of the presence of an over-temperature of at least 220 °C.

Locking: Restarting after having cooled down is possible only by resetting it manually (JTL-8, JTL-8 NR and JTL-17 NR).

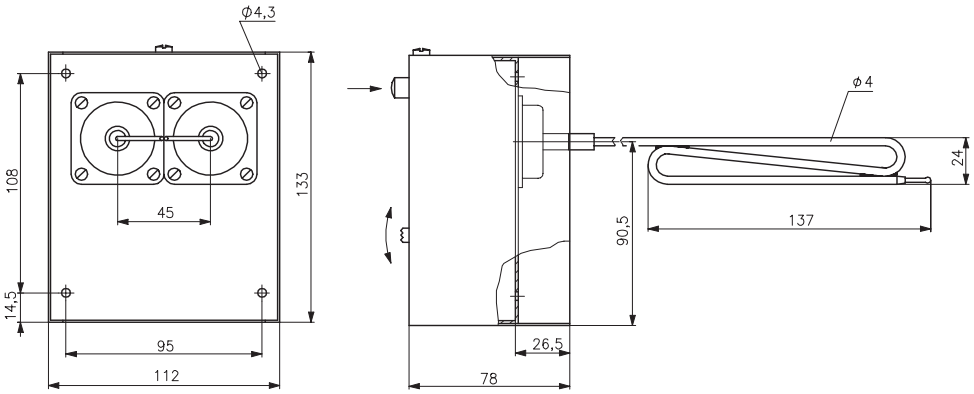
Air heater thermostat JTL-2…-11/JTL-8 NR…-17 NR

Capillary system – 2 functions or 3 functions – **TÜV-tested**

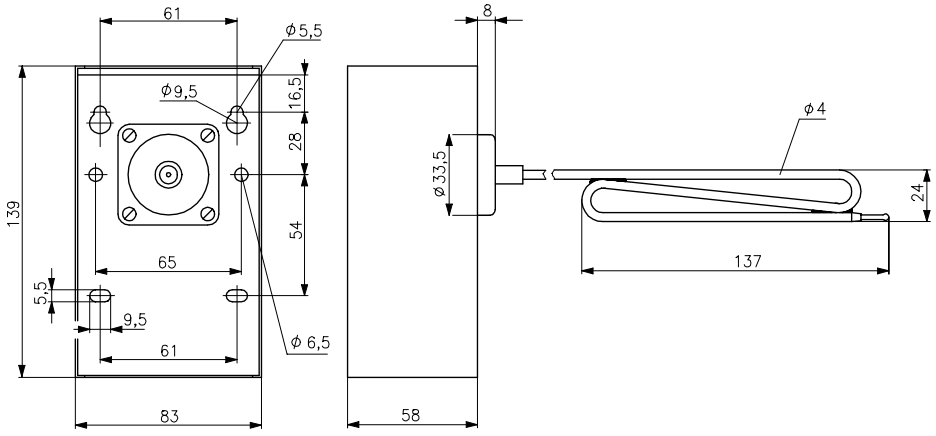
JTL-17 NR

JTL-2

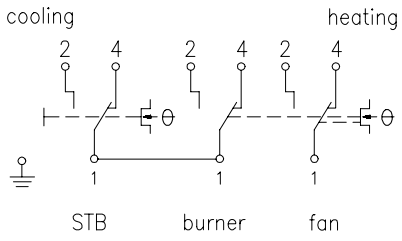
JTL-..NR



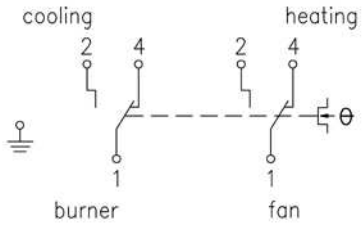
JTL-..



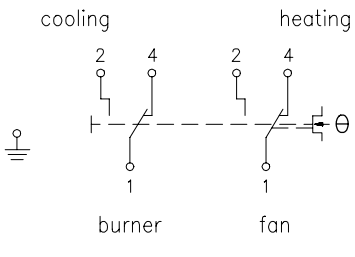
JTL-..NR



JTL..(TW)



JTL-.(STB)



Duct thermostat JTU-1 … -50

Capillary system – **TÜV-tested**

Technical data

Housing colour:	grey
Sensor material:	Cu
Ambient temperature:	–15 … +80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	200 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Electrical connection:	screw-type terminals
Mounting / attachment:	mounting on air duct
Protection rating:	IP 40
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	liquid-filled capillary, active over its entire length
General features:	internal setting, scale: degrees Celsius

Application

Minimum or maximum thermostat for inflow air monitoring and fan regulation in ventilation and air conditioning systems.

Overheating protection thermostat for electrical heat registers and directly fired air heaters with oil and gas operation.

Attention: Assemble the device in a vibration-free manner in order to avoid malfunctions and / or sensor rupture.

JTU-1, JTU-20, JTU-50:
Type testing by TÜV in accordance with DIN EN 14597,
for hot air heaters in accordance with DIN 4794

Type	Item no.	Control range	Hysteresis (approx.)	Capillary length	Features	PG
JTU-50	E 6100000	–25 … +65 °C	1.5 K	350 mm	Control function: heating or cooling, TW	II
JTU-1	E 6100012	20 … 100 °C	8 … 30 K adjustable	350 mm	Control function: heating or cooling, TW, intrinsic safety, protection against cold	II
JTU-3	E 6100036	20 … 100 °C	external reset	350 mm	Control function: heating or cooling, locked when the temperature is rising, STB, intrinsic safety, protection against cold, overheating protection	II
JTU-20	E 6100075	20 … 100 °C	external reset	1250 mm	Control function: heating or cooling, locked when the temperature is rising, STB, intrinsic safety, protection against cold	II
JTU-5	E 6100048	60 … 140 °C	8 … 30 K adjustable	350 mm	Control function: heating or cooling, TW	II
JTU-6	E 6100051	60 … 140 °C	external reset	350 mm	Control function: heating or cooling, locked when the temperature is rising, TB	II

TW = temperature monitor, STB = safety temperature limiter, TB = temperature limiter

JTU-2 is replaced by JTU-3.

Intrinsic safety / protection against cold: The devices are intrinsically safe, i.e., upon loss of the sensor medium owing to sensor rupture, for example, the burner is switched off. Since minus temperatures generate the same effect through volume reduction of the sensor medium, the devices are adjusted by means of the “cold screw” such that they switch off the burner only at temperatures below –15 °C. They can only be switched on again manually at temperatures above approx. –5 °C by means of the manual reset button.

Overheating protection: This device provides protection from uncontrolled overheating, which is caused, for example, by a heat build-up or by creeping capillary filling losses when there is invisible damage to the sensor or the capillary tube etc. Upon reaching a temperature of 220 °C, the safety slot in the sensor melts and, in reaction to losing the filling medium, the device switches off the burner towards the safe side. The burner cannot be switched on again. The device is then unusable and serves as evidence of the presence of an over-temperature of at least 220 °C.

Locking: Restarting after having cooled down is possible only by resetting it manually (JTU-3, JTU-6 and JTU-20).

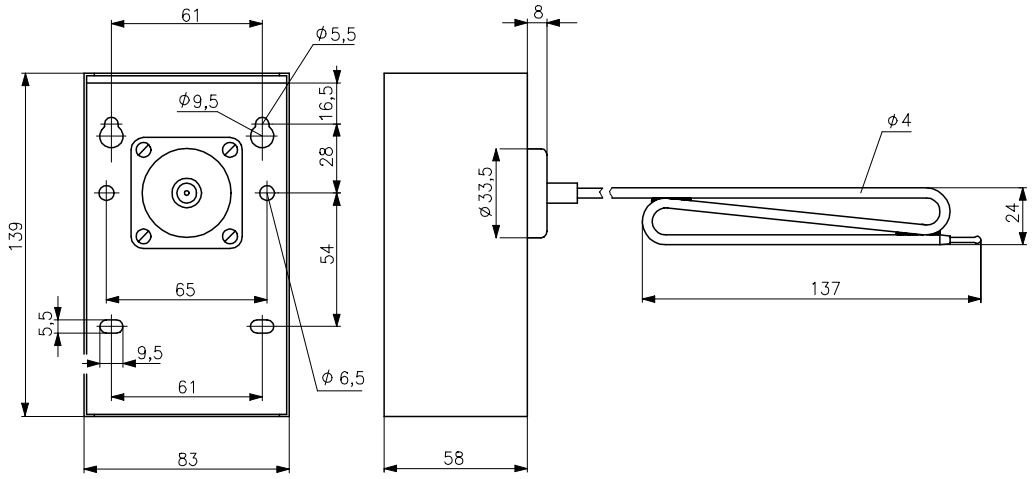
JTU-20

JTU-3 / -6

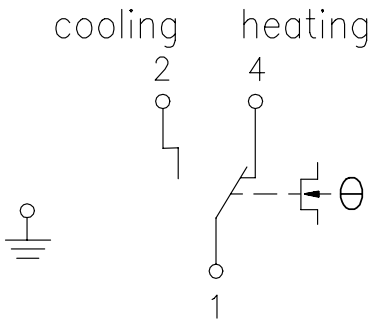
Duct thermostat JTU-1 … -50

Capillary system – **TÜV-tested**

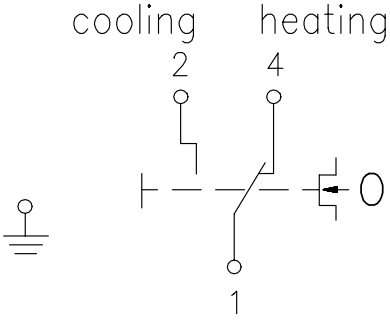
JTU-20



JTU-1, -5, -50



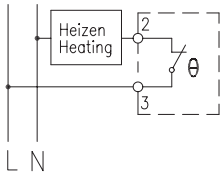
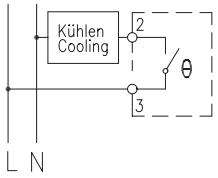
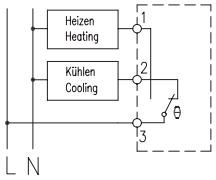
JTU-3 / -6 / -20



Control cabinet thermostats

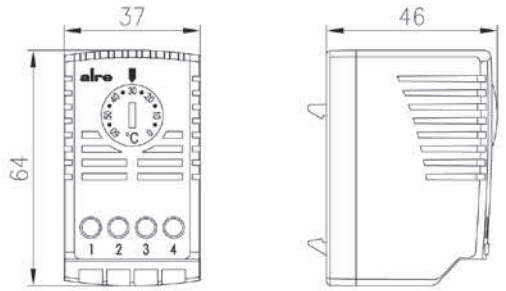
mechanical, bimetal

Technical data		Application
Housing colour:	grey, like RAL 7035	Application scenarios include temperature monitoring in control cabinets, machines and housings.
Ambient temperature:	0…60 °C	
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing	
Max. switching voltage:	230 VAC/50 Hz, 48 VDC	
Min. switching voltage:	24 VAC/50 Hz, 24 VDC	
Min. switching current:	The resistance of the contact transition results in a voltage drop across the contact. This can have a strong influence on very small switching signals.	
Switching element:	bimetallic contact	
Hysteresis:	approx. 4…7 K at a temperature change of max. 4 K/h	
Electrical connection:	screw-type terminals 0.5 mm² up to 2.5 mm²	
Mounting/attachment:	on supporting rails (35 mm) according to EN 60715	
Protection rating:	IP 30	
Protection class:	0, determined by the assembly location	
Safety and EMC:	according to DIN EN 60730	
Sensor:	bimetal	
Function type:	TR (temperature controller)	
General features:	external setting, scale: degrees Celsius, snap-lock control button	
Test mark/Approbation:	UL, VDE	

Type/image	Item no.	Features	Circuit diagram	PG
RTBSS-110.250/04 	ZN 111524	Max. switching current: 10 (2) A/VAC, max. 30 W / VDC Switching contact: NC contact Control function: heating Control range: 0…60 °C scale red		II
RTBSS-111.250/05 	ZN 112525	Max. switching current: 10 (2) A/VAC, max. 30 W / VDC Switching contact: NO contact Control function: cooling Control range: 0…60 °C scale blue		II
RTBSS-112.250/07 	ZN 113527	Max. switching current: NC contact 10 (2) A / VAC, max. 30 W / VDC NO contact 5 (2) A / VAC, max. 30 W / VDC Switching contact: changeover Control function: heating or cooling Control range: 0…60 °C scale grey		II

Accessories	Item no.	Features	PG
JZ-13	ZA 990001	standard rail with drilled holes for fastening control cabinet controllers (length 40 mm)	II

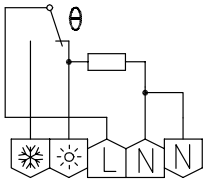
RTBSS



Control cabinet thermostats

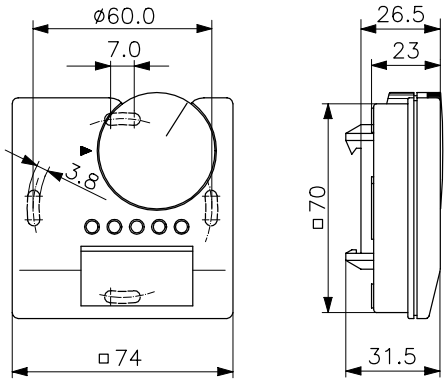
mechanical, bimetal

Technical data		Application
Ambient temperature:	0…60 °C	Application scenarios include temperature monitoring in control cabinets, machines and housings.
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing	
Housing colour:	grey	
Operating voltage:	230 VAC, 50 Hz	
Average power consumption:	< 0.5 W	
Max. switching current:	NC contact 10 (4) A, NO contact 5 (2) A	
Max. switching voltage:	230 VAC, 50 Hz	
Min. switching voltage:	230 VAC, 50 Hz	
Switching contact:	changeover	
Control function:	heating or cooling	
Control range:	10…60 °C	
Hysteresis:	approx. 2 K at a temperature change of max. 4 K/h	
Electrical connection:	screw-type terminals	
Mounting/attachment:	on supporting rails (35 mm) according to EN 60715	
Protection rating:	IP 30	
Protection class:	0, determined by the assembly location	
Safety and EMC:	according to DIN EN 60730	
Sensor:	bimetal	
Function type:	TR (temperature controller)	
General features:	internal setting, scale: degrees Celsius, mechanical range setting	

Type/image	Item no.	Features	Circuit diagram	PG
PTR 01.082 	A 201302			II

Accessories	Item no.	Features	PG
JZ-13	ZA 990001	standard rail with drilled holes for fastening control cabinet controllers (length 40 mm)	II

PTR



Control cabinet hygrostats

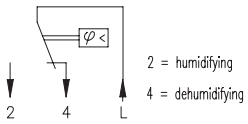
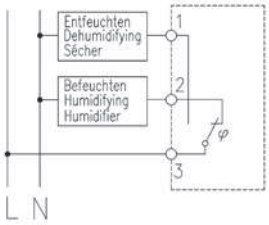
with changeover contact

Technical data

Housing colour:	grey, like RAL 7035
Operating voltage:	none
Max. switching current:	De-humidifying: 5 (0.2) A, Humidifying: 2 (0,2) A
Min. switching current:	100 mA at 24 VAC
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	changeover
Control function:	humidifying or de-humidifying
Mounting / attachment:	on supporting rails (35 mm) according to EN 60715
Protection rating:	IP 30
Protection class:	0, determined by the assembly location
Safety and EMC:	according to DIN EN 60730
Sensor:	plastic fibres
Function type:	controller
General features:	external setting
Test mark / Approbation:	RFHSS-114.110/01 UL at 230 VAC

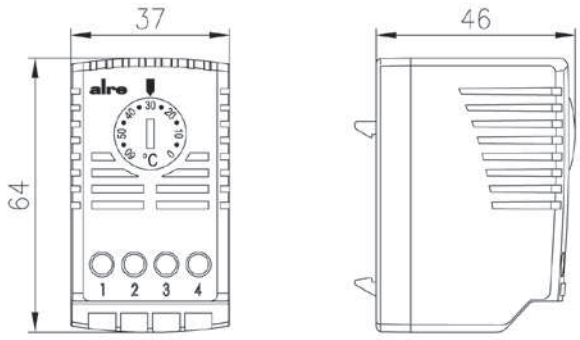
Application

Hygrostat for monitoring and controlling humidity in control cabinets and machines

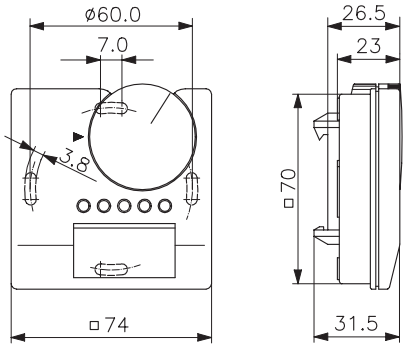
Type / image	Item no.	Features	Circuit diagram	PG
PHY 60.082 	A 261004	Ambient temperature: 10 … 60 °C Permissible atmospheric humidity: non-condensing Control range: 30 … 100% rel. humidity Hysteresis: approx. 4% rel. humidity Tolerances: +/- 3% rel. humidity at 50% rel. humidity Electrical connection: screw-type terminals mechanical range setting		II
RFHSS-114.110/01 	ZN 275001	Ambient temperature: 0 … 60 °C Admissible humidity: max. 95% rel. humidity, non-condensing Control range: 40 … 90 % rel. humidity Hysteresis: approx. 5% rel. humidity Electrical connection: screw-type terminals 0.5 mm² to 2.5 mm² Test mark / Approbation: UL for 230 VAC snap-in turning knob		II

Accessories	Item no.	Features	PG
JZ-13	ZA 990001	standard rail with drilled holes for fastening control cabinet controllers (length 40 mm)	II

RFHSS



PHY



Plant engineering

Controller for distributor assembly (DIN top hat rail) ITR 79

remote sensor, electronic

Technical data

Housing colour:	grey, like RAL 7035
Ambient temperature:	–10…+40 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	NO contact: 10 (2) A, NC contact: 5 (1.5) A
Min. switching current:	The resistance of the contact transition results in a voltage drop across the contact. This can have a strong influence on very small switching signals.
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	5 VAC, 50 Hz
Switching element:	relay
Switching contact:	toggler, potential-free
Electrical connection:	screw-type terminals up to 2.5 mm²
Mounting / attachment:	on supporting rails (35 mm) according to EN 60715
Protection rating:	IP 20
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Function type:	TR (temperature controller)
General features:	external setting

Application

Control and monitoring of the temperature in large halls, greenhouses and floor heating systems. The devices have sensor rupture and sensor short-circuit protection.

Sensors are not a part of the delivery scope
(except for ITR 79.804)
For available sensors,
see the “Sensors” section.

Sensor use according to the specified sensor number (for example, sensor number 24: All the sensors with this number can be used, e.g., KF-4).
Avoid parallel routing of sensor wires together with mains voltage-bearing wires ore use shielded wires.

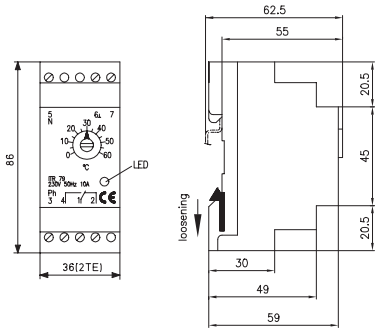
Type	Item no.	Control range	Features	PG
ITR 79.402	D 4780167	–35…+15 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 1 K (sensor 1), scale: degrees Celsius, display “heating” red	II
ITR 79.404	D 4780155	0…60 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 10 K (sensor 4), scale: degrees Celsius, display “heating” red	II
ITR 79.405	D 4780181	35…95 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 50 K (sensor 5), scale: degrees Celsius, display “heating” red	II
ITR 79.408	D 4780179	–10…+40 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 8 K (sensor 3), scale: degrees Celsius, display “heating” red	II
ITR 79.503	D 4780524	0…11 °C	Control function: heating, frost protection locked when the temperature is dropping, hysteresis approx. 1.5 K, sensor: NTC 2 K 25 (sensor 0), scale: degrees Celsius, display “heating” red	II
ITR 79.504	D 4780371	0…60 °C	Control function: cooling, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 10 K (sensor 4), scale: degrees Celsius, display “cooling” green	II
ITR 79.508	D 4780369	–10…+40 °C	Control function: cooling, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 8 K (sensor 3), scale: degrees Celsius, display “cooling” green	II
Two setpoint adjusters (e.g. day / night temperature via external clock)				**PG**
ITR 79.600	D 4780508	**2** x 5…30 °C	Control function: heating, hysteresis: approx. 0.5 K, sensor: NTC 47 K (sensor 2), ECO contact: toggling between setpoint value 1 and setpoint value 2, scale: degrees Celsius	II
Complete device including remote sensor HF-8 / 4-K2 (4-m cable)				**PG**
ITR 79.804	D 4780545	0…60 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 2 K (sensor 8), multi-digit scale 0…6, display “heating” red	II

Accessories	Item no.	Features	PG
JZ-13	ZA 990001	standard rail with drilled holes for fastening control cabinet controllers (length 40 mm)	II

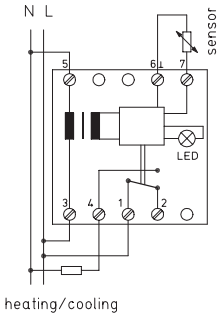
Controller for distributor assembly (DIN top hat rail) ITR 79

remote sensor, electronic

ITR 79.4.../.5.../.8...

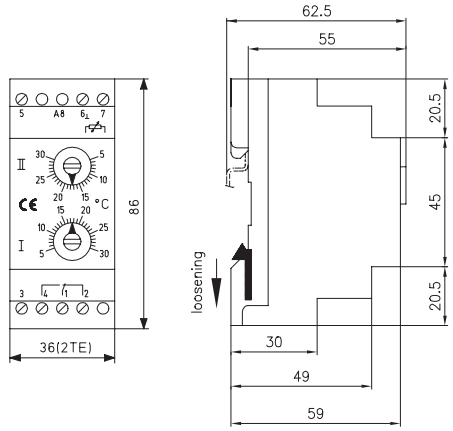


ITR 79.4.../.5.../.8...

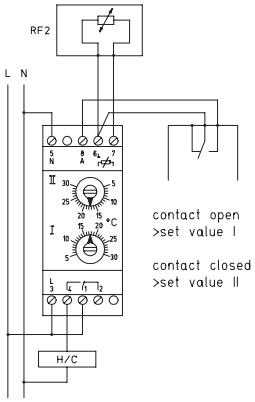


ITR 79.804

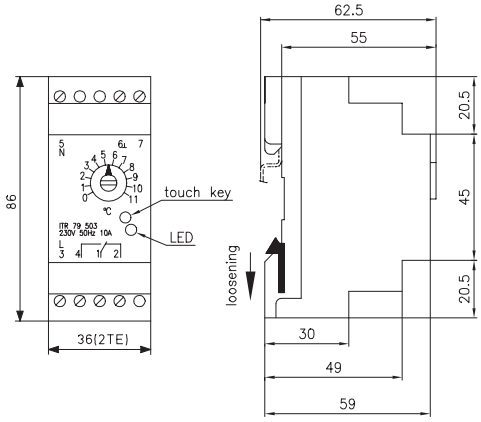
ITR 79.6



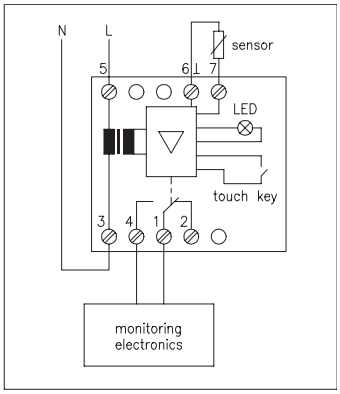
ITR 79.6



ITR 79.503



ITR 79.503



Universal controller ETR 74

remote sensor, electronic, with digital display, 1-/2-stage

Technical data

Housing colour:	grey
Ambient temperature:	0…45 °C
Permissible atmospheric humidity:	max. 95% relative humidity non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	10 (4) A
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	toggler, potential-free
Control range:	0…50 °C
Display type:	7-segment, 3-digit (for actual temperature)
Electrical connection:	screw-type terminals
Mounting/attachment:	wall mounting
Protection rating:	IP 54
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Sensor:	KTY 11-7 (sensor 57)
Function type:	TR (temperature controller)
General features:	external setting, scale: degrees Celsius, operating mode heating/cooling switchable by means of internal jumper, “heating/cooling” display

Application

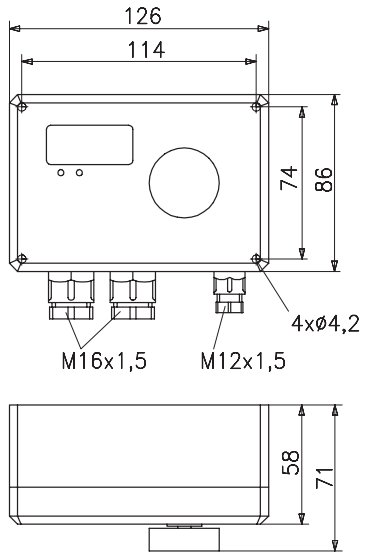
For controlling and/or monitoring the temperatures of liquid or gaseous media with digital actual value display. Suitable for surface-mounting in humid rooms, as a remote controller in industrial and agricultural applications.

