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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

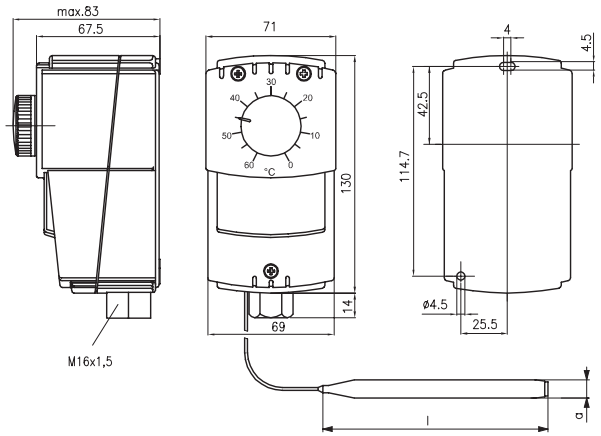
For protecting coils and immersion sleeves, see the “Accessories/miscellaneous” section.
Immersion sleeves are not included in the delivery.
for types with “X” in the type specification: TH/NTH-140
for types without “X” in the type specification: TH/NTH-100/200/280

Single-stage capillary thermostats JET-1

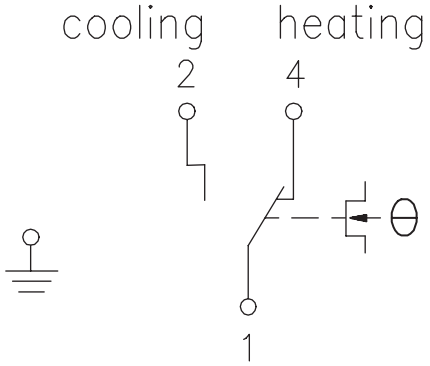
Temperature monitor (TW)

Temperature limiter (TB)

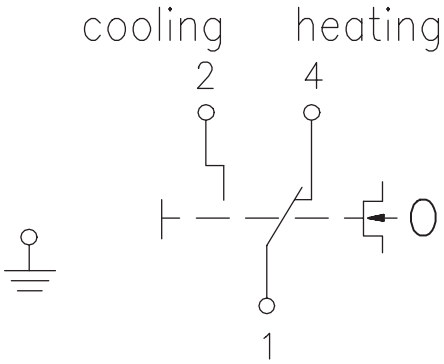
Temperature controller (TR)



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

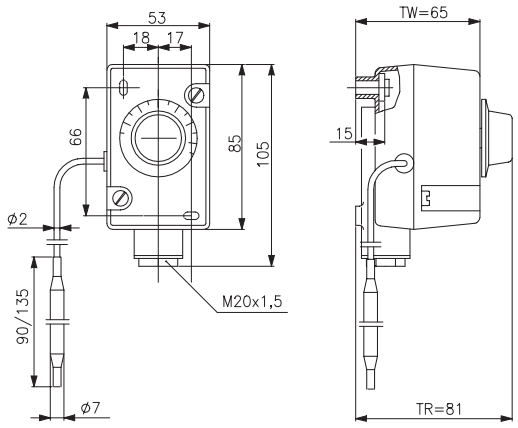
TR = temperature controller, TW = temperature monitor

Accessories

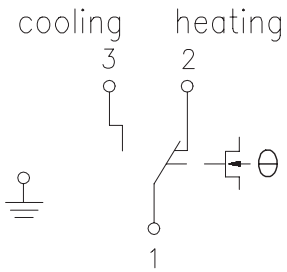
For immersion sleeves (TH-100/200/280, NTH-100/200/280) and protecting coils (SW-200), see the “Accessories/miscellaneous” section.

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.

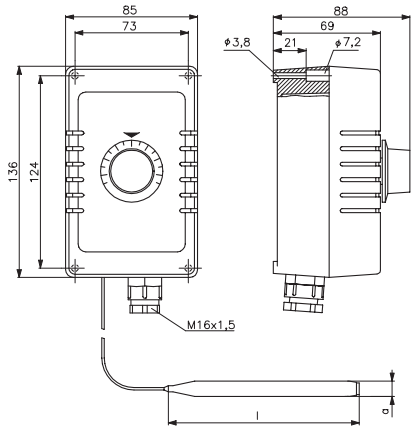
Type	Item no.	Control range	Hysteresis in the stage (approx.)	Sensor a x l (mm)	Features	PG
JMT-206 X	E 6060340	20…80 °C	1 K	9.6 x 122 mm	external setting, TR	II