Sensors are not a part of the delivery scope
For available sensors, see below or the “Sensors” section.

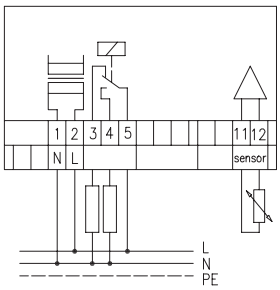
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Type	Item no.	Features	PG
ETR 74.1	G 8000272	Control function: heating or cooling, hysteresis: adjustable 0.1…2.5 K	III
ETR 74.2	G 8000273	Control function: heating or cooling 2-stage, hysteresis in the stage: adjustable 0.1…2.5 K hysteresis between the stages: adjustable 1…5 K	III

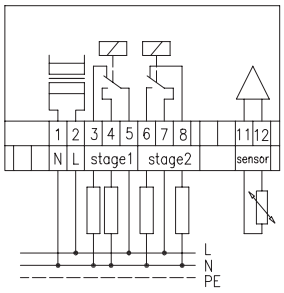
ETR 74



ETR 74.1



ETR 74.2



Accessories	Item no.	Features	PG
AF-57	G 9040681	external temperature sensor	III
BTF2-Y11/7-0000	SA 140018	room temperature sensor, surface-mounted	III
FUFY-11/7-0000	SN 090202	room temperature controller, flush-mounted	III
KF-57	G 9031454	cable temperature sensor with 1.5-m PE cable	III

Universal controller ETR 77

remote sensor, electronic

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	–20 … +50 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	NO contact: 10 (3) A (heating), NC contact: 5 (1.5) A (cooling)
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting
Protection class:	II
Sensor:	KTY 81-121 (sensor 51)

Application

Thanks to various sensor models suitable for universal use in heating, ventilation, air-conditioning and refrigeration technology as well as in mechanical and plant engineering. The heating state is indicated by a red LED.

Sensors are not a part of the delivery scope
For available sensors, see below or the “Sensors” section.

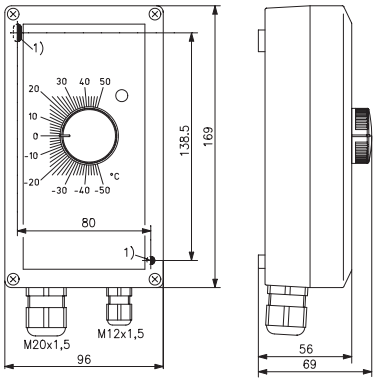
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Safety and EMC: according to DIN EN 60730

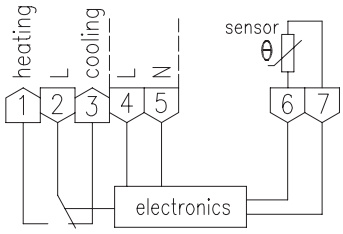
Type	Item no.	Control range	Features	Hysteresis adjustable	PG
ETR 77.008-5	D 4770014	–50 … +50 °C	IP 65, TW, internal setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.108-5	D 4770040	–50 … +50 °C	IP 54, TR, external setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.009-5	D 4770026	0 … 100 °C	IP 65, TW, internal setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.109-5	D 4770053	0 … 100 °C	IP 54, TR, external setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.109-15	D 4770089	0 … 100 °C	IP 54, TR, external setting, scale: degrees Celsius	5 … 15 K	II

TR = temperature controller, TW = temperature monitor

ETR 77



ETR 77



Accessories	Item no.	Features	PG
AF-51	G 9040420	external temperature sensor	III
ALF-51	G 9050210	contact temperature sensor	III
BTF2-Y81 / 121-0000	SA 140017	room temperature sensor, surface-mounted	III
FUFY-81 / 121-0000	SN 090201	room temperature controller, flush-mounted	III
GFL-51	G 9060070	assembly-type duct sensor	III
KF-51	G 9031452	cable temperature sensor with 1.5-m silicone cable	III
KF-51 / 6	G 9031453	cable temperature sensor with 6-m silicone cable	III
STF-51	SN 080500	radiation temperature sensor	III

Digital temperature display JDI-0 / -08

DIN rack

Technical data

Housing colour:	black
Ambient temperature:	– 20 … + 50 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Control function:	none
Display type:	7-segment, 3-digit excluding decimal place
Electrical connection:	screw-type terminals up to 2.5 mm²
Mounting / attachment:	assembly in front panels, control cabinet and distributor doors, etc.
Protection rating:	IP 20 front-side
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Function type:	display
Display range:	– 40 … + 120 °C

Application

Usable as a thermometer in conjunction with remote sensors.

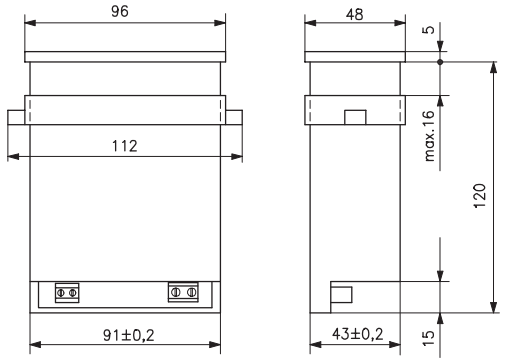
Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

All sensors with the number 51 can be used, (e.g., KF-51).

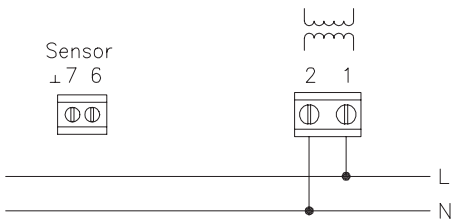
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Type	Item no.	Features	PG
JDI-0	D 4780306	Sensor: KTY 81-121 (sensor 51), operating elements: zero equalisation function	II
JDI-08	D 4780395	sensor: up to 8 KTY 81-121 (sensor 51), operating elements: 8-stage rotary switch for measurement point selection	II

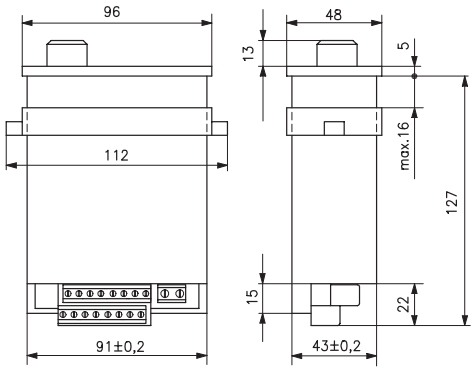
JDI-0



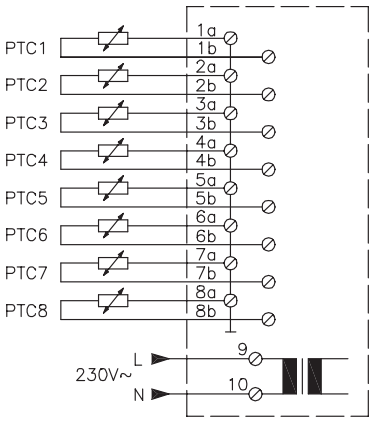
JDI-0



JDI-08



JDI-08



Digital controllers ITR 71 / JDI-1 / -10

Temperature setting via “rotary knob” / temperature setting via “potentiometer”
DIN rack

Technical data

Housing colour:	black
Ambient temperature:	–20 … +50 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	10 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Hysteresis adjustable:	0.5 … 5 K
Electrical connection:	screw-type terminals up to 2.5 mm²
Mounting / attachment:	assembly in front panels, control cabinet and distributor doors, etc.
Protection rating:	IP 20 front-side
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Sensor:	KTY 81-121 (sensor 51)
Function type:	TR (temperature controller)
General features:	external setting, “heating” display, external setting, switching status display, heating / cooling jumper, “zero equalisation” potentiometer

Application

For controlling or monitoring the temperature of liquid or gaseous media.

Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

Sensor application according to the specified sensor number (all sensors with the number 51 can be used, e.g., KF-51).

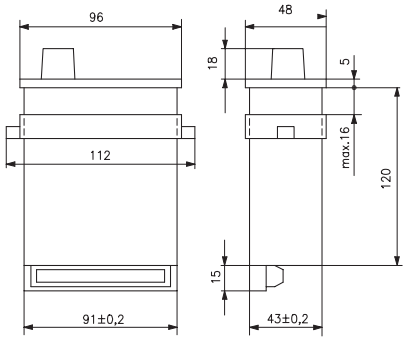
Note: Make sure the sensor line is routed in the protective duct. Parallel routing together with lines that carry alternating currents is not admissible.

Type	Item no.	Control range	Display	PG
ITR 71.050	D 4710018	–40 … +50 °C	Display type: 7-segment, 3-digit excluding decimal place, scale: degrees Celsius	II
ITR 71.100	D 4710006	0 … 100 °C	Display type: 7-segment, 3-digit excluding decimal place, scale: degrees Celsius	II
ITR 71.125	D 4710020	40 … 125 °C	Display type: 7-segment, 3-digit excluding decimal place, scale: degrees Celsius	II

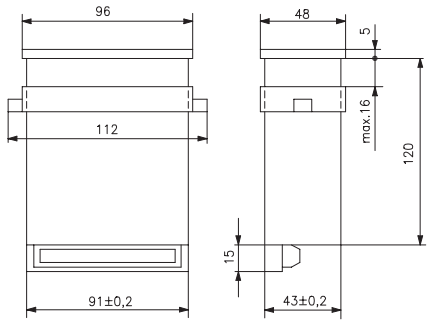
Type	Item no.	Control range	Display	PG
JDI-1	D 4780318	–40 … +120 °C	Display type: 7-segment, 3-digit excluding decimal place	II
JDI-10	D 4780539	–40 … +120 °C	Display type: 7-segment, 4-digit with decimal place	II

JDI-1

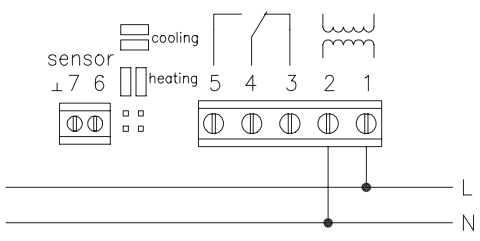
ITR-71



JDI-1 / -10



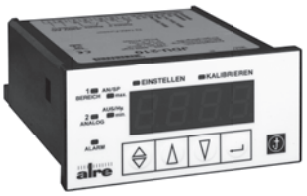
ITR 71 … +JDI-1 / -10



Plant engineering

Microprocessor controller JDI-22

For PT-100 sensors
DIN rack



Technical data

Housing colour:	black, front side white
Ambient temperature:	– 20 … + 50 °C
Permissible atmospheric humidity:	max. 80% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	Changeover contact: 10 (2) A, NO contact: 5 (1) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	relay
Switching contact:	1x toggler, 1x NO contact, potential-free
Control function:	heating and / or cooling, 2-stage heating, 2-stage cooling
Control range:	– 50 … + 200 °C
Hysteresis adjustable:	freely programmable
Display type:	7-segment, 4-digit with decimal place
Electrical connection:	screw-type terminals, push-type terminals up to 1.5 mm²
Mounting / attachment:	assembly in front panels, control cabinet and distributor doors, etc.
Protection rating:	IP 54 front-side
Protection class:	II front-side
Safety and EMC:	according to DIN EN 60730
Sensor:	PT 100 (2- / 3-conductor)
Function type:	2- / 3-point controller
General features:	external setting, operation using direct-dial buttons, digital actual value display, digital target value display
Accuracy:	< 0.3% FS +/- 1 digit at 25 °C
Measurement rate:	approx. 4 measurements / s
Resolution:	0.1 °C

Application

2- / 3-point controller for controlling and / or monitoring the temperatures of liquid or gaseous media, with decimal place, digital setpoint / actual value display for front panel integration. As a digital remote controller for use in the industrial, agricultural and in mechanical / plant engineering sectors.

Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section. (all types with PT-100 sensor)

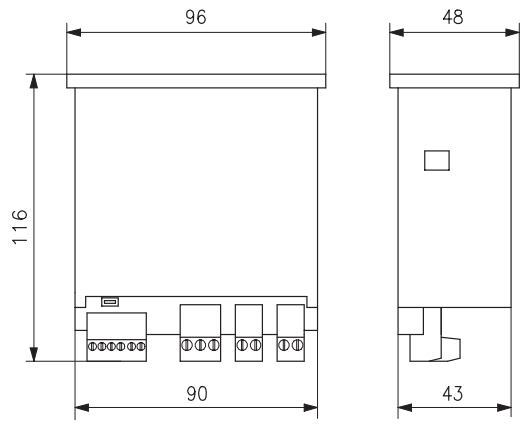
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Relay pin assignment:
Relay 1: terminal 3 – input
terminal 4 – NO contact
Relay 2: terminal 5 – input
terminal 6 – NO contact
terminal 7 – NC contact

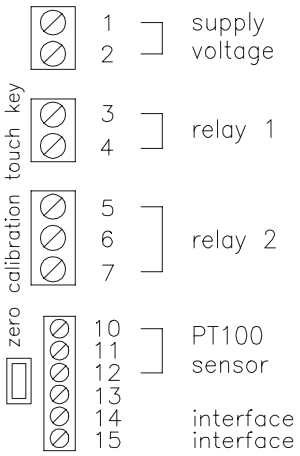
Replacement for old types JDI-2 / JDI-21

Type	Item no.	PG
JDI-22	G 8000398	III

JDI-22

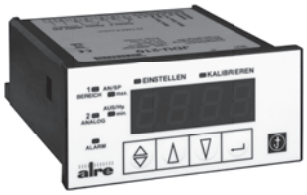


JDI-22



Microprocessor controller JDU-210

For PT-100/PT-1000 sensors and transducers
DIN rack



Technical data

Housing colour:	black, front side white
Ambient temperature:	–20…+50 °C
Permissible atmospheric humidity:	max. 80% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	Changeover contact: 10 (2) A, NO contact: 5 (1) A
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	relay
Switching contact:	1x toggler, 1x NO contact, potential-free
Control function:	outputs freely programmable in connection with the measurement value
Control range:	–50.0…+200.0 °C, –200…+850 °C, –1999…+9999 digit
Hysteresis:	freely programmable
Display type:	7-segment, 4-digits, with decimal display
Electrical connection:	screw-type terminals, push-type terminals up to 1.5 mm²
Mounting/attachment:	assembly in front panels, control cabinet and distributor doors, etc.
Protection rating:	IP 54 front-side
Protection class:	II front-side
Safety and EMC:	according to DIN EN 60730
Sensor:	PT 100 (2-/3-conductor), PT 1000 (2-conductor), measuring transducer (0–1 V, 0–10 V, 0–20 mA, 4–20 mA)
Function type:	2-/3-point controller, 2-point controller with alarm
General features:	external setting, operation using direct-dial buttons

Application

2-/3-point controller for controlling and/or monitoring the temperatures of liquid or gaseous media, with decimal place, digital setpoint/actual value display for front panel integration. As a digital remote controller for use in the industrial, agricultural and in mechanical/plant engineering sectors.
Our transducers can be used with standardised signals for the JDU-210 controller. The physical size is determined by the transducer.

Sensors and transducers are not a part of the delivery scope.
For available sensors or measuring transducers, see the “Sensors” section.

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

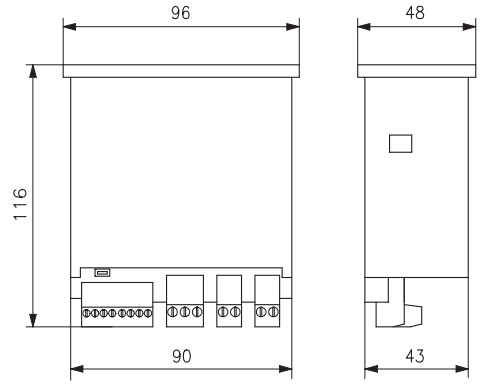
Relay pin assignment:
Relay 1: terminal 3–input
terminal 4–NO contact
Relay 2: terminal 5–input
terminal 6–NO contact
terminal 7–NC contact

Replacement for old types:
JDI-210/JDR 1/JDR-210

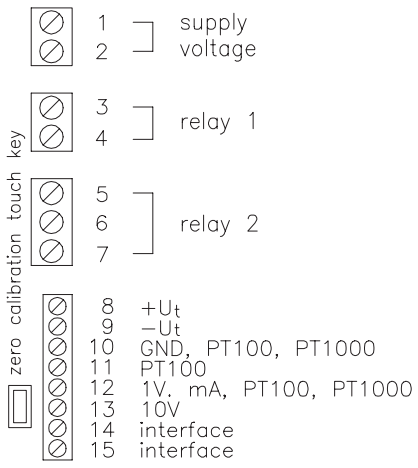
Accuracy:
PT 100/PT 1000: < 0.3% FS
+/- 1 digit at 25 °C, standard signal: < 0.2% FS
+/- 1 digit at 25 °C
Measurement rate:
PT: approx. 4 measurements/s
Standard signal: approx. 100 measurements/s
Resolution: 0.1 °C at –50.0…+200.0 °C,
1.0 °C at–200…+850 °C
Transducer power supply:
24 VDC +/- 5% max. 20 mA,
galvanically isolated

Type	Item no.	PG
JDU-210	G 8000399	III

JDU-210



JDU-210



Differential temperature controller ETR 78

remote sensor, electronic

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	0 … 55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	10 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	toggler, potential-free
Control function:	heating or cooling
Setting range Δ T:	1 … 20 °C
Hysteresis adjustable:	0.1 … 2 K
Electrical connection:	screw-type terminals
Mounting / attachment:	wall-mounting, position-independent
Protection rating:	IP 65
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Function type:	TW (temperature monitor)
General features:	internal setting

Application

Capture of the temperature difference between 2 independent NTC sensors. Predominant use in solar heating systems for activating the circulating pump; also for controlling heating and raw water pumps, valves or heat pumps based on a temperature difference.

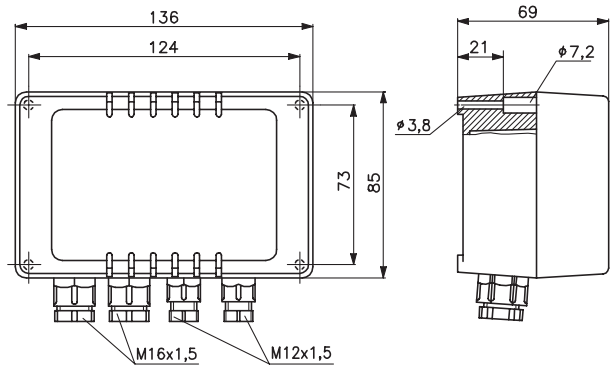
Sensors are not a part of the delivery scope. For available sensors, see the “Sensors” section.

Sensor application according to specified sensor number (e.g., sensor number 5: all the sensors with this number can be used, e.g., KF-5 or AF-5). You must order **two sensors** per device.

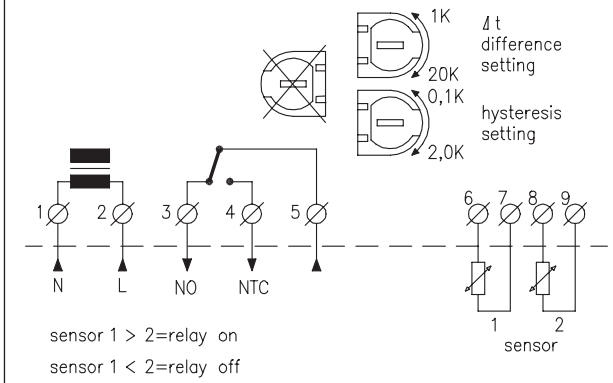
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Type	Item no.	Control range	Features	PG
ETR 78.005	D 4780041	35 … 95 °C	Sensor: NTC 50 K (sensor 5)	II
ETR 78.006	D 4780080	0 … 60 °C	Sensor: NTC 8 K (sensor 3)	II

ETR 78



ETR 78



Function: 2 temperature sensors are connected to the controller, between which the temperature can be compared; when the specified temperature difference Δ is exceeded, a switching process is actuated. The sensors employed can have different shapes, depending on their purpose, e.g., external sensors, cable temperature sensors, air duct sensors etc. The relevant sensors must be ordered separately. The output relay is designed to be potential-free. Upon actuation, the potential present at terminal 5 is connected through to the working contact terminal 4 (terminal 3 = break contact).

Method of operation: As long as the temperature at sensor 1 is lower than at sensor 2, the output relay remains disabled. The output relay only actuates when the temperature at sensor 1 exceeds that at sensor 2 by the preset temperature difference. The absolute sensor temperatures have no influence on the function. Care must be taken, however, that both sensor temperatures are within the working range of the controller.

2-stage controller JBT-2

remote sensor, electronic

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	0…55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	10 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay
Switching contact:	2 x togglers, potential-free
Control function:	2-stage heating, 2-stage cooling, heating and cooling with neutral zone
Hysteresis in the stage:	adjustable 0.2…1.5 K
Hysteresis between the stages:	adjustable 0.2…6 K
Electrical connection:	screw-type terminals
Protection rating:	IP 65
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Function type:	TR (temperature controller)
General features:	external setting, scale: degrees Celsius

Application

2-stage heating or cooling. With the corresponding wiring of the relay contacts, heating and cooling can also be realised with a neutral zone. The desired function can be selected by means of jumpers.

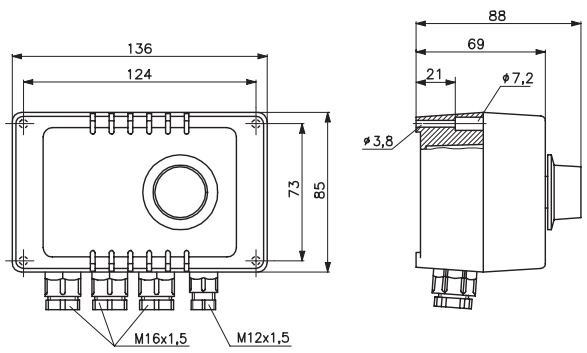
Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

The specified sensor numbers mean that all sensors, e.g., KF or AF with this number can be used, e.g., KF-3 or AF-3.

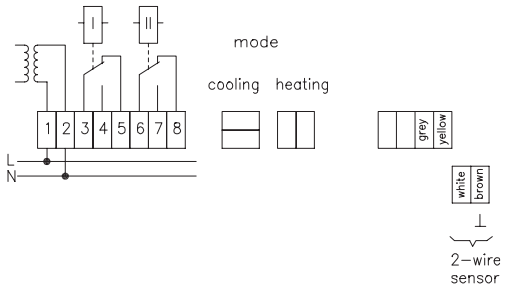
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Type	Item no.	Control range	Features	PG
JBT-22 A	D 4760037	10…50 °C	Mounting/attachment: wall mounting Sensor: NTC 8 (sensor 3/23)	II
JBT-23 A	D 4760254	35…95 °C	Mounting/attachment: wall mounting Sensor: NTC 50 (sensor 5/25)	II

JBT-2.A



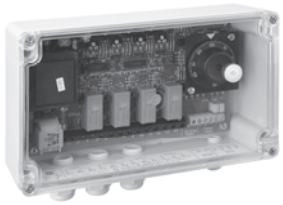
JBT-2.A



Sensor connection: w/br = NTC

4-stage controller JBT-4

remote sensor, electronic



Technical data

Housing colour:	grey (lower part like RAL 7016, upper part transparent)
Ambient temperature:	0…55 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Operating voltage:	230 VAC, 50 Hz
Max. switching current:	10 (3) A
Max. switching voltage:	230 VAC, 50 Hz
Switching element:	relay, potential-free
Switching contact:	4 x togglers
Control function:	4-stage heating, 4-stage cooling, multistage heating and cooling with neutral zone
Control range:	–10…+50 °C
Hysteresis in the stage:	adjustable 0.25…2 K
Hysteresis between the stages:	adjustable 0.5…6 K
Electrical connection:	screw-type terminals
Mounting / attachment:	wall mounting
Protection rating:	IP 65
Protection class:	II
Sensor:	NTC 8 K (sensor 3)
Function type:	TW
Safety and EMC:	according to DIN EN 60730
General features:	Scale: degrees Celsius internal setting
Display:	switch status display with LEDs

Application

JBT-4: 4-stage “heating or cooling”.
With the corresponding wiring of the relay contacts, “heating and cooling” with a neutral zone can also be implemented. The desired function can be selected by means of jumpers.

Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

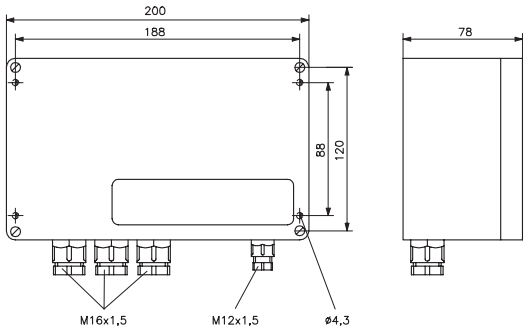
The specified sensor numbers mean that all sensors, e.g., KF or AF with this number can be used, e.g., KF-3 or AF-3.

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

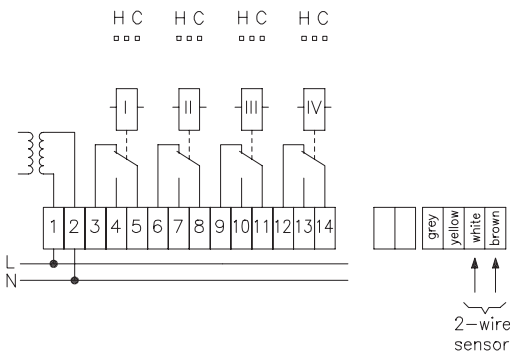
Type	Item no.	Features	PG
JBT-420 B	D 4760494		II

Accessories	Item no.	Features	PG
AF-3	G 9040390	Outdoor temperature sensors	III
BTF2-C08-0000	SA 140015	Room temperature sensors – surface-mounted	III
FUFC 08-0000	SN 090199	Room temperature sensors – flush-mounted	III
KF-3	G 9031447	Cable temperature sensor with 1,5 m connection cable	III

JBT-420B



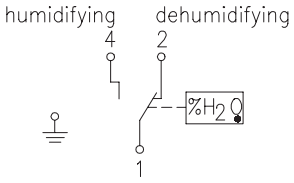
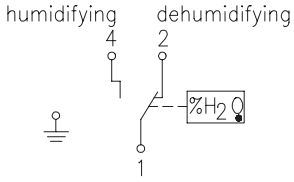
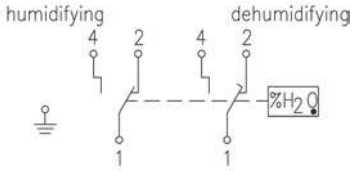
JBT-420B



Mechanical hygrostats

Duct assembly

Technical data		Application
Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)	Use in ventilation and air-conditioning ducts, climate exposure cabinets and dehumidifiers for controlling and/or monitoring the atmospheric humidity in industrial and agricultural applications. Not suitable for aggressive gases. Max. air speed 8 m/s, with sensor protection FS-HI 15 m/s.
Ambient temperature:	0…60 °C	
Permissible atmospheric humidity:	non-condensing	
Operating voltage:	none	
Max. switching current:	15 (8) A	
Min. switching current:	150 mA at 125 VAC	
Max. switching voltage:	230 VAC, 50 Hz (> 24 V only in dry surroundings)	
Min. switching voltage:	24 VAC, 50 Hz	
Switching element:	microswitch	
Switching contact:	toggler, potential-free	
Control range:	30…100% rel. humidity	
Hysteresis:	approx. 5% rel. humidity	
Tolerances:	> 50%: +/- 3.5% relative humidity < 50%: +/- 4% relative humidity	
Electrical connection:	screw-type terminals	
Mounting/attachment:	mounting on air duct or wall mounting using accessory JZ-20-1	
Protection rating:	IP 65 front-side	
Protection class:	II	
Safety and EMC:	according to DIN EN 60730	
Sensor:	plastic fibres	

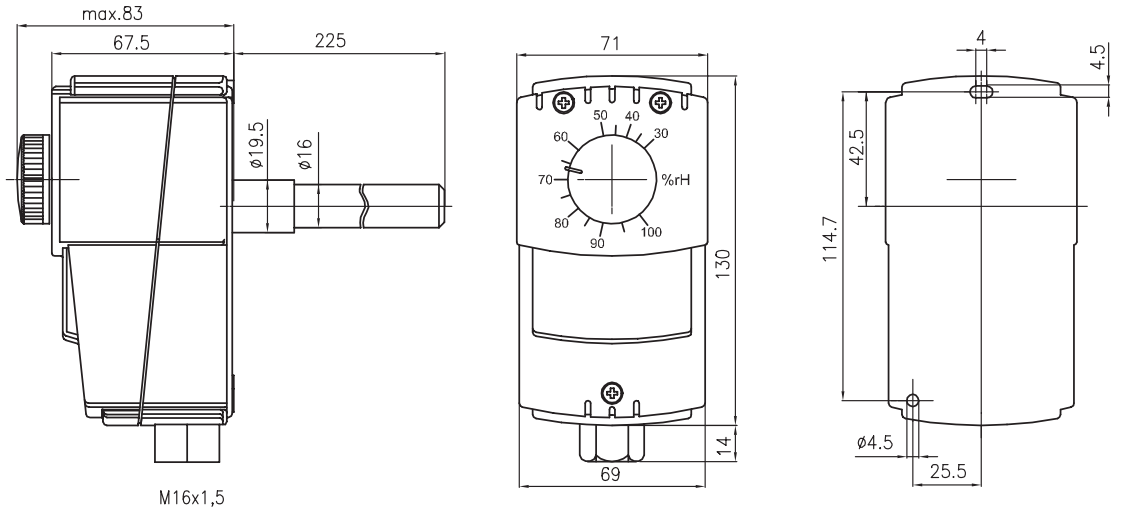
Type/image	Item no.	Features	Circuit diagram	PG
HI-1 	JA 010100	Control function: humidifying or de-humidifying Function type: controller external setting, mechanical range setting		II
HI-1F 	JA 010200	Control function: humidifying or de-humidifying Function type: monitor internal setting		II
HI-2 	JA 010300	Control function: 2 x humidifying or de-humidifying Hysteresis between the stages: adjustable 3…15% rel. humidity Function type: controller external setting, mechanical range setting		II

Mechanical hygrostats

Duct assembly

Accessories / options	Item no.	Features	PG
JZ-20-1 	E 6130144	Wall bracket for HI	II
FS-HI 	H 530975	Sensor protection for HI: finely woven mesh wire, for use at high air speeds of over 8 m/s	II
FS2-HI 	H 531011	PTFE filter for HI: fine sensor protection against dust and contamination	II

HI-.



Air flow switch JSL-1E

mechanical

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	– 40 … + 80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. medium temperature:	85 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA at 24 VAC
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	airflow monitoring
Hysteresis:	approx. 1 m/s
Electrical connection:	screw-type terminals
Mounting/attachment:	mounting on air duct
Protection rating:	IP 65 housing side, IP 20 medium side
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	wind indicator
Material of lug:	V2A (1.4301)
Material of lever:	brass
Function type:	monitor
General features:	internal setting

Application

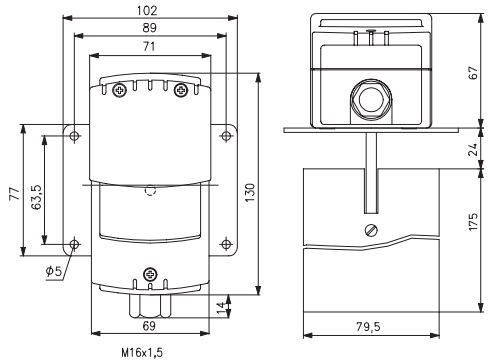
Monitoring of air flows in ducts, in air supply and air exhausting devices of fans or electrical heat registers.

The wind indicator relay is set to the minimum switching points at the factory. By turning the inside screw to the right, the switch-on/switch-off values can be increased. Fitting is done in the vertical paddle position from the top in a horizontal pipe/duct.

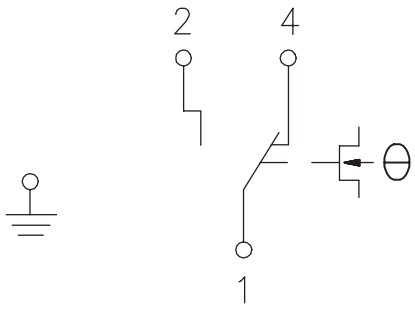
Type	Item no.	Min. switch-on value:	Min. switch-off value:	Max. switch-on value:	Max. switch-off value:	PG
JSL-1E	JA 070100	2 m/s	1 m/s	9.2 m/s	8 m/s	II

Type	Item no.	Features	PG
JZ-08	E 6150031	spare vane for JSL-1E	II

JSL-1E



JSL-1E



Mounting: The device can be mounted in any alignment, but attention must be paid to the correct direction of flow. When fitting in a vertical duct, the weight of the vane must be balanced at the range screw, which results in changed switching values. Attention: Owing to the changed switching values, at flows near the minimum set value the wind indication relay may not function properly! At air speeds higher than 5 m/s, owing to the danger of breakage, the vane must be cut on the sides where indicated. This increases the minimum switch-off value set at the factory from 1 m/s to 2.5 m/s. A calming path that is 5 times the duct diameter must be provided before and after the assembly location. The scope of delivery includes a seal to be fitted between the duct and the device.

Function: The devices are set to the minimum switch-off value at the factory. A higher value can be selected by turning the range screw to the right. If the flow exceeds the value that has been set, contacts 1–2 close and the corresponding assembly is enabled. If the flow drops below the value that has been set, contacts 1–2 open and contacts 1–4 close.

Airflow monitors JSL-20/21

electronic

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	0 … 60 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	100 °C
Max. switching current:	10 (3) A
Min. switching current:	150 mA at 24 VAC
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	relay, potential-free
Control range:	0.2 m/s … 10 m/s max. air speed at the sensor 10 m/s
Hysteresis adjustable:	1 … 10%
Switching on delay:	15 … 120 s (adjustable)
Switching off delay:	2 … 20 s (adjustable)
Electrical connection:	screw-type terminals
Fitting length:	approx. 150 mm
Protection rating:	IP 65
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Sensor type:	hot film anemometer
Function type:	monitor
General features:	internal setting

Application

For flow-dependent monitoring of fans, adjusting butterfly valves of humidifiers and electric heat registers according to DIN 57100, part 420, or for use in conjunction with DDC systems.

Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.
Cable recommendation: 4 x 0.75 mm², shielded. Sensor cables can be extended up to 100 m.

Attention: The controller device and the sensor form an integral unit and are calibrated to one another. Only they are compatible with one another. Both have the same device number. Connecting sensors of other devices is not permissible and results in malfunctions.

Type	Item no.	Features	PG
JSL-20	G 8000004	Operating voltage: 230 VAC, 50 Hz Switching contact: changeover Control function: gets actuated when the flow rate that has been set is undershot (without locking) Mounting/attachment: wall mounting, position-independent Sensor: with connecting cable	III
JSL-20/24 V AC	G 8000117	Operating voltage: 24 VAC, 50 Hz Switching contact: changeover Control function: gets actuated when the flow rate that has been set is undershot (without locking) Mounting/attachment: wall mounting, position-independent Sensor: with connecting cable	III
JSL-20 K	G 8000204	Operating voltage: 230 VAC, 50 Hz Switching contact: changeover Control function: gets actuated when the flow rate that has been set is undershot (without locking) Mounting/attachment: mounting on air duct Sensor: fastened on housing	III
JSL-21	G 8000016	Operating voltage: 230 VAC, 50 Hz Switching contact: 2 x toggler Control function: gets actuated when the flow speed that has been set is undershot, with additional alarm contact (with locking: before restarting, the machine must be de-energised electrically (Reset)) Mounting/attachment: wall mounting, position-independent Sensor: with connecting cable	III
JSL-21/24 V AC	G 8000133	Operating voltage: 24 VAC, 50 Hz Switching contact: 2 x toggler Control function: gets actuated when the flow speed that has been set is undershot, with additional alarm contact (with locking: before restarting, the machine must be de-energised electrically (Reset)) Mounting/attachment: wall mounting, position-independent Sensor: with connecting cable	III

Measuring principle: The airflow has a cooling effect on a heated sensor situated in the sensor pipe. The higher the airflow, the greater the cooling of the sensor. The effect of the air temperature is compensated for by a second measuring element.

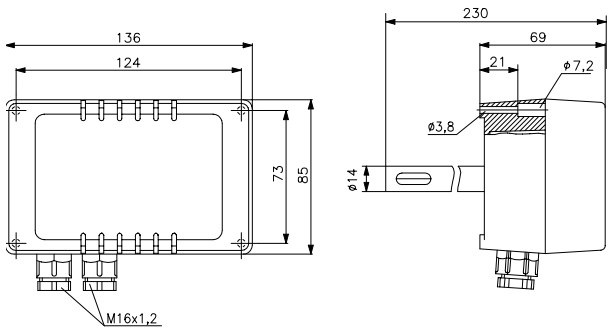
Airflow monitors JSL-20/21

electronic

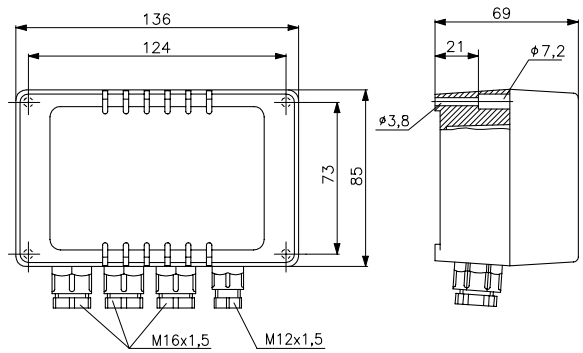
Function JSL-20xx: Contacts 4/5 close upon applying the supply voltage. When the switch-on delay lapses and the flow speed is greater than the set value, the relay remains actuated; else the relay is deactivated (contacts 4/3 close). If during operation the flow speed drops below the set value, the relay deactivates after the defined switch-off delay.

Function JSL-21xx: After applying the operating voltage and building up the desired flow speed within the start-up delay, relay 2 is actuated (contacts 7/6 close) and the downstream assembly is activated. Thus, possibly harmful heating/humidification without air exhausting is prevented. If the necessary air speed is not reached within the start-up delay, relay 1 switches to the alarm contact 4/5. If the flow drops below the set value during operation, the associated effect is triggered after the switch-off delay has elapsed. The contacts 7/6 are opened (heating off) and the contacts 4/5 are simultaneously closed (alarm). Before restarting, the device must be electrically de-energised and the voltage applied afresh.

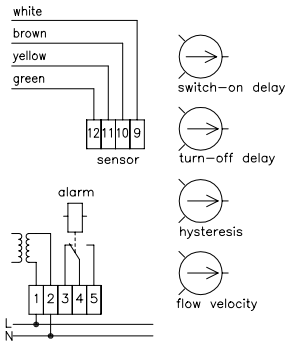
JSL-20 K



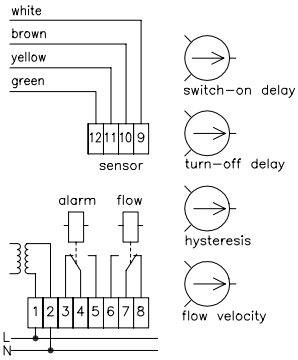
JSL-20/-21



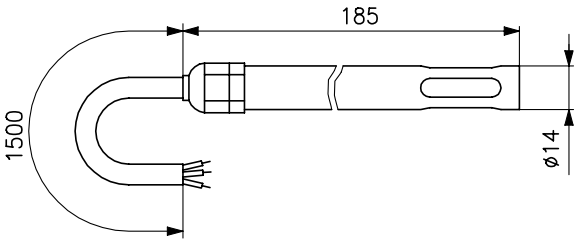
JSL-20



JSL-21



Sensor for JSL-20 / -21



Differential pressure switch JDW-3…10/JDL-111…116

JDW-3

JDL-111

JDL-112

JDL-113

Technical data

Housing colour:	black
Ambient temperature:	– 15 … + 80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	80 °C
Permissible medium temperature:	– 15 … + 80 °C
Operating voltage:	none
Min. switching current:	1 mA
Max. switching voltage:	230 VAC/50 Hz, 24 VDC
Min. switching voltage:	12 VAC/50 Hz, 12 VDC
Switching element:	microswitch
Switching contact:	toggler, gold contact, potential-free
Control function:	switches if the pressure is undershot or exceeded
Pressure connection:	6.2 mm
Mounting/attachment:	wall mounting
Electrical connection:	screw-type terminals (JDL-113 spade plug)
Protection class:	II
Protection rating:	IP 54 (JDL-113 IP 20)
Safety and EMC:	according to DIN EN 60730
Sensor:	pressure membrane
Function type:	monitor (JDL-116 A controller)

Application

Monitoring of overpressure, differential or under-pressure of air and incombustible, non-aggressive gases. Exhaust or fan monitoring or flow monitor for securing electrical heat registers, as filter monitoring, air pressure shortage safeguard, limit value controller.

JDW-…: Supplied without mounting bracket; can be screwed on directly (with 2 screws).

JDW-…Z: Supplied with attached mounting bracket JZ-10.

JDL…: Supplied with attached mounting bracket JZ-10.

Note: Once the differential pressure switch has connected a voltage > 24 V and a current > 0.1 A, the gold layer at the contacts will have burnt away. Thereafter, the differential pressure switch can only be operated at this or a higher power.

Note: The hose set is not a part of the delivery scope and must be ordered separately.

Conversion table pressure

	Pa	kPa	bar	mbar	mmWs
1 Pa =	1	0.001	0.00001	0.01	0.101971
1 kPa =	1,000	1	0.01	10	101.971
1 bar =	100,000	100	1	1,000	10197.1
1 mbar =	100	0.1	0.001	1	10.1971
1 mmWs =	9.80665	0.00980665	0.0000980665	0.0980665	1

Type	Item no.	Control range	Max. pressure	Hysteresis (dependent on setting range)	Features	PG
JDW-3	H 531002	20…330 Pa	5,000 Pa	approx. 8…20 Pa	Max. switching current: 1.5 (0.4) AAC, 1 (0.2) ADC internal setting	II
JDW-3 Z	H 531001	20…330 Pa	5,000 Pa	approx. 8…20 Pa	Max. switching current: 1.5 (0.4) AAC, 1 (0.2) ADC internal setting, fixing bracket	II
JDW-5	H 530996	30…500 Pa	5,000 Pa	approx. 10…25 Pa	Max. switching current: 1.5 (0.4) AAC, 1 (0.2) ADC internal setting	II
JDW-5 Z	H 531000	30…500 Pa	5,000 Pa	approx. 10…25 Pa	Max. switching current: 1.5 (0.4) AAC, 1 (0.2) ADC internal setting, fixing bracket	II
JDW-10	H 530997	400…1600 Pa	5,000 Pa	approx. 30…60 Pa	Max. switching current: 1.5 (0.4) AAC, 1 (0.2) ADC internal setting	II
JDL-111	H 5309098	20…300 Pa	15,000 Pa	approx. 10…15 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC internal setting, silicon-free	II
JDL-112	H 5309100	40…600 Pa	30,000 Pa	approx. 22…33 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC internal setting, silicon-free	II

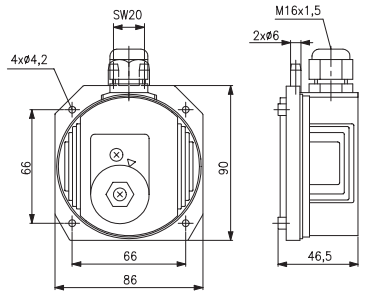
Differential pressure switch JDW-3…10/JDL-111…116

Type	Item no.	Control range	Max. pressure	Hysteresis (dependent on setting range)	Features	PG
JDL-113	H 530998	40 Pa fixed	5,000 Pa	approx. 15 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC	II
JDL-115	H 5309136	100…1,000 Pa	30,000 Pa	approx. 20…40 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC internal setting, silicon-free	II
JDL-116	H 530960	250…5,000 Pa	30,000 Pa	approx. 60…150 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC internal setting, silicon-free	II
JDL-116 A	H 530978	250…5,000 Pa	30,000 Pa	approx. 60…150 Pa	Max. switching current: 5 (1) AAC, 1 (0.2) ADC external setting, silicon-free	II

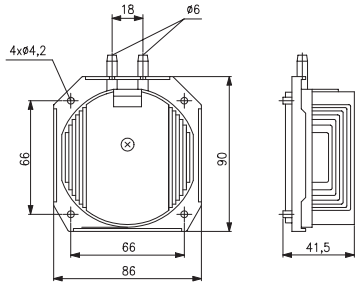
Accessories

Type	Item no.	Features	PG
JZ-06/1	H 5309229	connection set with duct connections made of plastic silicon-free, 2 x 90° angles 2 extensions 90 mm, 4 self-tapping screws, 2 m tube (Ø 6 mm outside)	II
JZ-10	H 5309237	mounting bracket with screws for JDL-113 and JDW-3/-5/-10 (Z shape)	II
JZ-28	H 531012	IP-65 cover set, consisting of a cover with pressure compensation element, O-ring and 3 screws, suitable for retrofitting types JDL-111, JDL-112, JDL-113, JDL-115 and JDL-116	II

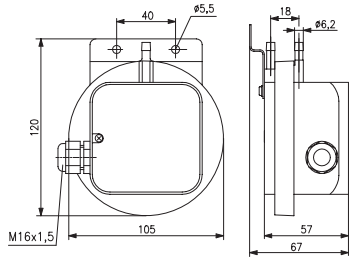
JDW-3/-5/-10



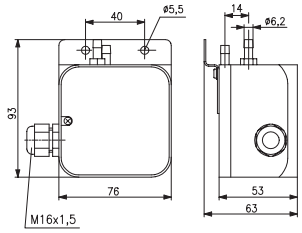
JDL-113



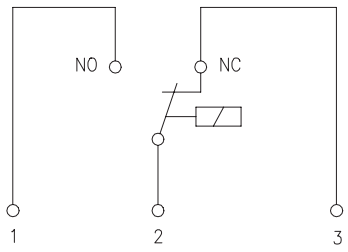
JDL-111



JDL-112/115…-16



JDW-…/JDL-…



JZ-06/1

JZ-10

JDL-116 A

Plant engineering

Flow switch JSF-1 E…4 E

mechanical – **TÜV-tested**

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
Ambient temperature:	– 40 … + 85 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Permissible medium temperature:	120 °C
Operating voltage:	none
Max. switching current:	15 (8) A
Min. switching current:	150 mA at 24 VAC, 50 Hz
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	Microswitch
Switching contact:	toggler, potential-free
Control function:	switches if the set value is undershot or exceeded
Hysteresis:	depends on the pipe diameter (see the table of switching values)
Electrical connection:	screw-type terminals
Mounting / attachment:	assembly by means of tapered Whitworth pipe thread R1"
Protection rating:	IP 65
Protection class:	I
Safety and EMC:	according to DIN EN 60730
Sensor:	flow paddle
Material of paddle:	stainless steel
Function type:	monitor
General features:	internal setting
Accuracy:	+/– 15% of the set value
Test mark / Approbation:	JSF-1E / JSF-2E / JSF-3E / JSF-4E TÜV.SW.016-13 JSF-1RE / JSF-2RE TÜV.SW.017-13

Type-tested by the TÜV according to the "Flow 100" VdTÜV circular

Application

Flow monitoring of liquid media in pipes from ½" to 8", for example, oil, cooling and lubricant circuits or as safety against a shortage of water.

Assembly: Vertical in a horizontal pipe.

Calming path at least 5 times the pipe diameter before and after the paddle.*

The max. flow can be significantly higher than the maximum setting value of the monitor.

Not approved for drinking water applications.

TÜV test up to 6" or for all diameters

Type	Item no.	Pipe	Medium	Features	PG
JSF-3 E	JA 060500	½"	normal	material of carrier: brass max. pressure: 5 bar attached T-piece, grey iron	II
JSF-4 E	JA 060600	¾"	normal	material of carrier: brass max. pressure: 5 bar attached T-piece, grey iron	II
JSF-1 E	JA 060100	1" … 8"	normal	material of carrier: brass max. pressure: 8 bar	II
JSF-1 RE	JA 060200	1" … 8"	normal	material of carrier: brass max. pressure: 5 bar reduced switching values**	II
JSF-2 E	JA 060300	1" … 8"	aggressive***	material of carrier: V4A max. pressure: 13 bar	II
JSF-2 RE	JA 060400	1" … 8"	aggressive***	material of carrier: V4A max. pressure: 5 bar reduced switching values**	II

Flow switch JSF-1 E … 4 E
mechanical – **TÜV-tested**

Accessories	Item no.	Features	PG
JZ-09	E 6140170	spare paddles (each 4 units) from 1“ … to 8“	II

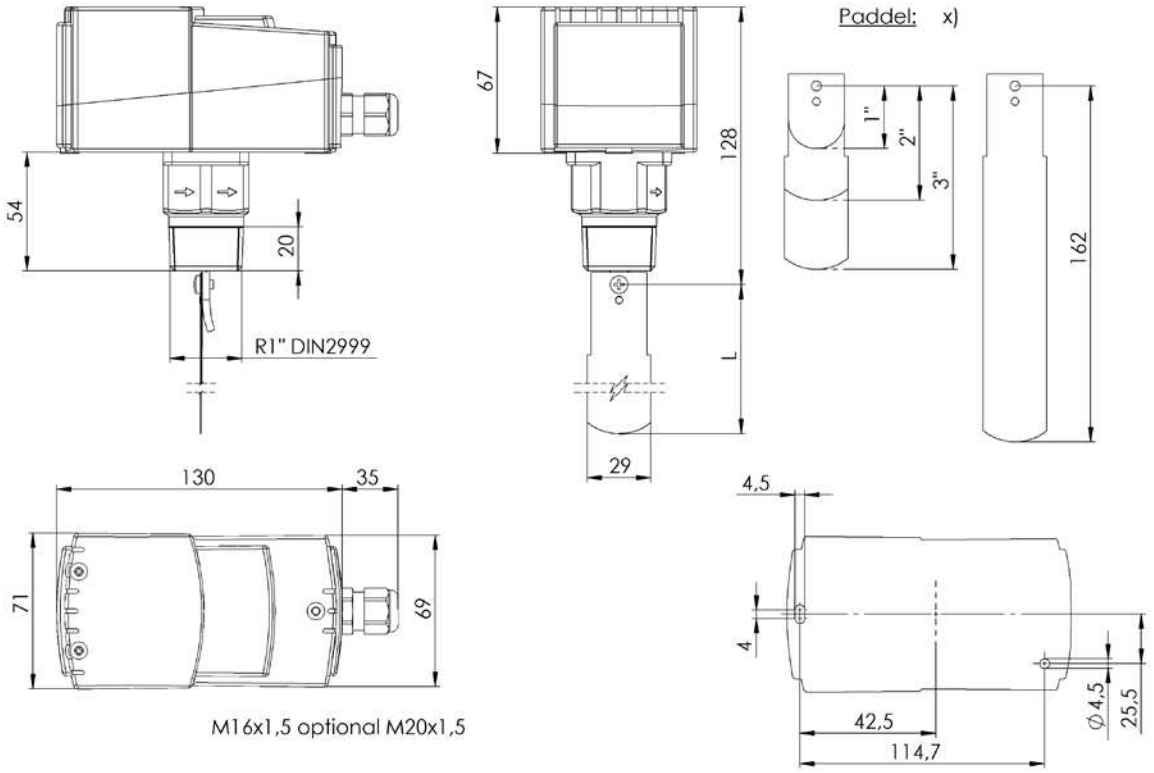
* for 1“ = paddle 1
for 2“ = paddle 1 and 2
for 3“ to 8“ = paddles 1, 2 and 3

If reduced flow values (marked in the table under the “Pipe” column with added letter Z) marked) are to be reached, paddle 4 should be used as follows:
at 4“ = paddles 1, 2, 3, 4 (shorten paddle 4 to 92 mm)
for 5“ = paddles 1, 2, 3, 4 (shorten paddle 4 to 117 mm)
for 6“ = paddles 1, 2, 3, 4 (shorten paddle 4 to 143 mm)
for 7“ and 8“ = paddles 1, 2, 3, 4 (paddle 4 not shortened)

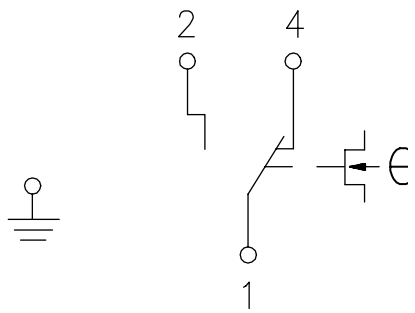
** device types for low flow volume (see switching value table) “RE”

*** medium aggressive: All parts of the current monitor touching the medium are made of V4A.

JSF-.E/RE



JSF-.E/RE



DN nominal width	Pipe thread inches
6	1/8"
8	1/4"
10	3/8"
15	1/2"
20	3/4"
25	1"
32	1 1/4"
40	1 1/2"
50	2"
65	2 1/2"
80	3"
100	4"
125	5"
150	6"

Flow switch JSF-1 E…4 E

mechanical – **TÜV-tested**

Switching value table in m^3/h for JSF-1 E / 2 E / 1 RE / 2 RE

Type	Pipe diameter	Min. setting (factory setting)		Max. setting	
		Off	On	Off	On
E	1"	0.55	0.86	2.00	2.10
RE	1"	0.19	0.57	1.00	1.10
E	1¼"	0.82	1.30	2.80	3.00
RE	1¼"	0.24	0.90	1.40	1.60
E	1½"	1.10	1.70	4.00	4.20
RE	1½"	0.50	1.20	1.90	2.20
E	2"	2.10	3.20	7.30	7.80
RE	2"	0.90	2.30	3.60	4.10
E	2½"	2.80	4.30	9.80	10.50
RE	2½"	1.20	3.10	4.90	5.50
E	3"	4.00	6.10	13.80	14.70
RE	3"	2.10	4.90	7.40	8.20
E	4"	10.40	15.40	32.00	33.90
RE	4"	4.90	11.30	17.10	19.10
E	4" Z	7.00	10.50	21.70	23.10
RE	4" Z	3.30	7.70	11.60	13.00
E	5"	20.80	30.60	63.50	67.30
RE	5"	9.70	22.40	34.00	37.90
E	5" Z	10.70	15.80	33.30	34.70
RE	5" Z	5.00	11.50	17.50	19.60
E	6"	29.20	43.00	89.10	94.50
RE	6"	13.60	31.50	47.60	53.20
E	6" Z	13.10	19.30	39.90	42.40
RE	6" Z	6.10	14.10	21.40	23.90
E	8"	72.60	85.10	165.70	172.50
RE	8"	25.70	59.60	90.10	100.70
E	8" Z	38.60	46.50	90.80	94.20
RE	8" Z	21.70	36.50	55.30	61.80

When there is a “Z” (=additional paddle) in the “Pipe” column, the long paddle 4 included in the delivery must be used in addition to the 3 factory-installed paddles.

Switching value table in l / h for JSF-3 E / -4 E

3 E	½	174	480	846	948
4 E	¾	138	408	768	858

The accuracy of the specified values depends on the actual diameter of the pipe, the actual reduction in the extra paddle and the flow monitor’s installation depth.

The devices are set to the minimum switch-off value at the factory. By turning the inner adjusting screw in a clockwise direction, you can set a higher deactivation value. The actual flow quantity must in any case be higher than the one specified in the switch table or the switch-on value, but there is no upper limit. The values specified apply to volume-related mass (density) of water. If the flow drops below the value that has been set, contacts 1 and 2 open and contacts 1 and 4 close.

Flow switch JSW
with device plug

Technical data

Housing colour:	black
Material of paddle:	stainless steel
Material of carrier:	nickel-plated brass
Ambient temperature:	–20…+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. pressure:	25 bar
Permissible medium temperature:	110 °C
Operating voltage:	none
Max. switching current:	5 A
Min. switching current:	100 mA at 24 VAC, 50 Hz
Max. switching voltage:	230 VAC, 50 Hz
Min. switching voltage:	24 VAC, 50 Hz
Switching element:	microswitch
Switching contact:	toggler, potential-free
Control function:	switches if the set value is undershot or exceeded
Electrical connection:	4-pin plug according to DIN EN 175301-803 (previously DIN 43650 - A/ISO 4400)
Mounting/attachment:	union nut G 3/8" on brazing spout (for brazing in a standard copper T-piece with outlet 1/2") or T-piece
Protection rating:	IP 65
Protection class:	II
Safety and EMC:	according to DIN EN 60730
Sensor:	flow paddle
Function type:	monitor
General features:	internal setting
Accuracy:	+/– 15% of the set value (switching values are only accurate if the flow monitor has been installed in our T-piece If copper T-pieces are used, the switching values will increase.)

Brass union nut G 3/4" with o-ring and brazing spout for brazing in a standard copper T-piece with outlet 1/2" included in the scope of delivery.

Application

Monitoring small and medium, non-aggressive quantities of liquid in pipes with small diameters ½" to 1".

Assembly: Vertical in a horizontal pipe. Calming path at least 5 times the pipe diameter before and after the paddle.

Not approved for drinking water applications.

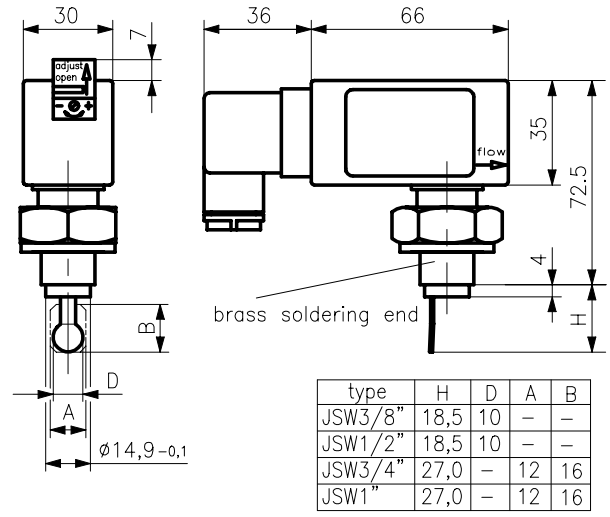
Type	Item no.	Pipe	DN	Max.	Switching point dropping*	Switching point rising	Δl/min	PG
JSW-1/2	H 530944	½"	15	20 l/min	5…6.5 l/min	5.5…7 l/min	0.5	III
JSW-3/4	H 530945	¾"	20	40 l/min	7…9.5 l/min	9…11 l/min	2	III
JSW-1	H 530946	1"	25	60 l/min	13.5…16.5 l/min	17…20.5 l/min	3.5	III

T-piece (nickel-plated brass):		
T-piece ½"	H 530957	III
T-piece ¾"	H 530951	III
T piece 1"	H 530953	III

Flow switch JSW

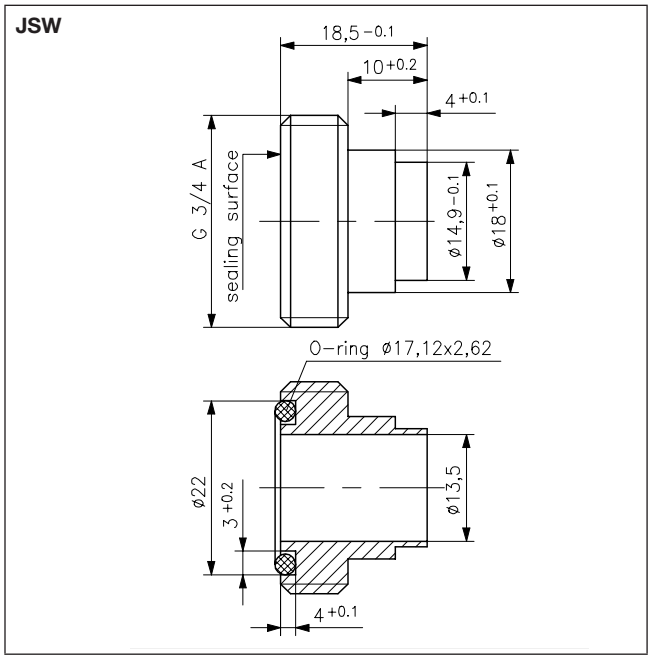
with device plug

JSW

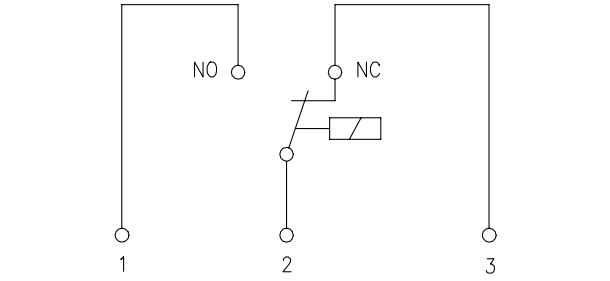


type	H	D	A	B
JSW3/8"	18,5	10	–	–
JSW1/2"	18,5	10	–	–
JSW3/4"	27,0	–	12	16
JSW1"	27,0	–	12	16

JSW



JSW

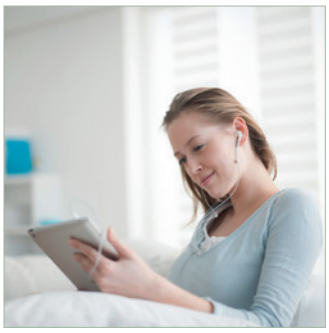


The device works according to the principle of a spring-loaded paddle with magnetic control of a microswitch. When in rest position or if the switch-off value is undershot (= “dropping switching point”), contacts 2 and 3 are closed and can be used as signal contacts. Upon reaching the upper switching value (= switch-on value or “switching point rising”), the contact changes and 2 to 1 are closed. If used as a water shortage safeguard, for example, a pump can be switched on with these contacts. The actual flow quantity must in any case be higher than the switch-on value, but there is no upper limit. The switching points given in the table apply to flow monitors with an attached T-piece and a water temperature of 20 °C in a horizontal pipe. The devices are set to the minimum value at the factory, but can be adapted to an existing system. To that end, the cover of the setting screw on the front side (which is designed so that it cannot be lost) is pushed up in the direction of the arrow and the setting screw is rotated by a maximum of 7 revolutions in the plus direction. With a switching value range of, for example, 13–16.5 l/min, a setting range of 3.5 l/min is obtained. With a total of 7 permissible screw revolutions, this gives a change of 0.5 l/min per screw revolution.

SENSOR TECHNOLOGY

If you wish to adjust,
you have to sense.

SENSOR TECHNOLOGY
A proper sense of feeling to act intelligently.

Sensor technology is becoming increasingly more important. It makes life more comfortable and secure through processing diverse data. Physical values (temperature, flow, humidity or pressure) are measured and provided to the intelligent control technology.

Sensor technology as the basis for security and comfort.

Overview of sensor technology:
Temperature

	Room temperature sensor (surface-mounted / flush mounted) – passive	Page 188 – 190
	Outdoor temperature sensor – passive / active	Page 191 – 192
	Sleeve temperature sensors / Cable temperature sensors	Page 193 – 194
	Contact temperature sensors – passive / active	Page 195
	Pendulum temperature sensors / radiation temperature sensors	Page 196 – 197
	Assembly-type duct sensors – passive / active	Page 198 – 200
	Industrial assembly type duct sensors – (Form B) passive	Page 201

Pressure / differential pressure

	Pressure transducers (liquids / gases)	Page 202 – 203
	Differential pressure transducers (air)	Page 204

Humidity

	Temperature and humidity transducers (room / duct / outdoors)	Page 205 – 206

Sensor characteristic curves (see the technical annex in section “Accessories / miscellaneous”)

Room temperature sensors – surface-mounted BTF2

Surface-mounted superflat – Design Berlin 1000, for measuring the temperature in dry rooms

Technical data

Design:	Berlin 1000
Housing colour:	pure white, like RAL 9010
Housing material:	ABS plastic
Ambient temperature:	–10 … +50 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.33 mm² to 1.5 mm² only at protective low voltage max. 30 VAC / 42 VDC
Max. measurement current:	< 1 mA
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Tolerances:	PT100 / PT1000 DIN EN 60751 B Ni 1000 DIN EN 43760 B
Mounting / attachment:	surface- / wall-mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”

Application

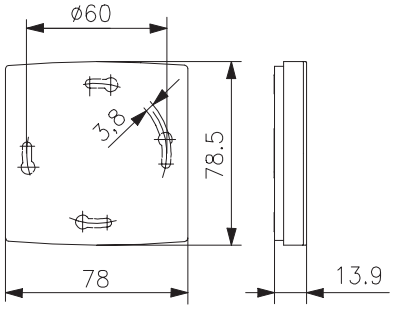
Temperature measurement in living spaces and office spaces.

Assembly and wiring of the lower part can take place separately, surface-mounted or on a switch socket Ø 60 mm by means of socket screws.

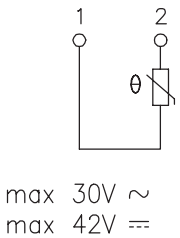
Please follow the EMC directives. Avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	PG
PT-100	BTF2-P100-0000	SA 140000	III
PT-1000	BTF2-P1000-0000	SA 140001	III
Ni-1000	BTF2-N1000-0000	SA 140002	III
Ni-1000 TK 5000	BTF2-N1000TK5000-0000	SA 140003	III
LM 235Z	BTF2-LM-0000	SA 140012	III
NTC 2K25 “Sensor 0”	BTF2-C225-0000	SA 140013	III
NTC 47K “Sensor 2”	BTF2-C47-0000	SA 140014	III
NTC 8K “Sensor 3”	BTF2-C08-0000	SA 140015	III
NTC 10K “Sensor 4”	BTF2-C10-0000	SA 140006	III
NTC 2K “Sensor 8”	BTF2-C02-0000	SA 140016	III
KTY 81-121 “Sensor 51”	BTF2-Y81/121-0000	SA 140017	III
KTY 11-7 “Sensor 57”	BTF2-Y11/7-0000	SA 140018	III

Dimension drawing Berlin 1000



Circuit diagram



Room temperature sensors – flush-mounted FUF

for measuring the temperature in dry rooms

Technical data

Design:	Berlin UP (flush-mounted)
Housing colour:	pure white, like RAL 9010
Housing material:	PC plastic
Ambient temperature:	–10 … +50 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.5 mm² to 1.5 mm² only at protective low voltage max. 30 VAC/42 VDC
Max. measurement current:	< 1 mA
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Tolerances:	PT100/PT1000 DIN EN 60751 B Ni 1000 DIN EN 43760 B
Mounting/attachment:	in flush-mounted socket, can be adapted to fit virtually any rocker switch ranges 50 x 50 mm
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”

Application

Temperature measurement in living spaces and office spaces.

The room temperature sensor with 50 x 50-mm cover can be integrated into almost all switch ranges by means of an insert frame.
(Frames are not a part of the delivery scope.) For integration examples, see the “Heating technology” section.

Please follow the EMC directives. Avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

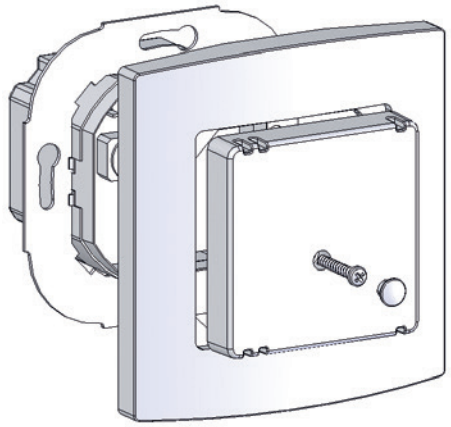
Sensor	Type	Item no.	Surface finish	PG
PT-100	FUFP 100-0000	SN 090000	glossy	III
PT-1000	FUFP 1000-0000	SN 090001	glossy	III
Ni-1000	FUFN 1000-0000	SN 090002	glossy	III
Ni-1000 TK 5000	FUFN 1000 TK 5000-0000	SN 090003	glossy	III
LM 235Z	FUFLM-0000	SN 090150	glossy	III
NTC 2K25 “Sensor 0”	FUFC 225-0000	SN 090197	glossy	III
NTC 47K “Sensor 2”	FUFC 47-0000	SN 090198	glossy	III
NTC 8K “Sensor 3”	FUFC 08-0000	SN 090199	glossy	III
NTC 10K “Sensor 4”	FUFC 10-0000	SN 090005	glossy	III
NTC 2K “Sensor 8”	FUFC 02-0000	SN 090200	glossy	III
KTY 81-121 “Sensor 51”	FUFY 81/121-0000	SN 090201	glossy	III
KTY 11-7 “Sensor 57”	FUFY 11/7-0000	SN 090202	glossy	III

Accessories	Item no.	Features	PG
JZ-090.900	VV000025	alre frame “Berlin” for all flush-mounted controllers and sensors with 50 x 50-mm pure white cover, glossy, like RAL 9010	I

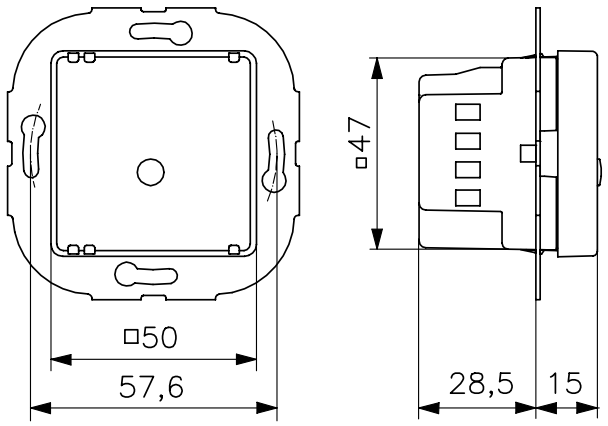
Room temperature sensors – flush-mounted FUF

for measuring the temperature in dry rooms

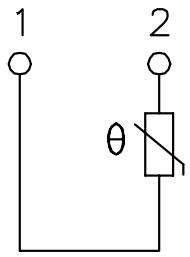
FUF with alre frame “Berlin”



Dimension drawing FUF



Circuit diagram FUFxx-0000



Outdoor temperature sensors AF with passive output

AF … outdoor temperature sensor with inside sensor

AF

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Ambient temperature:	–30 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.14 mm² up to 2.5 mm² only at protective low voltage max. 30 VAC/42 VDC
Max. measurement current:	< 1 mA
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Tolerances:	PT100/PT1000 DIN EN 60751 B Ni 1000 DIN EN 43760 B
Mounting/attachment:	surface-/wall-mounting
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”

Application

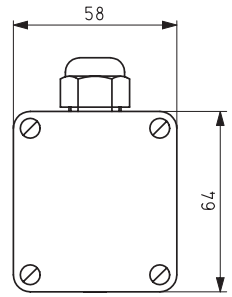
The AF outdoor temperature sensors are used for temperature measurement in the outdoors, in damp environments, in cold storage rooms and greenhouses as well as in industrial applications and are specially protected against dust and moisture. If there is direct incident sunlight on the sensor housing, the use of a sun shade is recommended.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

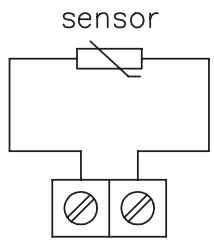
Sensor	Type	Item no.	PG
PT 100	**AFP 100**	G 9040010	III
PT 1000	**AFP 1000**	G 9040020	III
NI 1000	**AFN 1000**	G 9040030	III
NI 1000 TK 5000	**AFN 1000 TK 5000**	G 9040040	III
LM 235 Z	**AFLM**	G 9040130	III
NTC 2K25 “Sensor 0”	**AF-0**	G 9040360	III
NTC 1K “Sensor 1”	**AF-1**	G 9040370	III
NTC 47K “Sensor 2”	**AF-2**	G 9040380	III
NTC 8K “Sensor 3”	**AF-3**	G 9040390	III
NTC 10K “Sensor 4”	**AF-4**	G 9040400	III
NTC 50K “Sensor 5”	**AF-5**	G 9040561	III
NTC 2K “Sensor 8”	**AF-8**	G 9040410	III
KTY 81-121 “Sensor 51”	**AF-51**	G 9040420	III
KTY 11-7 “Sensor 57”	**AF-57**	G 9040681	III

Accessories	Item no.	Features	PG
S protection 01	G 9990170	Ball impact guard, sun and rain protection; 150 x 90 x 47 mm; stainless steel V4A 1.4571	III

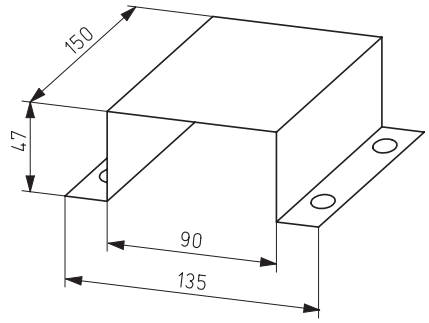
Dimension drawing



Sensor circuit diagram



S protection 01



Outdoor temperature sensors with passive and active output

AFH ... outdoor temperature sensor with sleeve lead-out
AFHM ... outdoor temperature sensor with transducer 4–20 mA with sensor sleeve lead-out
MTRVD ... outdoor temperature sensor with transducer 0–10 V with sensor sleeve lead-out

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Operating voltage (active):	24 VDC
Ambient temperature:	–30 ... +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. measurement current (passive):	< 1 mA
Electrical connection:	screw-type terminals 0.14 mm² to 2.5 mm² only at protective low voltage, Max. passive output: 30 VAC/42 VDC, AFHP 100/3L 3-conductor, AFHP 100/4L 4-conductor,
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Tolerances:	PT100/PT1000 DIN EN 60751 B Ni 1000 DIN EN 43760 B
Mounting/attachment:	surface-/wall-mounting
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730

Application

The outdoor temperature sensors are used for temperature measurement in the outdoors, in damp room applications, in cold storage rooms and greenhouses as well as in industrial applications and are specially protected against dust and moisture. Owing to the external sensor sleeve, this outdoor sensor has a very good actuation response to temperature changes. When the outdoor temperature sensor is active, the temperature-dependent resistance of the sensor is converted linearly into a current signal of 4–20 mA or a voltage signal between 0–10 V.
If there is direct incident sunlight on the sensor, the use of a sun shade is recommended.