TR = temperature controller

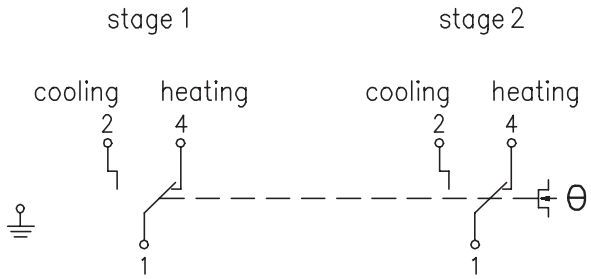
Accessories

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)

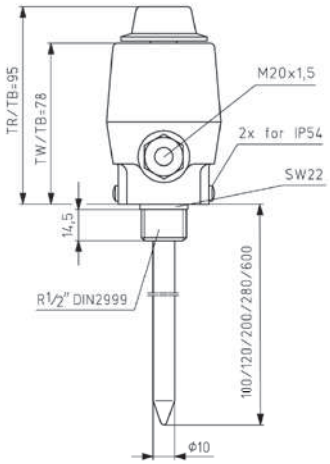
Capillary thermostats as boiler controller KR 80

Capillary system – **TÜV-tested**

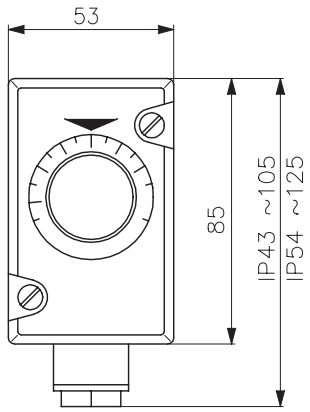
KR 80.108-1

KR 80.207

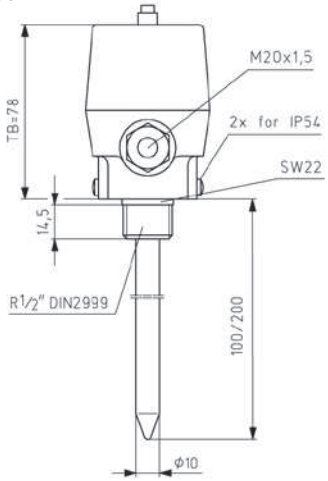
KR 80. ...



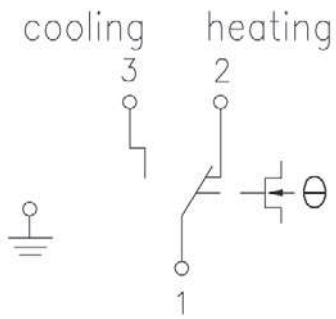
KR 80. ...



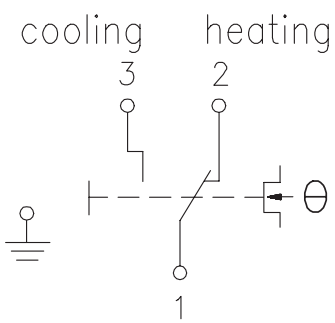
KR 80.2..



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.

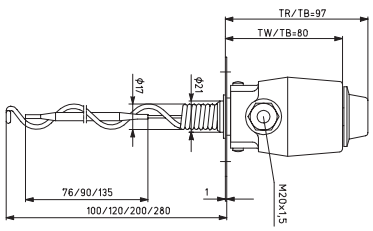
Mounting / attachment:
on the installed protecting coil with a system connection

Type testing by TÜV in accordance with DIN EN 14597

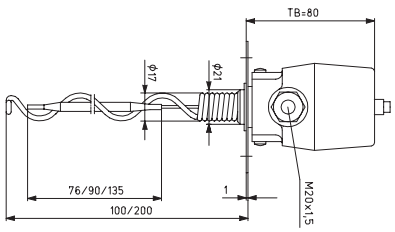
Type	Item no.	Control range	Hysteresis (approx.)	Length of protecting coil	Features	PG
LR 80.003-1	C 1801800	0…35 °C	1 K	120 mm	external setting, TR	II
LR 80.108-1	C 1801801	0…35 °C	1 K	120 mm	internal setting, TW	II
LR 80.109-1	C 1801810	0…35 °C	1 K	200 mm	internal setting, TW	II
LR 80.028-2	C 1801807	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)