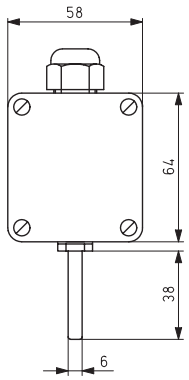
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type (passive)	Item no.	PG
PT 100	**AFHP 100**	G 9040160	III
PT 100	**AFHP 100/3L**	G 9040631	III
PT 100	**AFHP 100/4L**	G 9040571	III
PT 1000	**AFHP 1000**	G 9040170	III
NI 1000 TK 5000	**AFHN 1000 TK 5000**	G 9040190	III
NTC 10 K "Sensor 4"	**AFHC 10**	G 9040220	III
LM 235 Z	**AFHLM**	G 9040280	III

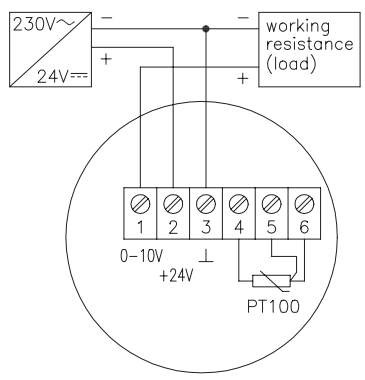
Type (active)	Item no.	Output signal	Measurement range	PG
MTRVD-965.758	G 9040711	0–10 V	–50 ... +50 °C, 0 ... 50 °C, –20 ... +80 °C, 0 ... 100 °C	III
AFHM/4–20	G 9040300	4–20 mA	–50 ... +50 °C	III
AFHM/2/4–20	G 9040351	4–20 mA	0 ... 50 °C	III

Accessories	Item no.	Features	PG
S protection 01	G 9990170	Ball impact guard, sun and rain protection; 150 x 90 x 47 mm; stainless steel V4A 1.4571	III

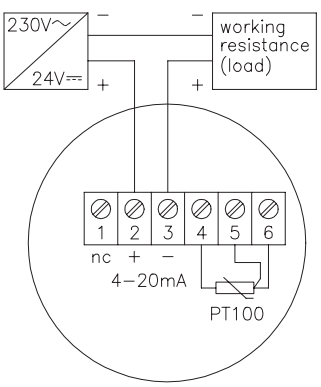
Dimension drawing



Connection circuit diagram 0–10 V



Connection circuit diagram 4–20 mA



Sleeve temperature sensors HF

HF .../P sleeve temperature sensor with PVC cable
HF .../S sleeve temperature sensor with silicone cable

Technical data (HF.../P and HF.../S)

Sensor dimensions:	Ø 6 mm x 45 mm
Sensor sleeve material:	V2A (1.4301)
Permissible atmospheric humidity:	max. 95% relative humidity, non-condensing
Max. measurement current:	< 1 mA
Electrical connection:	only at protective low voltage, max. 30 VAC/42 VDC, HFP 100/S/3L 3-conductor, HFP 100/S/4L 4-conductor
Connecting cable:	1 m, 2 x 0.5 mm² (HFP 100/S/6 m: 6 m, 2 x 0.5 mm²)
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Tolerances:	PT100/PT1000 DIN EN 60751 B Ni 1000 DIN EN 43760 B
Mounting/attachment:	in immersion sleeve, protective coil, on pipe etc.
Protection rating:	IP 65, moisture-impregnable burnishing
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”
Immersion sleeves:	Immersion sleeves can be found in the “Miscellaneous” section.

Application

The HF sleeve sensors are used for temperature measurement in liquid or gaseous media. Thanks to the moisture-impermeable burnishing, the sleeve sensor is particularly protected against moisture and dust.

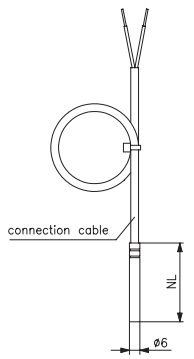
If used in liquid media, integration in an immersion sleeve is necessary.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	Features	PG
PT 100	**HFP 100/P**	G 9030010	Sensor wire PVC, –35 ... +105 °C	III
PT 1000	**HFP 1000/P**	G 9030020	Sensor wire PVC, –35 ... +105 °C	III
Ni 1000	**HFN 1000/P**	G 9030030	Sensor wire PVC, –35 ... +105 °C	III
Ni 1000 TK 5000	**HFN 1000 TK 5000/P**	G 9030040	Sensor wire PVC, –35 ... +105 °C	III
NTC 10 K	**HFC 10/P**	G 9030070	Sensor wire PVC, –35 ... +105 °C	III
LM 235 Z	**HFLM/P**	G 9030130	Sensor wire PVC, –35 ... +105 °C	III

Sensor	Type	Item no.	Features	PG
PT 100	**HFP 100/S**	G 9030140	Sensor wire, silicone, –50 ... +150 °C	III
PT 100	**HFP 100/S/6 m**	G 9030411	Sensor wire, silicone, –50 ... +150 °C	III
PT 100	**HFP 100/S/3L**	G 9030331	Sensor wire, silicone, –50 ... +150 °C	III
PT 100	**HFP 100/S/4L**	G 9030911	Sensor wire, silicone, –50 ... +150 °C	III
PT 1000	**HFP 1000/S**	G 9030150	Sensor wire, silicone, –50 ... +150 °C	III
Ni 1000	**HFN 1000/S**	G 9030160	Sensor wire, silicone, –50 ... +150 °C	III
Ni 1000 TK 5000	**HFN 1000 TK 5000/S**	G 9030170	Sensor wire, silicone, –50 ... +150 °C	III
NTC 10 K	**HFC 10/S**	G 9030200	Sensor wire, silicone, –50 ... +150 °C	III
LM 235 Z	**HFLM/S**	G 9030260	Sensor wire, silicone, –50 ... +125 °C	III

Dimension drawing



Cable temperature sensors HF

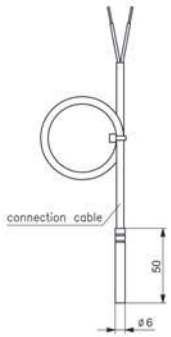
(remote sensor for alre standard devices, for example, ITR79 …

Technical data		Application
Sensor dimensions:	see dimension schematic	For temperature measurement of liquid media by integrating in immersion sleeves (TH/NTH). For temperature measurement of air and nonaggressive gases in the air duct by integration in a protecting coil (SW-200, see the “Accessories/ miscellaneous” section).
Sensor sleeve material:	V4A (1.4571)	
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing	
Max. measurement current:	< 1 mA	
Electrical connection:	only at protective low voltage max. 30 VAC/42 VDC KF-100-4 and KF-100/6-4 4-conductor	
Sensor wire extendable up to:	depending on the cross-section of the conductor and the sensor unit type	
Tolerances:	PT100/PT1000 Class B	
Mounting/attachment:	in immersion sleeve, protective coil, on pipe etc.	
Protection rating:	IP 67	
Protection class:	III	
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”	
Accessories:	Immersion sleeves/protective coil can be found in the “Miscellaneous” section.	

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	Features	PG
“Sensor 0” (NTC 2 K 25)	**KF-0**	G 9031441	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 1” (NTC 1K)	**KF-1**	G 9031442	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 2” (NTC 47K)	**KF-2**	G 9031446	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 3” (NTC 8 K)	**KF-3**	G 9031447	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 3” (NTC 8 K)	**KF-3/10**	G 9031448	Wire PE, 10 m, –35…+100 °C	III
“Sensor 4” (NTC 10 K)	**KF-4**	G 9031449	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 4” (NTC 10 K)	**KF-4/6**	G 9031450	Wire PE, 6 m, –35…+100 °C	III
“Sensor 5” (NTC 50 K)	**KF-5**	G 9031451	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 6” (NTC 100 K)	**KF-6**	G 9031455	Wire PE, 1.5 m, –35…+100 °C	III
“Sensor 51” (KTY 81-121)	**KF-51**	G 9031452	Wire silicone, 1.5 m, –50…+150 °C	III
“Sensor 51” (KTY 81-121)	**KF-51/6**	G 9031453	Wire silicone, 6 m, –50…+150 °C	III
“Sensor 57” (KTY 11-7)	**KF-57**	G 9031454	Wire PE, 1.5 m, –35…+100 °C	III
PT-100	**KF-100-4**	G 9031443	Wire silicone, 1.5 m, –50…+180 °C	III
PT-100	**HF-100/6-4**	G 9031444	Wire silicone, 6 m, –50…+180 °C	III
PT-1000	**KF-1000**	G 9031445	Wire silicone, 1.5 m, –50…+180 °C	III

Dimension drawing KF



Contact temperature sensor with passive and active output

ALF … contact temperature sensor

MTRKK … contact temperature sensor with transducer 0–10 V or 4–20 mA

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Ambient temperature:	–30 … +70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. measurement current (passive):	< 1 mA
Electrical connection:	Screw-type terminals 0.14 mm² to 2.5 mm² only at protective low voltage passive max. 30 VAC/42 VDC
Mounting/attachment:	on pipe by means of cable tie
Tolerances:	PT100/PT1000 DIN EN 60751 B NI1000 DIN EN 43760 B
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found under “Miscellaneous”

Application

The ALF contact temperature sensors are used for temperature measurement on pipes, tubes or heat carriers.

When the contact temperature sensor is active, the temperature-dependent resistance of the sensors is converted linearly into a voltage signal of 0–10 V or a current signal of 4–20 mA.

For better temperature transmission between the pipe and the contact sensor, the use of a heat conducting paste is recommended.

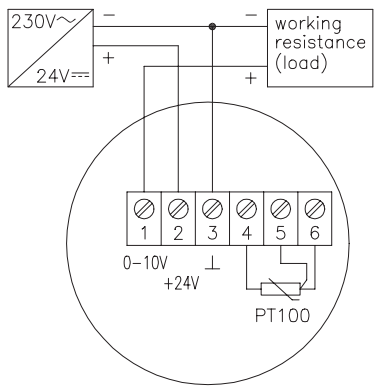
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	PG
PT 100	**ALFP 100**	G 9050010	III
PT 1000	**ALFP 1000**	G 9050020	III
NI 1000	**ALFN 1000**	G 9050030	III
NI 1000 TK 5000	**ALFN 1000 TK 5000**	G 9050040	III
LM 235 Z	**ALFLM**	G 9050130	III
“Sensor 0” (NTC 2K25)	**ALF-0**	G 9050270	III
“Sensor 2” (NTC 47K)	**ALF-2**	G 9050160	III
“Sensor 3” (NTC 8K)	**ALF-3**	G 9050180	III
“Sensor 4” (NTC 10K)	**ALF-4**	G 9050190	III
“Sensor 5” (NTC 50K)	**ALF-5**	G 9050200	III
“Sensor 51” (KTY 81-121)	**ALF-51**	G 9050210	III

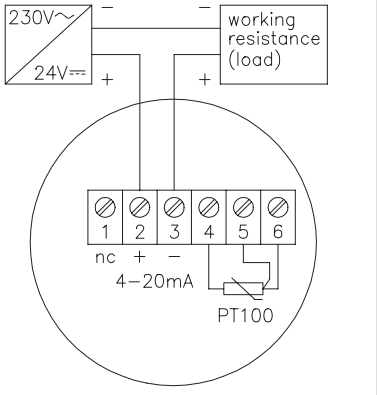
Contact temperature sensor, active	Item no.	Features	PG
MTRKK-965.758	G 9050350	**Measurement ranges:** –50 … +50 °C, 0 … +50 °C, –20 … +80 °C, 0 … +100 °C **Operating voltage:** 24 VDC **Output signals:** continuous 0–10 VDC, continuous 4–20 mA **Sensor type:** PT-100 2-conductor (0–10 V), 3-conductor (4–20 mA)	III

Accessories	Item no.	Features	PG
WP-01	G 9990180	heat conduction paste 2 ml	II

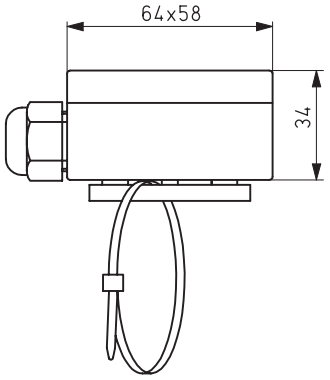
Connection diagram 0–10 V



Connection diagram 4–20 mA



Dimension drawing



Pendulum temperature sensor PF

Technical data

Sensor material:	Al black, PVC wire
Sensor dimensions:	Ø 60 mm
Ambient temperature:	–30…+80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. measurement current:	< 1 mA
Electrical connection:	only at protective low voltage max. 30 VAC/42 VDC
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Connecting cable:	2 x 0.5 mm²
Mounting/attachment:	suspended
Tolerances:	PT100/PT1000 DIN EN 60751 B NI1000 DIN EN 43760 B
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found in the “Miscellaneous” section.

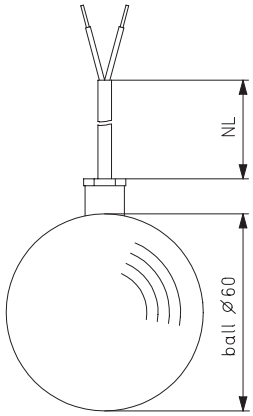
Application

The pendulum temperature sensor PF serves to measure the temperatures in larger spaces. Owing to the spherical form, this sensor captures the temperature from all directions of the room, so that when correctly positioned in the room, a representative measurement result can be achieved.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	Features	PG
PT 100	**PFP 100**	G 9130010	Wire length: 1 m	III
PT 1000	**PFP 1000**	G 9130020	Wire length: 1 m	III
“Sensor 4” NTC 10 K	**PFC 10**	G 9130070	Wire length: 1 m	III
“Sensor 2” NTC 47 K	**PFC 47/6 (6 m)**	G 9130180	Wire length: 6 m	III

PF dimension drawing



Radiation temperature sensor STF

Technical data

Design:	Berlin 200
Housing colour:	pure white, like RAL 9010, ball black
Housing material:	ABS plastic
Ambient temperature:	–20 ... +60 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. measurement current:	< 1 mA
Electrical connection:	screw-type terminals 0.14 mm² up to 1.5 mm² only at protective low voltage max. 30 VAC / 42 VDC
Sensor wire extendable:	depending on the cross-section of the conductor and the sensor unit type
Mounting / attachment:	surface / wall mounting (4-hole assembly on flush-mounted socket)
Protection rating:	IP 30
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found in the “Miscellaneous” section.

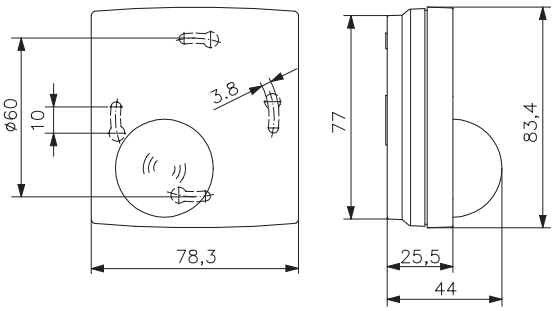
Application

The radiation temperature sensor is a dual sensor for the measurement of radiation and room heat. The radiation sensor is located in the black hemisphere; the room sensor is located the plastic housing. Connection with screw-type terminals.

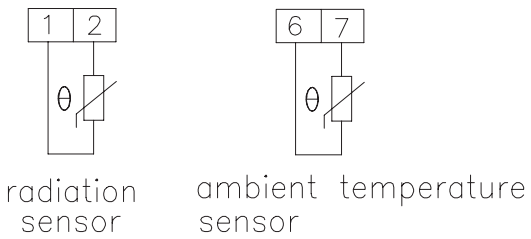
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Type	Item no.	PG
“Sensor 0” 2x NTC 2 K 25	**STF-0**	SN 080100	III
“Sensor 2” 2x NTC 47 K	**STF-2**	SN 080200	III
“Sensor 4” 2x NTC 10 K	**STF-4**	SN 080400	III
“Sensor 51” 2x KTY 81-121	**STF-51**	SN 080500	III

STF dimension drawing



STF connection diagram



Assembly-type duct sensor EKF/GFL

with passive output

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Sensor tube material:	V2A (1.4301)
Ambient temperature:	–30...+70 °C
Max. sensor temperature	150 °C (sensor type LM 235 Z 125 °C)
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Electrical connection:	screw-type terminals 0.14 mm² up to 2.5 mm² only at protective low voltage max. 30 VAC/42 VDC
Tolerances:	PT100/PT1000 DIN EN 60751 B NI1000 DIN EN 43760 B
Mounting/attachment:	in immersion sleeves (THMs, THV) for fluids or with mounting flange (MF) in air ducts
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found in the “Miscellaneous” section.
Immersion sleeves:	subtract 15 mm from the fitting length (EL) to determine the nominal length (NL) of the immersion sleeve, for example, EL = 65 mm corresponds to THV/50

Application

The assembly-type duct sensors EKF/GFL are used for measuring temperatures in liquids and gases in pipes, air ducts or tanks. The mounting flange (MF) is required for use in air ducts. If used in liquids, immersion sleeves made of brass with nickel plating (THMs) should be used. For aggressive media, immersion sleeves made of stainless steel V4A (THV) are recommended. Immersion sleeves or mounting flanges are not part of the delivery scope and must be **ordered separately** as accessories.

Accessories: mounting flange for installation in air ducts: MF matching immersion sleeves in brass: immersion sleeves with brass plating can be found under “Miscellaneous”, matching immersion sleeves stainless steel (V4A): immersion sleeves made of stainless steel V4A can be found in the “Miscellaneous” section

Sensor wire extendable: depending on the cross-section of the conductor and the sensor unit type

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Fitting length 65 mm (for 50-mm immersion sleeves)	Fitting length 115 mm (for 100-mm immersion sleeves)	Fitting length 165 mm (for 150-mm immersion sleeves)	PG
PT 100	**EKFP 100/50** Item no.: G 9140010	**EKFP 100/100** Item no.: G 9140140	**EKFP 100/150** Item no.: G 9140270	III
PT 1000	**EKFP 1000/50** Item no.: G 9140020	**EKFP 1000/100** Item no.: G 9140150	**EKFP 1000/150** Item no.: G 9140280	III
NI 1000	–	**EKFN 1000/100** Item no.: G 9140160	**EKFN 1000/150** Item no.: G 9140290	III
NI 1000 TK 5000	–	**EKFN 1000 TK 5000/100** Item no.: G 9140170	**EKFN 1000 TK 5000/150** Item no.: G 9140300	III
NTC 10K “Sensor 4”	–	**EKFC 10/100** Item no.: G 9140200	–	III
LM 235 Z	–	**EKFLM/100** Item no.: G 9140260	**EKFLM/150** Item no.: G 9140390	III

Sensor	Fitting length 215 mm (for 200-mm immersion sleeves)	Fitting length 265 mm (for 250-mm immersion sleeves)	Fitting length 315 mm (for 300-mm immersion sleeves)	PG
PT 100	**EKFP 100/200** Item no.: G 9140400	**EKFP 100/250** Item no.: G 9140530	**EKFP 100/300** Item no.: G 9141581	III
PT 1000	**EKFP 1000/200** Item no.: G 9140410	**EKFP 1000/250** Item no.: G 9140540	**EKFP 1000/300** Item no.: G 9141421	III
NI 1000	**EKFN 1000/200** Item no.: G 9140420	–	–	III
LM 235 Z	**EKFLM/200** Item no.: G 9140520	–	–	III

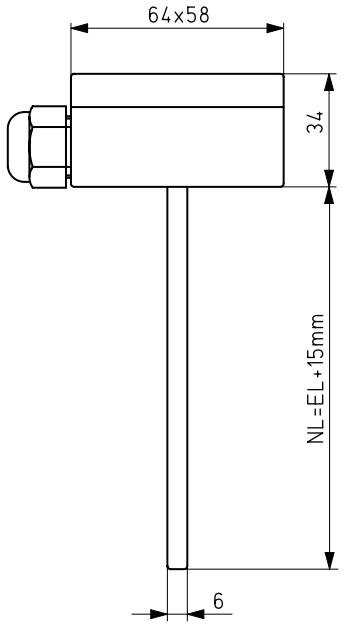
Assembly-type duct sensor EKF / GFL

with passive output

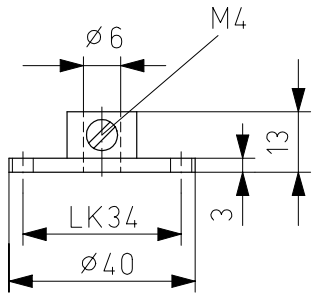
Sensor	Type (Fitting length 215 mm)	Item no.	PG
“Sensor 0” NTC 2K25	**GFL-0**	G 9060010	III
“Sensor 1” NTC 1 K	**GFL-1**	G 9060020	III
“Sensor 2” NTC 47K	**GFL-2**	G 9060030	III
“Sensor 3” NTC 8K	**GFL-3**	G 9060040	III
“Sensor 4” NTC 10K	**GFL-4**	G 9060050	III
“Sensor 5” NTC 50K	**GFL-5**	G 9060060	III
“Sensor 51” KTY 81-121	**GFL-51**	G 9060070	III

Accessories	Item no.	Features	PG
MF	G 9990160	mounting flange for integrated duct sensor	III

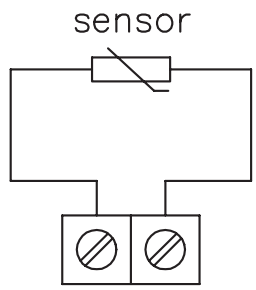
Dimension schematic, assembly-type duct sensor



Dimension schematic, mounting flange MF



Circuit diagram, assembly-type duct sensor



Assembly-type duct sensor

with active output (transducer 0–10 V or 4–20 mA)

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Sensor tube material:	V2A (1.4301)
Operating voltage:	24 VDC
Ambient temperature:	–30...+70 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	100 °C
Electrical connection:	screw-type terminals 0.14 mm² to 2.5 mm²
Tolerances:	PT 100, DIN EN 60751, class B
Mounting / attachment:	in immersion sleeves (THMs, THV) for fluids or with mounting flange (MF) in air ducts
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor:	PTC, internal
Immersion sleeves:	from the fitting length (EL), subtract 15 mm to determine the nominal length (NL) of the immersion sleeve, for example, EL = 65 mm corresponds to THV/50
Sensor type:	PT-100
Output signal:	continuous 4...20 mA or 0...10 V selectable
Measurement ranges:	–50...+50 °C, 0...+50 °C, –20...+80 °C, 0...+100 °C selectable

Application

The assembly-type duct sensor MTRKK is used for measuring temperatures in liquids and gases in pipes, air ducts or tanks. The temperature-dependent resistance of the sensor is converted linearly into a current signal of 4–20 mA or a voltage signal of 0–10 V. The transducer is supplied calibrated to the measurement range of –50 … +50 °C, 0 … +50 °C or 0 … +100 °C.
The mounting flange (MF) is required for use in air ducts. If used in liquids, immersion sleeves made of brass should be used with nickel plating (THMs). For aggressive media, immersion sleeves made of stainless steel V4A (THV) are recommended. Immersion sleeves or mounting flanges are not part of the delivery scope and must be **ordered separately** as accessories.