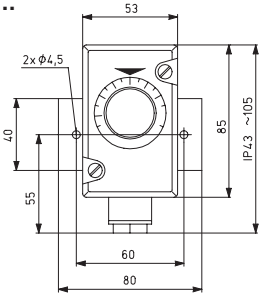
LR 80. ... (TR/TW)



LR 80.2.. (TB)

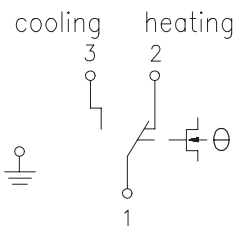


LR 80.…

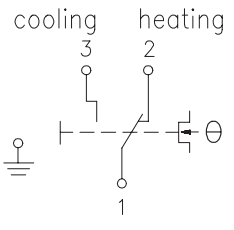


LR 80.108-1

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.

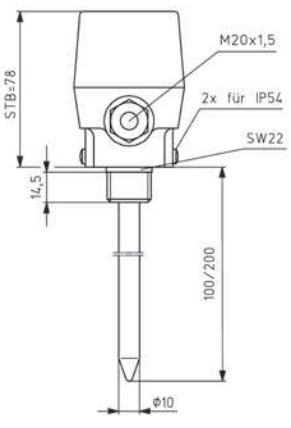
Sensor rupture safeguarding: Triggered at –15 °C

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

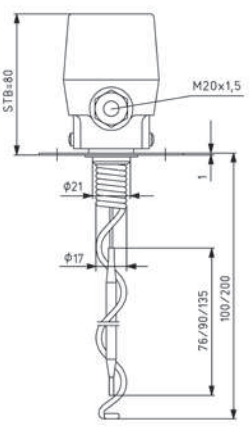
Type testing by TÜV in accordance with DIN EN 14597

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

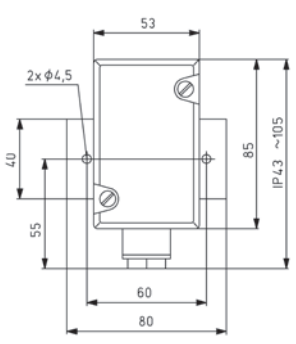
KR 80.3..



LR 80.3..

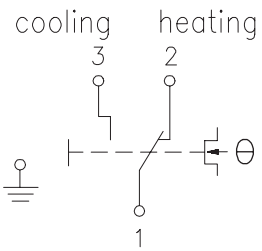


KR 80.3..*/LR 80.3..



*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

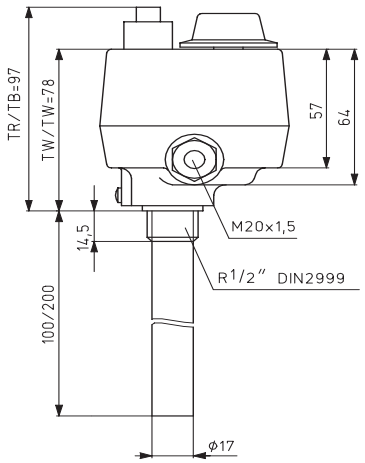
** Control function heating (prewired) or cooling, gets locked when temperature rises, manual reset after temperature drop of at least 8 K

Capillary thermostats as boiler dual controllers KR 85

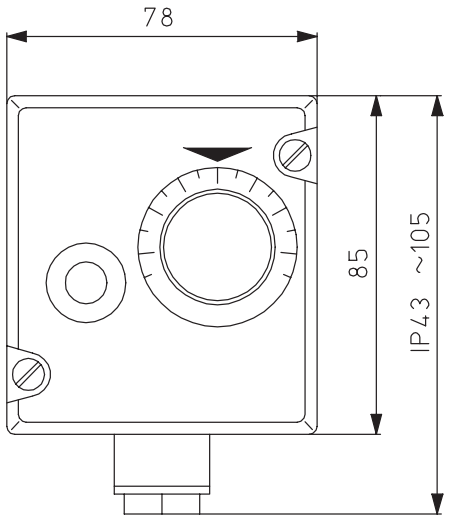
Capillary system – **TÜV-tested**

KR 85.4..

KR 85....



KR 85....