Accessories: mounting flange for installation in air ducts: MF matching immersion sleeves

Brass: immersion sleeves with brass plating can be found in the “Miscellaneous” section, matching immersion sleeves

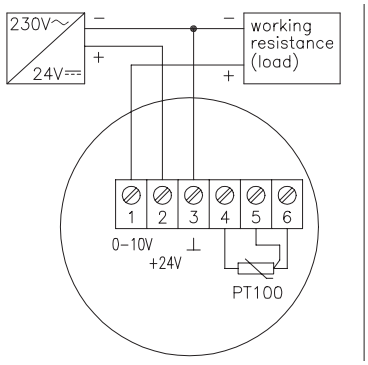
Stainless steel V4A: immersion sleeves made of stainless steel V4A can be found in the “Miscellaneous” section

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

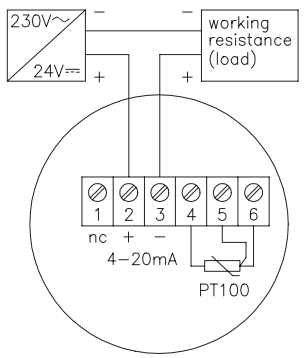
Fitting length	Type	Item no.	PG
65 mm (NL) (for 50-mm immersion sleeve)	**MTRKK-965.758/50 mm**	G 9142171	III
115 mm (NL) (for 100-mm immersion sleeve)	**MTRKK-965.758/100 mm**	G 9142181	III
165 mm (NL) (for 150-mm immersion sleeve)	**MTRKK-965.758/150 mm**	G 9142191	III
215 mm (NL) (for 200-mm immersion sleeve)	**MTRKK-965.758/200 mm**	G 9142201	III
265 mm (NL) (for 250-mm immersion sleeve)	**MTRKK-965.758/250 mm**	G 9142211	III
315 mm (NL) (for 300-mm immersion sleeve)	**MTRKK-965.758/300 mm**	G 9142221	III

Accessories	Item no.	Features	PG
MF	G 9990160	mounting flange for integrated duct sensor	III

Connection diagram 0–10 V



Connection diagram 4–20 mA



Industrial assembly-type duct sensor IKF1 (Form B)

with passive output

Technical data

Housing colour:	silver-grey
Housing material:	aluminium
Sensor tube material:	V2A (1.4301)
Ambient temperature:	−30 … +100 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	150 °C (sensor type LM 235 Z max. 125 °C)
Electrical connection:	screw-type terminals 0.14 mm² up to 2.5 mm² only at protective low voltage max. 30 VAC/42 VDC
Tolerances:	PT100/PT1000 DIN EN 60751 B NI1000 DIN EN 43760 B
Mounting/attachment:	in immersion sleeves (THMs, THV) for fluids or with mounting flange (MF) in air ducts
Protection rating:	IP 43
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor characteristic curves:	The sensor characteristic curves can be found in the “Miscellaneous” section.
Immersion sleeves:	from the fitting length (EL), subtract 15 mm to determine the nominal length (NL) of the immersion sleeve, for example, EL = 65 mm corresponds to THV/50
Accessories:	mounting flange for installation in air ducts: MF matching immersion sleeves in brass: immersion sleeves with brass plating can be found in the “Miscellaneous” section matching immersion sleeves stainless steel (V4A): immersion sleeves made of stainless steel can be found in the “Miscellaneous” section

Application

The industrial assembly-type duct sensor IKF1 is used for measuring temperatures of liquids and gases in pipes, air ducts or tanks in the mechanical and plant engineering sector. A mounting flange (MF) is required for use in air ducts. If used in liquids, immersion sleeves made of brass with nickel plating (THMs) should be used. For aggressive media, immersion sleeves made of stainless steel V4A (THV) are recommended. Immersion sleeves or mounting flanges are not part of the delivery scope and must be **ordered separately** as accessories.

Sensor wire extendable:
Depending on the cross-section of the conductor and the sensor unit type

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Sensor	Fitting length (EL) 65 mm (for 50-mm immersion sleeves)	Fitting length (EL) 115 mm (for 100-mm immersion sleeves)	Fitting length (EL) 165 mm (for 150-mm immersion sleeves)	PG
PT 100	**IKF1P 100/50** Item no.: G 9150010	**IKF1P 100/100** Item no.: G 9150140	**IKF1P 100/150** Item no.: G 9150270	III
PT 1000	**IKF1P 1000/50** Item no.: G 9150020	**IKF1P 1000/100** Item no.: G 9150150	**IKF1P 1000/150** Item no.: G 9150280	III

For the dimension schematic and circuit diagram of the industrial assembly type duct sensor, see the next page. For the dimension schematic of the mounting flange, see the next page.

Accessories	Item no.	Features	PG
MF	G 9990160	mounting flange for integrated duct sensor	III

Transducer “Pressure” MUD

MUD… transducer for liquid and gaseous media 0–10 V or 4–20 mA

Technical data

Housing colour:	silver
Housing material:	stainless steel
Operating voltage:	12–32 VDC
Ambient temperature:	–30…+80 °C
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing
Max. sensor temperature	100 °C
Electrical connection:	Plug according to DIN 43650
Mounting/attachment:	G 1/4", with adapter G 1/2"
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor:	maintenance-free pressure membrane
Accuracy:	linearity error +/-0.5% FS, total error +/-1.5% FS
Max. pressure:	2 times the measurement range
Accessories:	adapter G 1/2": MUD-A

Application

The MUD transducer is used for measuring pressure in non-aggressive gaseous or liquid media in hydraulics, pneumatics, in mechanical and plant engineering as well as in process engineering.

The stainless steel membrane is fully vacuum tight. The pressure sensors are maintenance free.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Transducer, pressure 0–160 mbar

Type	Item no.	Measurement range	Output signal	PG
MUD/0–10/0.16	G 9240010	0–160 mbar	0–10 V	III
MUD/4–20/0.16	G 9240020	0–160 mbar	4–20 mA	III

Transducer, pressure 0–2.5 bar

Type	Item no.	Measurement range	Output signal	PG
MUD/0–10/2.5	G 9240030	0–2.5 mbar	0–10 V	III
MUD/4–20/2.5	G 9240040	0–2.5 mbar	4–20 mA	III

Transducer, pressure 0–6 bar

Type	Item no.	Measurement range	Output signal	PG
MUD/0–10/6	G 9240050	0–6 bar	0–10 V	III
MUD/4–20/6	G 9240060	0–6 bar	4–20 mA	III

Transducer, pressure 0–10 bar

Type	Item no.	Measurement range	Output signal	PG
MUD/0–10/10	G 9240070	0–10 bar	0–10 V	III
MUD/4–20/10	G 9240080	0–10 bar	4–20 mA	III

Transducer “Pressure” MUD

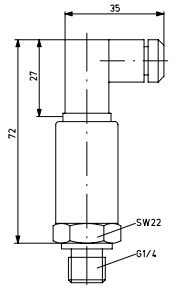
MUD … transducer for liquid and gaseous media 0–10 V or 4–20 mA

Accessories	Item no.	Features	PG
MUD-A ½"	G 9990190	Adapter G ½"	III

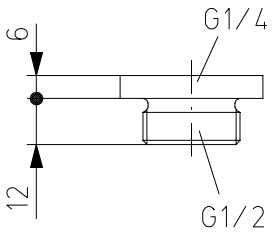
Conversion table for pressure

	Pa	kPa	bar	mbar	mWs
1 Pa =	**1**	**0.001**	**0.00001**	**0.01**	**0.000101971**
1 kPa =	**1.000**	**1**	**0.01**	**10**	**0.101971**
1 bar =	**100,000**	**100**	**1**	**1.000**	**10.1971**
1 mbar =	**100**	**0.1**	**0.001**	**1**	**0.0101971**
1 mWs =	**9,806.65**	**9.80665**	**0.0980665**	**98.0665**	**1**

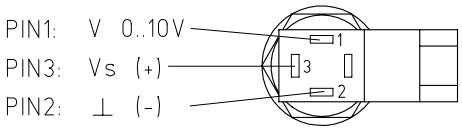
Dimension drawing



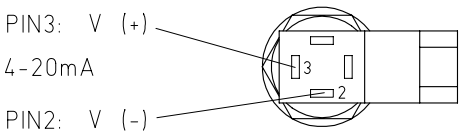
Adapter for MUD



Circuit diagram 0–10 V



Circuit diagram 4–20 mA



Transducer “Differential pressure – air”

Technical data

Housing colour:	grey
Housing material:	plastic
Material of parts coming in contact with the medium:	Ni, PU, Al, Au, Pyrex glass, silicone, Kovar, Duraplast, Ultem Plasic
Operating voltage:	15 – 30 VDC, 15 – 30 VAC
Ambient temperature:	10 … 50 °C
Permissible atmospheric humidity:	max. 80% rel. humidity, non-condensing
Max. pressure:	5 times the measurement range end value (relative pressure)
Electrical connection:	screw-type terminals up to 1.5 mm²
Mounting / attachment:	wall mounting
Protection rating:	IP 54
Protection class:	III
Safety and EMC:	according to DIN EN 60730
Sensor:	piezo-resistive pressure sensor
Pressure connection:	d x L: 6.6 x 10 mm (for flexible tubes d = 6 mm)
Cable gland:	M 12 x 1.5
Output signal:	continuous, adjustable 0 – 10 V, 0 – 20 mA, 4 – 20 mA
Accuracy:	Linearity: +/ – 2% FS Influence of supply: <0.05% Influence of position: 0.1% at 3000 Pa, 0.3% at 1500 Pa, 0.9% at 500 Pa, 1.8% at 250 Pa Temperature drift: offset and range respectively +/ – 0.12% FS/K Long-term stability: +/ – 2% FS/year

Application

The microprocessor-controlled pressure transducers are suitable for detecting overpressure, underpressure or differential pressure of non-aggressive gases.

They are used in heating, ventilation or air conditioning applications as well as in clean room technology or for fine draft measurement.

The pressure measurement is performed using a piezo-resistive pressure sensor.

For details on the suitable microprocessor controller JDU-210, see the “Plant engineering” section.

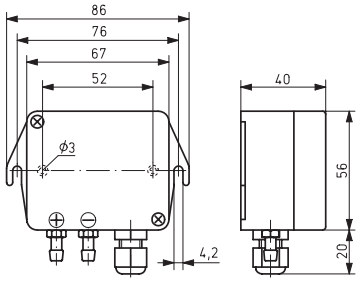
The types MDEKD replace the types DF.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Type	Item no.	Measurement ranges	PG
MDEKD-940.000	G 9270010	1000 Pa, 750 Pa; 500 Pa; 250 Pa relative pressure	III
MDEKD-940.100	G 9270020	10000 Pa; 7500 Pa; 5000 Pa; 2500 Pa relative pressure	III

Accessories	Item no.	Features	PG
JZ-27	G 9990450	cover with 3.5-digit LC display for MDEKD, easy assembly	III
JZ-01 L	H 5309226	Single duct connection made of plastic (grey) Ø 6 mm outside for differential pressure switch JDW, JDL, pressure transducer	II
JZ-06/1	H 5309229	Connection set with duct connections made of plastic, 2 x 90° angles, 2 extensions 90 mm, 4 self-tapping screws, 2-m tube Ø 6 mm outside for differential pressure switch JDW, JDL, pressure transducer	II

Dimension drawing



MDEKD with JZ-27

Transducer “Temperature and humidity”

Room and duct version

Room version

Duct version

Technical data	Room…	Duct...
Housing colour:	pure white, like RAL 9010	
Housing material:	**Room:** ABS plastic **Duct:** PA plastic (30% GF reinforced)	
Operating voltage:	**Room:** 24 VAC (0–10 V), 15–35 VDC (4–20 mA) **Duct:** 24 VAC (0–10 V), 16–32 VDC (0–10 V/4–20 mA)	
Ambient temperature:	–10…+60 °C	
Permissible atmospheric humidity:	non-condensing	
Electrical connection:	screw-type terminals 0.14 mm² to 1.5 mm²	
Mounting/attachment:	**Room:** surface-/wall-mounting (4-hole assembly on flush-mounted socket) **Duct:** duct assembly by means of mounting flange	
Protection rating:	**Room:** IP 30 **Duct:** IP 65	
Protection class:	III	
Accuracy:	**Room humidity:** +/– 3% rel. humidity (40…60% at 20 °C), else +/– 5% rel. humidity **Room temperature:** +/– 0.5 K (0–10 V), +/– 0.8 K (4–20 mA) **Duct humidity:** +/– 2% r.h. (20…80%), else +/– 3.5% r.h. **Duct temperature:** +/– 0.5 K	

Application

For measuring the temperature, the relevant humidity or the temperature and the relative humidity and conversion into an electrical quantity (standard signal 0–10 V/4–20 mA).

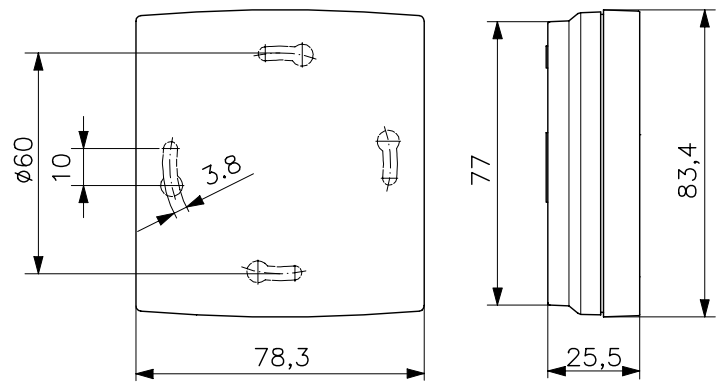
Usable in refrigeration, air conditioning, ventilation and process engineering as a room or duct sensor.

For details on the suitable microprocessor controller JDU-210, see the “Plant engineering” section.

Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Type	Item no.	Features	Output signal	PG
MFEKB-045.000	G 9262210	Room humidity, 0…100% rel. humidity	continuous 4–20 mA/0–10 V	III
MTEKB-045.000	G 9262310	Room temperature, 0 … 50 °C	continuous 4–20 mA/0–10 V	III
MKEAB-045.100	G 9261610	Room humidity/room temperature, 0…50 °C, 0…100% rel. humidity	continuous 4–20 mA	III
MKEVB-045.100	G 9261310	Room humidity/room temperature, 0…50 °C, 0…100% rel. humidity	continuous 0–10 V	III
MFEKK-945.000	G 9261910	Duct humidity, 0…100% rel. humidity	continuous 4–20 mA/0–10 V	III
MTRKK-965.758 / 200 mm	G 9142201	Duct temperature, –50…+50 °C, 0…+50 °C, –20…+80 °C, 0…+100 °C	continuous 4–20 mA/0–10 V	III
MKEKK-945.000	G 9262110	Duct humidity/duct temperature, 0…+50 °C, –20…+80 °C, 0…100% rel. hum.	continuous 4–20 mA/0–10 V	III

MxEKB, MKExB



Transducer “Temperature and humidity” MKEKD, for outdoor use

MKEKD transducer temperature/humidity, 0–10 V/4–20 mA
AFT humidity transducer, 0–10 V and 4–20 mA with passive temperature sensor

Technical data

Housing colour:	pure white, like RAL 9010
Housing material:	PA plastic (30% GF reinforced)
Operating voltage:	**AFT:** 24 VAC, 16–32 VDC, **MKEKD:** 24 VAC (0–10 V), 16–32 VDC (0–10 V/4–20 mA)
Ambient temperature:	**AFT:** 0…50 °C **MKEKD:** –10…+60 °C
Permissible atmospheric humidity:	non-condensing
Electrical connection:	screw-type terminals 0.14 mm² to 1.5 mm²
Mounting/attachment:	Surface-/wall-mounting
Protection rating:	IP 65
Protection class:	III
Safety and EMC:	according to DIN EN 61010 and DIN EN 50081
Accuracy:	Humidity: ±2% rel. humidity (20…80%), else ±3.5% rel. humidity Temperature: ±0.5 °C
Measurement range, humidity:	0…100% rel. humidity

Application

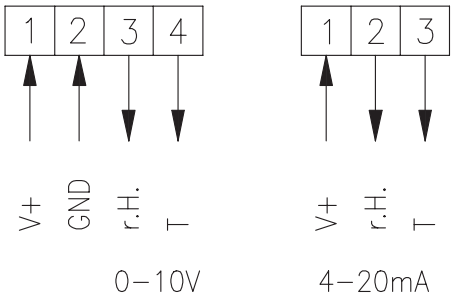
The temperature-humidity-transmitter is used in building automation, refrigeration and air-conditioning, as well as in clean room technology, in greenhouses, medicine rooms and in meteorological applications.

For details on the suitable microprocessor controller JDU-210, see the “Plant engineering” section.

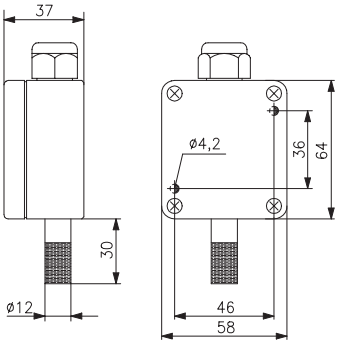
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

Type	Item no.	Features	PG
MKEKD-945.700	G 9262410	Temperature/humidity 0–10 V/4–20 mA; 0...50 °C; –20…+80 °C; 0…100% rel. humidity	III
AFT/P100	G 9260510	Humidity 0–10 V/4–20 mA, passive temperature sensor PT100	III
AFT/P1000	G 9260610	Humidity 0–10 V/4–20 mA, passive temperature sensor PT1000	III
AFT/NI1000	G 9260710	Humidity 0–10 V/4–20 mA, temperature sensor NI1000	III
AFT/NI1000 TK 5000	G 9261210	Humidity 0–10 V/4–20 mA, temperature sensor NI1000 TK 5000	III

Connection diagram 0–10 V/4–20 mA



Dimension drawing



ACCESSORIES AND MISCELLANEOUS

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It's good when it's getting better.

Overview, miscellaneous:
Sauna controllers

Accessories

Technical annex

Index

General information/Contact/Addresses

Sauna controllers SAUNATHERM VU / HYGROTHERM VU

For dry and wet saunas

Technical data	
Colour:	cream white, like RAL 9001
Housing material:	ABS
Mains voltage:	400 VAC, 3/N 50 Hz
Features:	sensor rupture/short-circuit safe-guarding, “light” switch, “ON/OFF” switch, “light/fan/electronics” micro-fuse, “ON/OFF” contact input
Trigger temperature of safety temperature limiter:	approx. 141 °C
Heating time limit:	6 h / 12 h / none
Pre-selection timer:	can be set to max. 12 h, 1-h intervals
Switching power, furnace:	max. 9 kW (max. 3 kW per phase)
Switching power, light:	max. 100 W, 230 VAC, 50 Hz
Switching power, fan:	max. 100 W, 230 VAC, 50 Hz
Switching element:	safety protection, relay 3-stage switching
Hysteresis:	approx. 1 K
Display type:	LED
Protection rating:	IP 44
Protection class:	II, if properly mounted
Safeguarding:	T1, 25 A (5 x 20)
Scope of delivery:	control unit, sensor/STB, fastening screws
Mounting:	wall mounting
Ambient temperature:	– 15 … +25 °C
Electrical connection:	screw-type terminals
Permissible atmospheric humidity:	max. 95% rel. humidity, non-condensing

Application

Sauna controllers for dry saunas or dry/wet saunas.

Load expansion possible with LG 9/18 (18 kW) or LG 9/30 (30 kW).

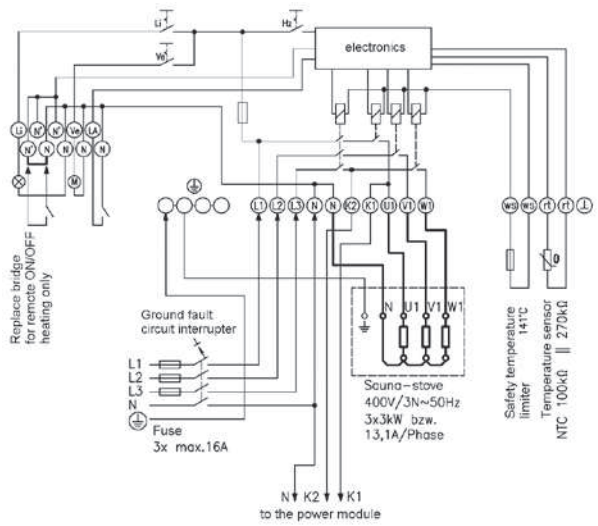
Type/image	Item no.	Features	PG
Saunatherm VU 	D4700653	Sauna controller for dry saunas (Finnish) Control range: 30 … 120 °C Switch: “Fan On/Off” Indicators: “HEATING”, “ON/OFF”, “Pre-selection timer”	III
Hygrotherm VU 	D4700736	Sauna controller for dry saunas (Finnish) or wet saunas Control range, dry sauna: 80 … 110 °C Control range, wet sauna: 40 … 60 °C / approx. 40 … 95 % rel. humidity Switching power vaporiser: max. 3 kW Switch: “Fan, 3-stage” Indicators: “Heating”, “ON/OFF”, “Pre-selection timer” Water shortage detection Post-operation drying temperature adjustable: approx. 60 … 80 °C Post-operation drying limitation: approx. 3.5 h Fan post-operation time: approx. 15 minutes	III

Accessories, sauna controllers SAUNATHERM VU / HYGROTHERM VU

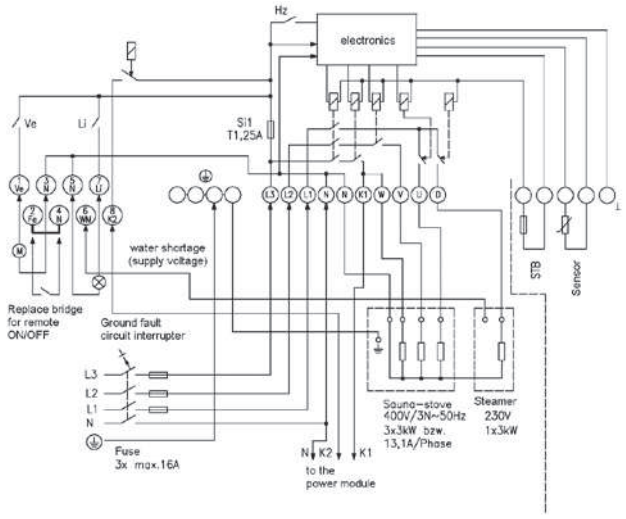
For dry and wet saunas

Type/image	Item no.	Features	PG
LG 9/18 	D4710450	Power switching unit 9 kW (max. 3 kW per phase) With this unit, all control units can be enhanced from 9 kW to 18 kW switching power (9 kW via control unit +9 kW via load switch = 18 kW total power).	III
LG 9/30 	H4690008	Power switching unit 21 kW (max. 7 kW per phase) With this unit, all control units can be enhanced from 9 kW to 30 kW switching power (9 kW via control unit +21 kW via load switch =30 kW total power).	III
Sensor/STB 	D4700662	Spare sensor/STB for Saunatherm VU and Hygrotherm VU	III

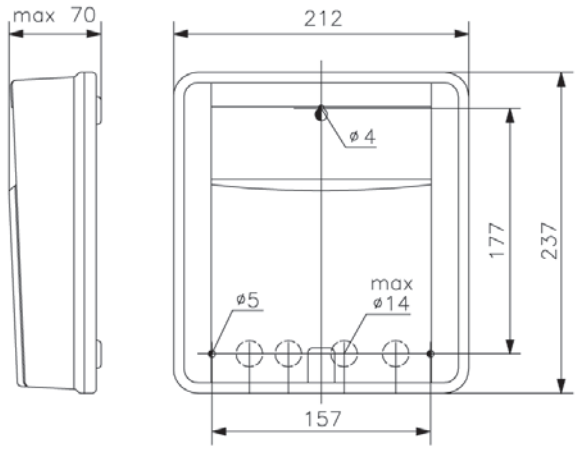
Circuit diagram, Saunatherm VU



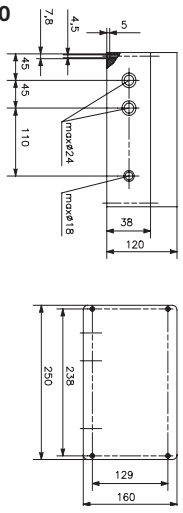
Circuit diagram, Hygrotherm VU



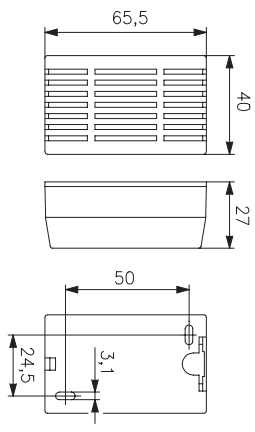
Sauna controllers, LG 9/18



LG 9/30



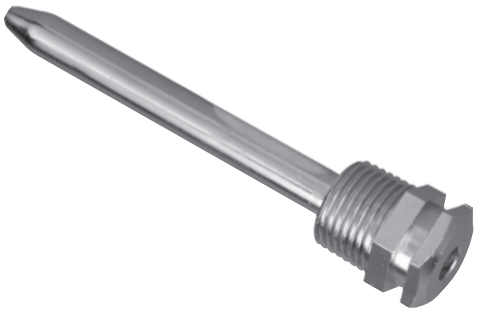
Sensor/STB



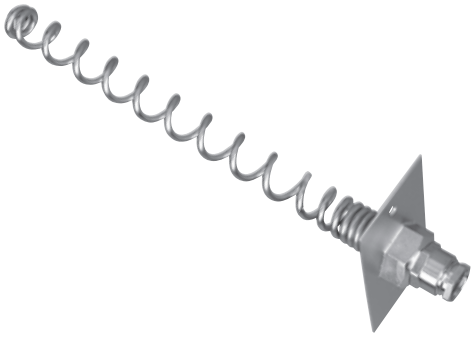
Immersion sleeves / protecting coils for KR/LR 80/85 and for sleeve sensors and cable temperature sensors

For industrial applications and heating technology

THK / NTHK



SW-200 / SW-200-12



Type	Item no.	Length of L	Diameter I x A*	Material	Max. pressure (P/bar)	PG
Immersion sleeves for KR 80/85						
THK-100	C 1809043	100 mm	7.5 x 10 mm	nickel-plated brass	20	II
THK-120	C 1809031	120 mm	7.5 x 10 mm	nickel-plated brass	20	II
THK-200	C 1809070	200 mm	7.5 x 10 mm	nickel-plated brass	20	II
THK-280	C 1809106	280 mm	7.5 x 10 mm	nickel-plated brass	20	II
THK-600	C 1809132	600 mm	7.5 x 10 mm	nickel-plated brass	20	II
NTHK-100	C 1809056	100 mm	7.5 x 10 mm	V4 A (1.4571)	40	II
NTHK-120	C 1809005	120 mm	7.5 x 10 mm	V4 A (1.4571)	40	II
NTHK-200	C 1809082	200 mm	7.5 x 10 mm	V4 A (1.4571)	40	II
NTHK-280	C 1809118	280 mm	7.5 x 10 mm	V4 A (1.4571)	40	II
THK-100 x 17	C 1809157	100 mm	14.8 x 17 mm	nickel-plated brass	20	II
THK-200 x 17	C 1809183	200 mm	14.8 x 17 mm	nickel-plated brass	20	II
NTHK-100 x 17	C 1809169	100 mm	14.8 x 17 mm	V4 A (1.4571)	40	II
NTHK-200 x 17	C 1809195	200 mm	14.8 x 17 mm	V4 A (1.4571)	40	II

Type	Item no.	Length of L	Diameter I x A*	Material	PG
Protecting coil for LR 80/85					
SWK 100	C 1809200	100 mm	10.5 x 17 mm	steel, nickel-plated	II
SWK 120	C 1809207	120 mm	10.5 x 17 mm	steel, nickel-plated	II
SWK 200	C 1809498	200 mm	10.5 x 17 mm	steel, nickel-plated	II
SWK 280	C 1809221	280 mm	10.5 x 17 mm	steel, nickel-plated	II

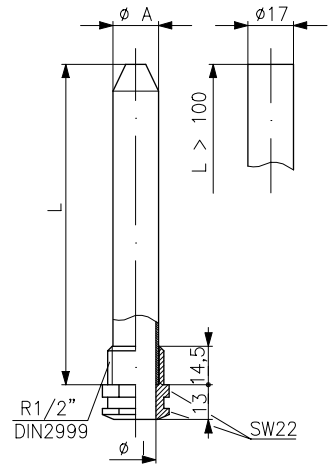
Type	Item no.	Length of L	Cable gland	Diameter I x A*	Material	PG
Protecting coil for capillary fastening in the air duct (JET / JMT / JTF / WR 81) and all sleeve sensors HF and cable temperature sensors KF						
SW-200	C 1809219	200 mm	7.8 mm	11 x 17 mm	steel, nickel-plated	II
SW-200-12	C 1809220	200 mm	11.8 mm	11 x 17 mm	steel, nickel-plated	II

* I = minimum inner diameter
A = nominal outer diameter

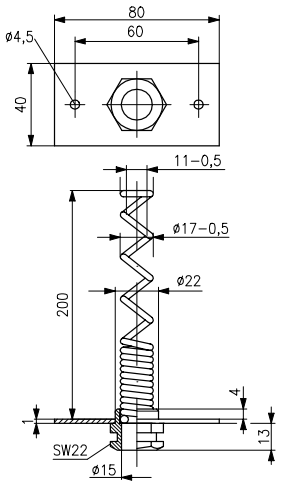
Immersion sleeves / protecting coils for KR/LR 80/85 and for sleeve sensors and cable temperature sensors

For industrial applications and heating technology

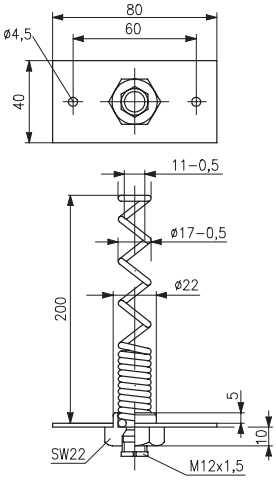
THK / NTHK



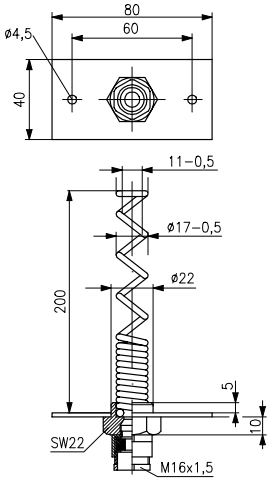
SWK



SW-200



SW-200-12



Immersion sleeves for capillary / frost protection thermostats / HF / screed mounting

For industrial applications and heating technology

TH / NTH

THF

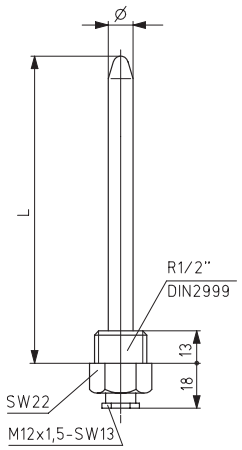
Type	Item no.	Length of L	Diameter I x A**	Material	Max. pressure (P/bar)	PG
For sensors HF / KF Ø 7 mm, capillary and frost protection thermostats JET / JMT / WR 81 und JTF (for JTF, only type TH / NTH-140)						
TH-55	C 1809296	55 mm	8 x 10 mm	nickel-plated brass	20	II
TH-100	C 1809310	100 mm	8 x 10 mm	nickel-plated brass	20	II
TH-140*	C 1809409	140 mm	10 x 12 mm	nickel-plated brass	20	II
TH-200	C 1809438	200 mm	8 x 10 mm	nickel-plated brass	20	II
TH-280	C 1809440	280 mm	8 x 10 mm	nickel-plated brass	20	II
NTH-55	C 1809284	55 mm	8 x 10 mm	V4 A (1.4571)	40	II
NTH-100	C 1809308	100 mm	8 x 10 mm	V4 A (1.4571)	40	II
NTH-140*	C 1809435	140 mm	10 x 12 mm	V4 A (1.4571)	40	II
NTH-200	C 1809439	200 mm	8 x 10 mm	V4 A (1.4571)	40	II
NTH-280	C 1809441	280 mm	8 x 10 mm	V4 A (1.4571)	40	II

* suitable for all types with an X in the designation, for example, JET-1 ... X or JMT 206 X
** I = minimum inner diameter
A = nominal outer diameter

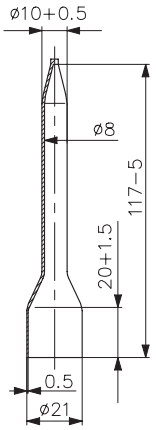
Cu protective sleeve for sleeve sensor HF / cable temperature sensor KF Ø 7.7 mm for screed mounting

THF	C 1809515	II

TH / NTH



THF

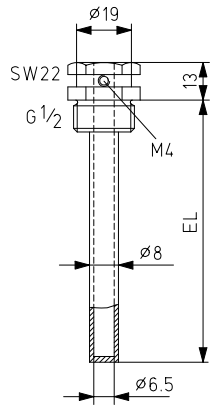


Immersion sleeves / mounting flange for HF, KF, EKF and IKF

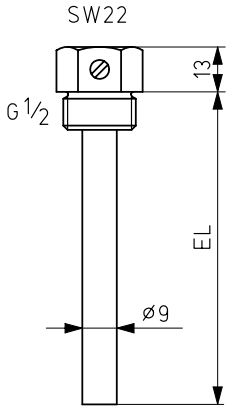
for sleeve sensors Ø 6 mm PVC and silicone, assembly-type and industrial duct sensors

For sensor technology

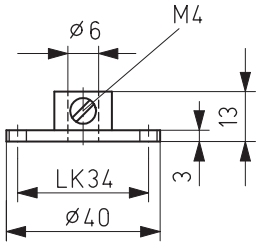
THMs



THV



MF



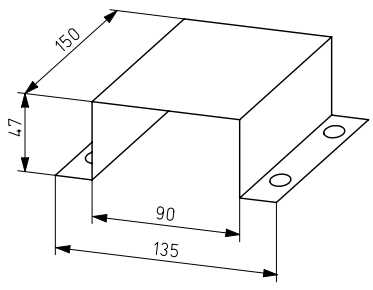
Type	Item no.	Fitting length EL	Diameter I x A*	Max. pressure (P/bar)	PG
Immersion sleeves, nickel-plated, with recess					
THMs/50	G 9990010	50 mm	6,5 x 8 mm	20	II
THMs/100	G 9990020	100 mm	6,5 x 8 mm	20	II
THMs/150	G 9990030	150 mm	6,5 x 8 mm	20	II
THMs/200	G 9990040	200 mm	6,5 x 8 mm	20	II
THMs/250	G 9990050	250 mm	6,5 x 8 mm	20	II
THMs/300	G 9990370	300 mm	6,5 x 8 mm	20	II
Immersion sleeves, stainless steel V4 A 1.4571					
THV/50	G 9990060	50 mm	6.3 x 9 mm	40	II
THV/100	G 9990070	100 mm	6.3 x 9 mm	40	II
THV/150	G 9990080	150 mm	6.3 x 9 mm	40	II
THV/200	G 9990090	200 mm	6.3 x 9 mm	40	II
THV/250	G 9990100	250 mm	6.3 x 9 mm	40	II
THV/300	G 9990200	300 mm	6.3 x 9 mm	40	II
THV/400	G 9990210	400 mm	6.3 x 9 mm	40	II
THV/450	G 9990470	450 mm	6.3 x 9 mm	40	II
THV/500	G 9990220	500 mm	6.3 x 9 mm	40	II
THV/600	G 9990400	600 mm	6.3 x 9 mm	40	II
Mounting flange, aluminium					
MF	G 9990160		6 x 40 mm		III

* I = minimum inner diameter
A = nominal outer diameter

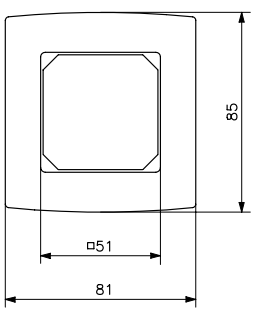
Accessories for heating technology / air conditioning technology / plant engineering and sensors

Type	Item no.	Description	PG
ATRS-1	C 1809518	Temperature determination set for ATR 83.0 ...	II
FS-HI	H 530975	Sensor protection (protective wire braiding) for duct hygrostat HI	II
FS2-HI	H 531011	PTFE filter fine protection for duct hygrostat HI	II
JZ-01 L	H 5309226	Single duct connection made of plastic (grey) Ø 6 mm outside for differential pressure switch JDW, JDL, pressure transducers	II
JZ-04	E 6160133	Capillary tube leadthrough for air ducts with 30-cm protective hose (JTF frost protection thermostats, JMT capillary controllers, WR, JET)	II
JZ-05/6 K	C 1809536	1 set of assembly brackets (6 pieces) for JTF frost protection thermostats made of plastic (max. 145 °C)	II
JZ-05/6 M	C 1809474	1 set of mounting brackets (6 pieces) for frost protection thermostats JTF, made of metal	II
JZ-05/1 M	C 1809462	single mounting bracket for frost protection thermostat JTF, made of metal	II
JZ-06/1	H 5309229	Connection set with duct connections made of plastic, 2 x 90° angles, 2 extensions 90 mm, 4 self-tapping screws, 2-m tube Ø 6 mm outside for JDW differential pressure switch, JDL, DF pressure transducer	II
JZ-07	E 6160145	Mounting bracket for frost protection thermostats JTF	II
JZ-08	E 6150031	Spare vane for wind indication relay JSL	II
JZ-09	E 6140170	Spare paddles (4 pieces), from 1"... 8" for flow monitor JSF	II
JZ-10	H 5309237	Mounting bracket for JDL 109/-113 and JDW-3/-5/-10 with 6 screws	II
JZ-13	ZA 990001	standard rail with drilled holes for fastening control cabinet controllers (length 40 mm)	II
JZ-17	MN 990001	Adapter plate for Berlin 3000 housing (hard-wired)	II
JZ-18	MN 990002	Adapter snap-on plate (controller is detachable) for Berlin 3000 housing (wireless)	II
JZ-19	MN 990003	Fully prewired plug-in socket (as for RTBSB-001.411), can be fitted with room thermostats RTBSB-001.086 or RTBSB-001.096	I
JZ-20-1	E 6130144	Wall holder including fastening material for duct hygrostat (HI), duct transducer TF, FF, FTF, air flow monitor JSL-20 K/21 K	II
JZ-24	BN 990002	Magnetic fastening set for simple and safe fastening of the multi-channel receivers or wiring strips	II
JZ-25	BN 990003	External antenna for reception enhancement under difficult reception conditions of the multi-channel receiver, antenna cable (JZ-26) is not a part of the delivery scope (see page 29 for product folio)	II
JZ-26	BN 990004	Antenna cable 1 m for connecting the external antenna JZ-25 with multi-channel receivers	II
JZ-27	G 9990450	LC-display 3½ digit, for MDEKD	III
JZ-28	H 531012	IP-65 cover set, consisting of a cover with pressure compensation element, O-ring and 3 screws, suitable for retrofitting of the types JDL-111, JDL-112, JDL-113, JDL-114, JDL-115 and JDL-116	II
JZ-090.900	VV 000025	alre frame “Berlin” for all flush-mounted controllers with cover 50 x 50 pure white, glossy, like RAL 9010	I
JZ-090.910	VV 000010	alre frame “Berlin” for all flush-mounted controllers with cover 50 x 50 pearl white, glossy, like RAL 1013	I
JZ-DA	H 5309230	Covering cap with external setting and seal for JDL-111, -112, -115, -116, -117, spare cap for JDL-11x A types	II
MUD-A ½"	G 9990190	Adapter G ¼" to G ½" for pressure transducer MUD	III
S protection 01	G9990170	Ball impact guard, sun and rain protection; 150 x 90 x 47 mm; stainless steel V4A 1.4571	III
WP-01	G 9990180	heat conduction paste 2 ml	II

S protection 01



alre frame “Berlin”



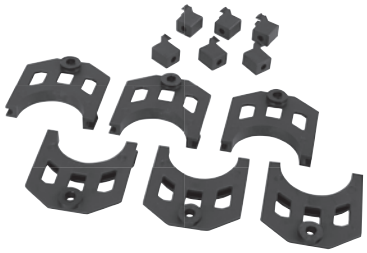
Accessories for heating technology / air conditioning technology / industrial applications and sensors

FS-HI

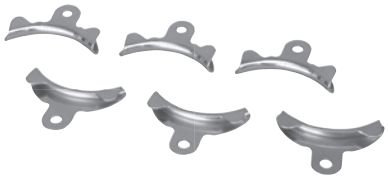
FS2-HI

JZ-04

JZ-05/6 K



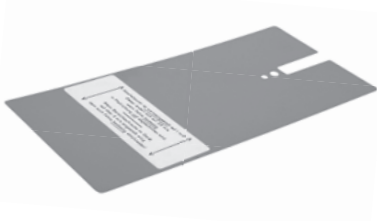
JZ-05/6 M



JZ-06/1

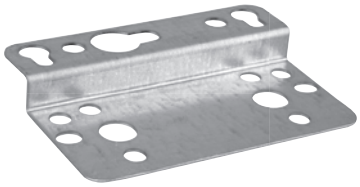
JZ-07

JZ-08



JZ-09

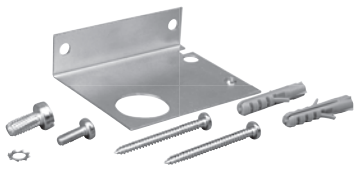
JZ-10



JZ-17

JZ-18

JZ-20-1



JZ-24

Type comparison old/new (JAT, JET and JRT)

Old alre types	Control range	Switching difference	New alre types	Control range	Switching difference
JAT-1F; JAT-6F	–15…+30 °C	2–20 K	**JAT-110F**	–35…+30 °C	2–20 K
			JAT-112*	–35…+30 °C	FT
			JAT-120F	0…60 °C	2–20 K
JAT-2NF; JAT-7NF	20…80 °C	2–20 K	**JAT-130F**	40…100 °C	2–20 K
JAT-3; JAT-5N	50…120 °C	3–16 K	phased out	alternative WR81.117-5	
JAT-5NF	50…120 °C	3–16 K	phased out	alternative WR81.117-5	
JAT-8	50…120 °C	ST	phased out		
JAT-4	100…200 °C	9–50 K	phased out		
JET-4X; JRT-8X;	–35…+30 °C	2–20 K			
JET-5X; JRT-5X	–35…+30 °C	1 K fixed	**JET-110X**	–35…+30 °C	2–20 K
JRT-8X(N)	–35…+30 °C	2–20 K	phased out		
JET-4XG; JRT-5XG	–35…+30 °C	2–20 K	phased out		
JET-4XF; JRT-8XF;	–35…+30 °C	2–20 K			
JET-5XF; JRT-5XF	–35…+30 °C	1 K fixed	**JET-110XF**	–35…+30 °C	2–20 K
JRT-7XG	–35…+30 °C	FT	phased out		
JET-7X; JRT-11X;	0…60 °C	2–20 K			
JET-8X; JRT-9X	0…60 °C	1 K fixed	**JET-120X**	0…60 °C	2–20 K
JET-7XG; JRT-11XG	0…60 °C	2–20 K	**JET-120XG**	0…60 °C	2–20 K
JET-7XF; JRT-11XF;	0…60 °C	2–20 K			
JET-8XF; JRT-9XF	0…60 °C	1 K fixed	**JET-120XF**	0…60 °C	2–20 K
JET-7XFG; JRT-9XG	0…60 °C	div.	phased out		
JET-16XN;	40…100 °C	2–20 K			
JET-17XN; JRT-14XN	40…100 °C	1 K fixed	**JET-130X**	40…100 °C	2–20 K
JET-16XNG; JRT-14XG	40…100 °C	div.	**JET-130XG**	40…100 °C	2–20 K
JET-16XNF;	40…100 °C	2–20 K			
JET-17XNF; JRT-14XNF	40…100 °C	1 K fixed	**JET-130XF**	40…100 °C	2–20 K
JET-18XN; JRT-17XN	40…100 °C	ST	**JET-133X**	40…100 °C	ST
JET-18XNF	40…100 °C	ST	**JET-133XF**	40…100 °C	ST
JET-10X; JRT-12XN;	70…130 °C	2–20 K	**JET-140X**	70…130 °C	2–20 K
			JET-140XF	70…130 °C	2–20 K
JET-12XF	70…130 °C	ST	**JET-143XF**	70…130 °C	ST
JET-13; JRT-13A	100…280 °C	8–50 K	**JET-150**	100…280 °C	8–50 K
JET-13F	100…280 °C	8–50 K	**JET-150F**	100…280 °C	8–50 K
JET-15	100…280 °C	ST	**JET-153**	100…280 °C	ST
			JET-153F	100…280 °C	ST
JET-20N; JRT-21N;	–35…+20 °C	2–15 K			
JET-21N; JRT-20N;	–35…+20 °C	1 K fixed			
JET-22; JRT-26	–15…+30 °C	2–15 K			
JET-23; JRT-22	–15…+30 °C	1 K fixed	**JET-110R**	–35…+30 °C	2–20 K
JET-20NF;	–35…+20 °C	2–15 K			
JET-21NF; JRT-20NF	–35…+20 °C	1 K fixed			
JET-22F; JRT-26F	–15…+30 °C	2–15 K			
JET-23F; JRT-22F	–15…+30 °C	1 K fixed	**JET-110RF**	–35…+30 °C	2–20 K
JET-24; JRT-27;	10…55 °C	2–15 K			
JET-25; JRT-24	10…55 °C	1 K fixed	**JET-120R**	0…60 °C	2–20 K
JET-24F; JRT-27F	10…55 °C	2–15 K			
JET-26F;	25…55 °C	2–15 K			
JET-25F; JRT-24F	10…55 °C	1 K fixed	**JET-120RF**	0…60 °C	2–20 K
JRT-27FH	10…55 °C	3 K fixed			

* Will be discontinued

Tips for heating installers and electricians

Berlin 1000/2000/3000 – bimetal

Problem	Cause
Large temperature variation present in the room (approx. 5 – 8 K).	1.) The neutral conductor N is not connected to terminal 4 of the controller. 2.) The neutral conductor N is connected to terminal 4 of the controller, but not in the distribution system (distribution box, fuse box).
The setting knob (setpoint transmitter) must be set higher than the desired room temperature.	1.) Incoming and outgoing (switched) phase have been interchanged. As a result, the feedback resistor continuously carries a voltage and acts like a temperature reducer in the room. Moreover, the temperature variation is very high (approx. 5 – 8 K) 2.) The heating output is dimensioned too low for the room. As a result of this, the power-on time of the controller is too long; the feedback resistor is thus switched on for too long and acts as a temperature reducer in the room. 3.) External heat sources are influencing the controller (for example, the sun, TV, lamp etc.). These external heat sources cause the controller to register a higher-than-actual temperature and, as a result, the room is not heated sufficiently.
The setting knob (setpoint transmitter) must be set lower than the desired room temperature.	1.) The controller has been installed, for example, behind a curtain or on an outer wall or next to a door. The controller registers a lower-than-actual temperature and, as a result, the room is overheated.
The room does not become warm.	1.) Faulty actuator element, actuator element does not open the valve. 2.) There may be coarse construction site dirt in the controller. This dirt is preventing the contact from closing. 3.) The controllers of two rooms have been connected in series. These rooms only become warm when both controller contacts are closed.

Other notes:

1.) Particularly with floor heating, it is important to remember that there are very long reaction times. Therefore, the room heats up very slowly and also cools slowly (incident sunlight, for example, results in overheating). Therefore, do not expect that a cold room will reach the desired room temperature within a short time after having set the adjusting knob to a high value.

2.) Also, with well insulated rooms, remember that the room temperature drops very slowly. As a result, it can happen that at night, despite “Reduced operation” (for example, 4 K lower), the room temperature drops only a little and the heating therefore does not get activated for a prolonged time.

3.) Very often, the function of bimetal controllers is impaired or rendered completely useless by construction site dirt that has penetrated into them. Therefore, the controllers should be installed only after any required spatula, painting or wallpapering work. Avoid drilling dust without fail.

Plant engineering

Note for connecting industrial thermostats and controllers to PLC or DDC:

For connecting industrial thermostats and controllers to programmable logic controllers (PLC) or direct digital controls (DDC), the use of normal commercial coupling relays with 230 V~ coil voltage and gold-plated switching contacts is recommended.

Sensor characteristic curves – table of sensor values

Temperature	PT 100	PT 1000	NI 1000	NI 1000 TK 5000	LM 235 Z
°C	Ω	Ω	Ω	Ω	mVolt
–50	80.30	803.00	742.55	790.88	2232.00
–45	82.30	823.00	766.76	810.75	
–40	84.30	843.00	791.31	830.84	2332.00
–35	86.20	862.00	816.21	851.15	
–30	88.20	882.00	841.46	871.69	2432.00
–25	90.20	902.00	867.04	892.47	
–20	92.20	922.00	892.96	913.48	2532.00
–15	94.10	941.00	919.22	934.74	
–10	96.10	961.00	945.82	956.24	2632.00
–5	98.00	980.00	972.74	977.99	
0	100.00	1000.00	1000.00	1000.00	2732.00
5	102.00	1020.00	1027.59	1022.26	
10	103.90	1039.00	1055.52	1044.79	2832.00
15	105.80	1058.00	1083.77	1067.59	
20	107.80	1078.00	1112.36	1090.65	932.00
25	109.70	1097.00	1141.29	1113.99	2982.00
30	111.70	1117.00	1170.56	1137.62	3032.00
35	113.60	1136.00	1200.16	1161.52	
40	115.50	1155.00	1230.11	1185.71	3132.00
45	117.50	1175.00	1260.41	1210.20	
50	119.40	1194.00	1291.05	1234.98	3232.00
55	121.30	1213.00	1322.05	1260.06	
60	123.20	1232.00	1353.40	1285.45	3332.00
65	125.50	1252.00	1385.12	1311.14	
70	127.10	1271.00	1417.21	1337.15	3432.00
75	129.00	1290.00	1449.67	1363.47	
80	130.90	1309.00	1482.50	1390.12	3532.00
85	132.80	1328.00	1515.73	1417.09	
90	134.70	1347.00	1549.34	1444.39	3632.00
95	136.60	1366.00	1583.36	1472.03	
100	138.50	1385.00	1617.79	1500.00	3732.00
105	140.40	1404.00	1652.62	1528.32	
110	142.30	1423.00	1687.89	1556.98	3832.00
115	144.20	1442.00	1723.58	1586.00	
120	146.10	1461.00	1759.72	1615.37	3932.00
125	148.00	1480.00	1796.30	1645.10	
130	149.80	1498.00	1833.35	1675.19	
140	153.60	1536.00	1908.87	1736.48	
150	157.30	1573.00	1986.35	1799.27	

Sensor characteristic curves – table of sensor values

Temperature	Sensor 0 NTC 2K25	Sensor 1 NTC 1KO	Sensor 2 NTC 47K	Sensor 3 NTC 8K	Sensor 4 NTC 10K	Sensor 5 NTC 50K	Sensor 6 NTC 100K	Sensor 8 NTC 2K	Sensor 51 KTY 81-121	Sensor 57 KTY 11-7
°C	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω
–50	151398	32540	3152409	537827	672283	2820844	8276704	77977	510	1051
–45	106557	24432	2230085	378534	473168	2027885	5751387	57655	535	1103
–40	75923	18515	1595524	269709	337137	1473182	4044707	43039	562	1156
–35	54731	14156	1153886	194427	243033	1080969	2877133	32427	589	1212
–30	39895	10916	843120	141724	177155	800794	2069021	24651	617	1269
–25	29390	8486	622133	104107	130508	598684	1503450	18902	647	1328
–20	21871	6648	463401	77696	97120	451517	1103398	14615	677	1390
–15	16434	5248	348285	58379	72973	343390	817535	11391	708	1453
–10	12462	4172	264028	44269	55337	263262	611269	8947	740	1518
–5	9533	3340	201812	33866	42333	203390	461045	7079	773	1586
0	7355	2691	155480	26126	32658	158300	350656	5642	807	1655
5	5719	2182	120696	20318	25397	124082	268840	4527	842	1726
10	4482	1780	94377	15923	19903	97925	207702	3657	877	1799
15	3539	1460	74314	12570	15713	77789	161654	2973	914	1874
20	2813	1205	58910	9994	12492	62184	126708	2431	951	1951
25	2252	1000	47000	8000	10000	50000	100000	2000	990	2030
30	1814	834	37732	6445	8056	40455	79428	1654	1029	2111
35	1471	699	30472	5224	6530	32910	63489	1376	1070	2194
40	1199	588	24750	4260	5325	26916	51056	1151	1111	2279
45	984	498	20214	3494	4368	22129	41297	967	1153	2366
50	811	423	16597	2882	3602	18285	33591	816	1196	2456
55	673	361	13697	2389	2986	15182	27470	693	1241	2545
60	560	309	11360	1991	2488	12664	22582	590	1286	2638
65	469	266	9466	1667	2084	10612	18656	505	1331	2733
70	395	230	7925	1402	1753	8931	15478	434	1378	2829
75	334	199	6664	1185	1481	7547	12917	374	1426	2928
80	283	173	5627	1006	1258	6404	10821	324	1475	3029
85	241	151	4771	857	1072	5456	9105	282	1525	3131
90	207	133	4062	734	917	4665	7693	246	1575	3236
95	177	117	3471	631	788	4004	6527	215	1627	3342
100	153	103	2978	544	680	3448	5559	189	1679	3451
105	132	91	2563	471	588	2980	4752	167	1732	3561
110	115	81	2215	409	511	2584	4077	147	1786	3674
115	100	72	1919	356	445	2248	3511	130	1841	3788
120	88	64	1669	12	389	1962	3033	116	1896	3905
125	77	57	1456	273	342	1717	2629	103	1950	4023
130	68	51	1274	240	301	1507	2287	91	2003	4143
140	53	41	984	188	235	1171	1745	73	2103	4390
150	42	34	769	148	185	920	1348	60	2189	4644

Technical terms

Range limitation (mechanical):

Below the adjusting knob, there are “setting flags” (red/blue) for mechanically delimiting the min./max. temperature range.
In this manner, an undesired mis-setting of the setpoint can be prevented, for example, in children’s rooms or public buildings.

Bimetal:

Thermo-bimetal is generally constructed of layers of metal or alloys of more or less the same thickness, which are firmly joined to one another and have different coefficients of thermal elongation. As a result, they bend under temperature changes, so that upon heating, the side with the component that has a lower heat elongation becomes hollow. The heat is transferred by conduction, radiation or convection from the surroundings (indirect heating).

Defrosting:

Defrosting is the regular de-icing or heating up of the heat exchanger or cooling unit to maintain efficient operation of the system.

Intrinsic safety (JTU, JTL)

Intrinsic safety / protection against cold: The devices are intrinsically safe, i.e., upon loss of the sensor medium owing to sensor rupture, for example, the burner is switched off. Since minus temperatures generate the same effect through volume reduction of the sensor medium, the devices are adjusted by means of the “cold screw” such that they switch off the burner only at temperatures below –15 °C. They can only be switched on again manually at temperatures above approx. –5 °C by means of the manual reset button.

Air conditioner, 2-pipe fan convector (fan coil):

The 2-pipe air conditioners are supplied with heating or cooling water for heat exchange, depending on the requirement, through the same pipe system via 2 pipes (inflow and outflow).

Air conditioner, 4-pipe fan convector (fan coil):

The 4-pipe air conditioners are supplied with heating or cooling water for heat exchange, depending on the requirement, through a heating circuit and a cooling circuit (4 pipes).

Cooling ceiling:

The cooling ceiling belongs to the group of panel heaters. Cooling ceilings are used often in office spaces for passive cooling. In such systems, cold water (usually at 16 °C) flows through a network of pipes and cools the room air. Lower inflow temperatures are not possible because of condensation water formation.

Neutral zone:

The control range in which neither heating nor cooling takes place is called the neutral zone.

Break contact (bimetal):

The control contact opens with increasing temperature and closes at dropping temperature (for “heating”).

Proportional band (p-band):

The proportional band is the range around the target temperature within which the controller delivers a steady output signal. This means that the room temperature is kept more or less constant within the proportional band by the controller (if the heating capacity is sufficient).

2-point control (ON/OFF control):

Control algorithm which, for example, switches off the output when the set temperature is exceeded and switches it on again when the current temperature falls short of the setpoint value. The temperature in the room is always subject to certain variations (control deviations). This deviation results from the switching temperature difference of the controller and the properties of the room, such as heating speed, heat loss etc.

3-point control:

In a 3-point control system, the controller can change between the operating modes heating, neutral zone and cooling.

PWM (pulse width modulation):

Process for generating a continuous-like transmission behaviour in a control path. By varying the power-on time at the input, owing to the time constant of the transmission path, a continuous-like (smooth) signal waveform is generated at its output.

Switching difference (hysteresis):

Difference between the switching on and switching off of the heater or the controller.
a) There is the switching temperature difference of the controller, which depends on the construction of the device.
b) There is the switching temperature difference of the room, which is dependent on the behaviour of the entire control path, i.e. on the floor design, the action of external heat sources, the installation location of the controller and the controller itself.
The switching temperature difference always refers to the controller. It does not express the actual switching temperature difference of the control path. The latter changes according to the deployment location and conditions. Any indoor temperature is constantly subject to variations. This deviation results from the switching temperature difference of the controller and the properties of the room, such as heating speed, heat loss etc.

Technical terms

NO contact (bimetal):

NO contact (bimetal): The control contact closes with increasing temperature and opens at dropping temperature (for “cooling”).

Changeover/toggler (bimetal):

This is a changeover/toggler with an NC contact and an NO contact. It operates as described for NC and NC contacts.

Split unit/Multi-split unit:

Split AC units consist of at least two heat exchangers in which one is installed as a vaporiser in the rooms to be cooled and the other serves as a condenser for heat dissipation. Most split units allow reverse operation for heating the rooms if this is required. Multi-split units consist of several vaporisers connected to a condenser (liquefier).

Valve actuator:

Electrical controllable valve for regulating, for example, the hot water flow in heating systems.
A distinction is made here between ON/OFF valve actuators and proportional valve actuators.
Proportional valves are designed for connecting controllers with a continuous control mode.

Continuous control:

The controller provides an analogue output signal. The value of the output signal changes continuously, i.e., without any steps or jumps, in response to the output signal.

Temperature reduction (TR):

The TR is also implemented via a resistor, as is the case with thermal recirculation. This resistor is activated manually or by a timer. As a result, the bimetal is made to feel a simulated temperature that is about 4 K higher than the actual temperature in the room. Consequently, in a room with a controller setting of, for example, 20 °C, the temperature in the room can drop to a value 4 K lower, to max. 16 °C. If the temperature drops further, the heating system switches on again, and at > 16 °C, it gets switched off. The magnitude of the temperature reduction to be actually achieved depends on the insulation of the building and the reduction period (one night, weekend, holiday).

Thermal recirculation (RF):

By means of an additional integrated heating resistor, the controller is made to switch off at the right time during the heating process.
As a result, exceeding the desired room temperature is minimised, and there is a smaller switching difference.

Heat pump:

Rooms can be cooled or heated with heat pumps. Modern systems allow efficient heating and cooling operation since they allow reversible process reversing.

Reversing valve:

A reversing valve (4-way control valve) facilitates a reversing cycle by turning the condenser (liquefier) into an evaporator which causes the cooling unit to heat up or defrost.

Valve and pump protection function:

The valve and pump protection function serves to prevent the valve seat and/or the pump(s) from corroding up during longer stop times. If using the device for the control of warm-water heating systems, activating the valveprotection function is recommended. After activation of the valve and pump protection function, the controller actuates the valve(s) or triggers a heating pump every Monday between 11.00 and 12.00 o’clock a.m. over a 5 minute time period. The valve and pump protection function is rendered active only if no heating operations were executed within the last week. Unnecessary heating during the heating season is thus avoided, thereby leaving the control system unaffected.

Evaporator/Liquefier:

A liquefier or condenser is a heat exchanger in a cooling unit that liquefies a gaseous medium through the dissipation of heat. Usually, further cooling of the cooling agent takes place in the liquefier. According to the definition of terms in the European Standard EN 378 Part 1, the condenser in cooling units is called the liquefier in order to easily distinguish it from an electrical condenser. The vaporiser implements the opposite process, evaporating the liquid medium by heating it up.

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Terms and conditions of sale and supply

General: We supply ex works in accordance with the familiar “General conditions for the supply of products and services of the electrical and electronics industry”, in the valid version at the time the contract is concluded, with the addition of the “Supplementary stipulation: Extended retention of title”, which we can make available if desired. These “General conditions for the supply of products and services of the electrical and electronics industry” apply together with the following terms and conditions of sale and supply, but with the stipulation that in case of contradictions between the “General conditions for the supply of products and services of the electrical and electronics industry” and our terms and conditions of sale and supply, the latter shall apply. Upon acceptance of the order, these “General conditions for the supply of products and services of the electrical and electronics industry” as well as our terms and conditions of sale and supply come into force in place of any terms and conditions of purchase of the customer, even if, according to these terms and conditions of the supplier, acceptance of the order is supposed to indicate recognition of these terms and conditions of purchase. By accepting our order confirmation without contradiction, the buyer agrees to renounce the demurrer derived from his terms and conditions of purchase; we accept this renunciation. Our conditions also apply to all future business relationships, even if they are not expressly agreed again. At a time not later than acceptance of the delivery or service by the buyer, our conditions will be considered to have once again been accepted. Any confirmation of the buyer with a reference to his terms and conditions of purchase is hereby rendered null and void. Deviations from our terms and conditions are only valid if they have been agreed to by us in writing.

1. Quotes: Our quotes are subject to change and without obligation. Declarations of acceptance and purchase orders need our written confirmation for them to become legally valid; the same applies to supplements, changes and subsidiary agreements. Drawings, illustrations, dimensions and other performance data are only binding if they are agreed expressly in writing.

2. Prices: The prices quoted by us are the prices ex works, plus the applicable value added tax. Packing, freight, insurance and customs costs are not included. If there is a substantial change in the material prices, the wages, salaries, freight, taxes and tolls or other cost-determining factors between the time of the contract sign-off and the delivery date, we reserve the right to apply a corresponding reasonable price increase.

3. Delivery: Due dates and deadlines specified by us are only approximate and non-binding, unless there is an express agreement to the contrary. We are not responsible for delays in delivery and performance owing to force majeure and circumstances beyond our control that render the delivery significantly more difficult or impossible – this includes, in particular, subsequent difficulties in procuring materials, operational disturbances, strikes, blockades, shortage of personnel, shortage of transport, governmental directives, also if such circumstances affect our suppliers or their sup-suppliers – even if binding due dates and deadlines have been agreed. Such circumstances entitle us to postpone the delivery and performance, or to withdraw partially or entirely from the contract. In such a case, the buyer will be informed about this situation without delay. In case of withdrawal, any payments that have been made will be returned immediately. If we are responsible for not complying with agreed, binding due dates and deadlines, the buyer, if he can prove loss owing to the delay, is entitled to damage compensation of 0.5% for every completed week of the delay, subject however to a maximum of 5% of the invoice value of the deliveries and services affected by the delay. Any additional claims, especially damage compensation claims of the buyer owing to delays in the supply or also damage compensation claims instead of the performance, which exceed the limits specified above, are excluded in all cases of delayed
delivery. This does not apply to mandatory liability in case of wilful intent, gross negligence or in case of loss of life, bodily injuries or harm to health. We are entitled to make partial deliveries or to partial performance at all times.
For technical production-related reasons, we reserve the right to supply excess or short deliveries of up to 10% of the agreed ordered quantity. Compliance with exact quantities cannot be demanded.

4. Packaging: The packaging will be charged according to actual expenses and will not be taken back, unless this is required by law. If certain specially marked solid packing containers are returned freight-paid, a reasonable credit note will be issued.

5. Payment: Our invoices are payable 14 days 2 % discount, 30 days net. From the 31st day after the invoice date, the buyer will owe penal interest at the rate being charged by the commercial banks for overdrafts on current accounts, subject, however, to a minimum of 5% above the base rate, plus the applicable value added tax. We are entitled to offset payments from the buyer against his older or less well secured debts first, despite there being stipulations to the contrary from the buyer. If costs and interest have already been incurred, we are entitled to set off the payment first against the costs, then against the interest and then against the principal. A payment is considered to have been made only after we have access to the funds. In case of submission of a cheque, only after realisation of the cheque. Bills do not hold good as payments, they will only be accepted as fulfilment. Orders from buyers unknown to us will only be accepted with advance payment or with cash on delivery. If the buyer does not meet any of his payment obligations, or if a cheque issued by him is not honoured, or if he stops making payments, or if there is a bill protest, or if we receive information on steps being initiated to force payment, or on any other circumstances that cast doubt on the creditworthiness of the buyer, all invoice amounts become due immediately, with the nullification of all agreed payment periods. In such a case, we are entitled to demand advance payments or collateral. The buyer can only withhold a payment if the defect has been recognised or is obvious, but only to the extent of the probable costs of correcting the defect as regards the individual defective object. The acceptance of a payment reminder is considered acceptance of the balance contained therein, unless contested in writing within one week.

6. Retention of title: Until such time as all the claims due to us from the buyer for any legal reason are fulfilled, the following collateral will be provided to us, which we shall release only upon request from the buyer by his choice, provided their value sustainably exceeds existing and identifiable future claims by more than 20%. The supplied goods remain our property, and processing and transfiguration always take place for us as the manufacturer, but without any obligation for us. If our ownership title expires through incorporation, it is agreed at this point that ownership of the buyer in the resulting item shall be transferred to us in proportion to the invoice value. The buyer will hold our property free of cost. Goods which are our property or partially our property in this manner are reserved goods. The buyer is entitled to process and sell the reserved goods in the normal course of business,
provided there has been no delay on his part in making payments to us. Pledging and transfer as collateral are not permitted. The buyer assigns to us, right at this stage, the claims in their entirety arising from the onward sale or from any other legal reason regarding the reserved goods
by way of security. The buyer empowers us to collect such claims on our account in the buyer's own name. If so required by us, the buyer will disclose the assignment to us and provide us with the required documents and information. If a third party accesses these reserved goods, the buyer will indicate that it is our property and inform us immediately. If the goods are transferred, whether processed or unprocessed, the buyer undertakes to similarly retain ownership through simple and extended retention of title. In case of violation of the contract by the buyer, especially delay in payment, we are entitled to take back the reserved goods at the cost of the buyer, or to institute a claim for return on a third party. The reclaiming or attaching of the reserved goods by us does not constitute a withdrawal from the contract, provided that the Consumer Credit Act (Verbraucherkreditgesetz) is not applicable.

7. Complaints: Claims against defects lapse after six months. This does not apply if the law compulsorily prescribes longer periods, or in cases of loss of life, bodily injuries or harm to health, in case of violation of obligations with wilful intent or gross negligence, and in case of fraudulent concealment of a defect. Damage compensation claims are otherwise covered by Clause 9 (Limitation of liability) of our terms and conditions of supply. The buyer is obliged to immediately inspect our delivery. Claims against defects can only be filed if the complaint is made in writing not later than one week after receipt of the goods. If our operating or assembly instructions or other instructions were not followed, or if changes are made to or repair work is carried out on our products, or parts replaced, or if our products are used contrary to the contractually required suitability, there will be no entitlements because of defects. The same applies if the buyer, in a manner that is not transparent to us, joins, mixes or processes our products, contrary to their normal and/or usual suitability, with his products or products of third parties, or uses our products contrary to the state of science and technology, or in any other manner contrary to their normal and/or usual suitability. All the information that we provide about the function and quality of our products in quotes, catalogues and other product descriptions refer exclusively to the results of examinations in standard and recognised laboratory conditions; we accept liability only to that extent, but not for the specific respective use by the buyer. In case of material defects, we may, at our discretion, replace the defective part by means of a free delivery of the replacement, or repair the part through our contractor at the buyer's premises. Repair or replacement is conditional upon the buyer having paid a reasonable proportion of the purchase price, taking the defect into consideration. When we supply a defect-free product for the purposes of replacement, the buyer must return the previously supplied defective product to us. For warranty claims, the product has to be delivered to us. If expressly desired by the buyer and if a corresponding purchase order is issued, we will also perform work on-site. The service deployment will be charged on the basis of our current "Service charges table". The calculation will be performed regardless of whether there is a warranty claim. Any other claims by the buyer, especially damage compensation claims, regardless of the legal reason, are excluded. This does not apply in case of mandatory liability in case of wilful intent, gross negligence or in case of loss of life, bodily injuries or harm to health.

8. Drawings, samples, designs, technical illustrations and similar documents will remain our property and may neither be used elsewhere nor disclosed to third parties without express written permission. Software may not be copied, nor be used directly or indirectly for any purpose other than the purpose of the contract related to the delivery.

9. Limitation of liability: Damage and expense reimbursement claims (in short: damage compensation claims), no matter for what legal reason, especially owing to violation of responsibilities from the contract obligation, and to impermissible actions, are excluded. This does not apply in cases where there is a mandatory liability, for example, according to the Product Liability Act, in case of wilful intent, gross negligence or in case of loss of life, bodily injuries or harm to health or in case of violation of essential contractual obligations. However, the damage compensation claim for the violation of essential contractual obligations is limited to the foreseeable damage typical for the contract, unless there is wilful intent, gross negligence or in case of loss of life, bodily injuries or harm to health. If the buyer is entitled to damage compensation claims according to this Clause 9, these will also lapse after six months. Damage compensation claims according to the Product Liability Law are subject to the legal statute of limitations, if they are mandatory.

10. Final provision: The laws of the Federal Republic of Germany apply to the legal relationship between us and the buyer. The place of fulfilment for the delivery and payment is Berlin. Insofar as is legally permissible, Berlin is the exclusive place of jurisdiction for all disputes arising directly or indirectly from the contractual relationship. If individual provisions of these terms and conditions of business or other conditions become invalid, the applicability of all the other provisions or conditions and the entire contract shall not be affected. The invalid provisions shall be replaced by another, which will achieve the intended financial purpose in a permissible manner. The German version is decisive for the meaning and explanation in case of any lack of clarity.

Safety regulations

When handling products, the applicable EU Directives and the assembly and installation instructions in the operating manuals must be followed without fail.

Notes on the technical data

The technical data specified in the catalogue were determined in laboratory conditions in accordance with the applicable standards. Only to that extent are the properties assured. All the equipment and components shown in this catalogue may only be used in keeping with their intended purpose. Testing for suitability for the purpose intended by the customer or for the use of the part under usage conditions is the responsibility of the customer; we do not provide any kind of guarantee.

We reserve the right to make changes to products and documentation as may be required for technical progress and continuous improvement and therefore, there may be deviations from the information in the catalogue. Printing errors excepted.

This price list is valid from 01.01.2018. This price list supersedes all previous price lists and renders them invalid.

We reserve the right to make changes.

General notes

REACH, RoHS, WEEE

The EU is striving to make the trade of chemical substances as safe as possible. This is based on the guiding principle of a “knowledge-based economy”. As part of this effort, the EU Commission has introduced a new chemical policy: REACH. This directive provides rules for the registering, assessing and approving of chemicals produced in or imported to the EU in quantities of 1 t/a or higher.

Alre-IT Regeltechnik is not subject to this new directive since the amount of chemicals used in our products is significantly less than a metric ton per annum.

We further hereby confirm that all our products subject to the directives of RoHS as well as WEEE (2002/96/EC) comply with the corresponding requirements.

Product testing

For information on our declarations of conformity and various product tests, please visit our website at www.alre.de.

Notes

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Notes

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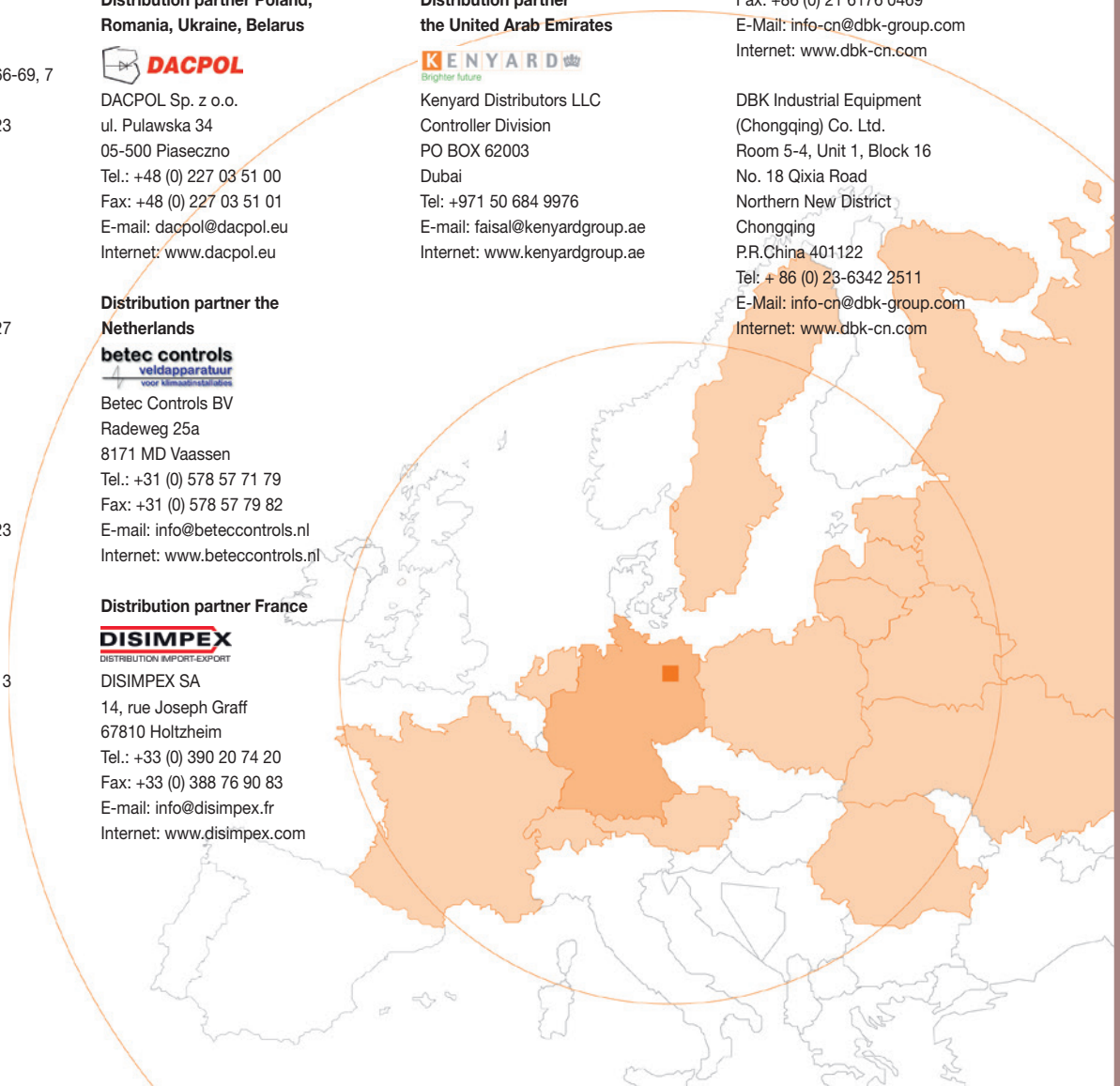

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EN/01-2018/1000