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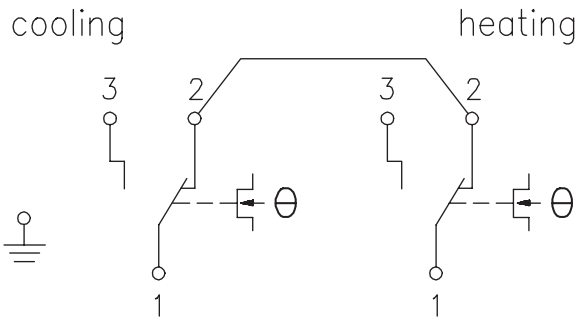
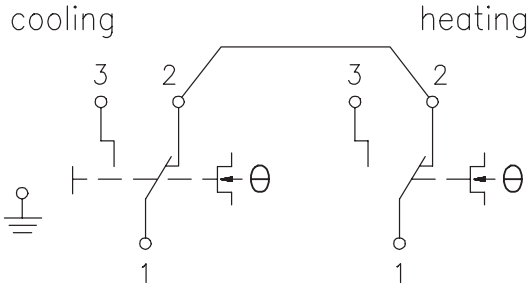


KR 85.2...



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

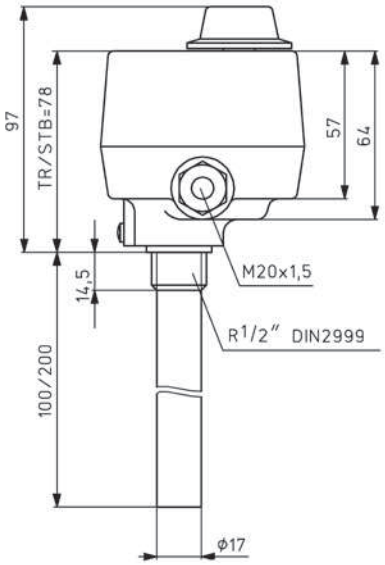
TR = temperature controller, STB = safety temperature limiter

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

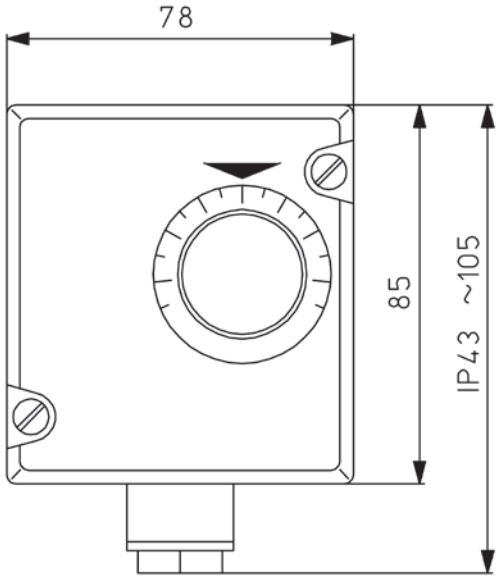
Capillary system – **TÜV-tested**

LR 85.3

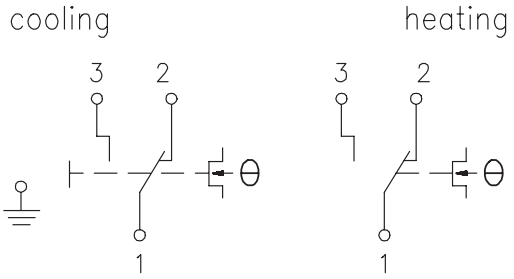
KR 85.3



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

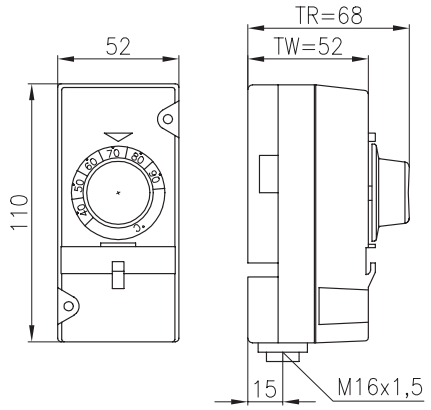
TR = temperature controller, TW = temperature monitor

Contact thermostats ATR 83, JAT-1, WR 81

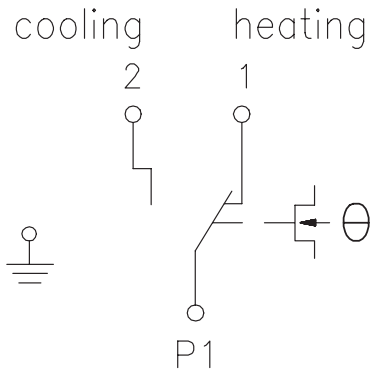
Capillary system

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

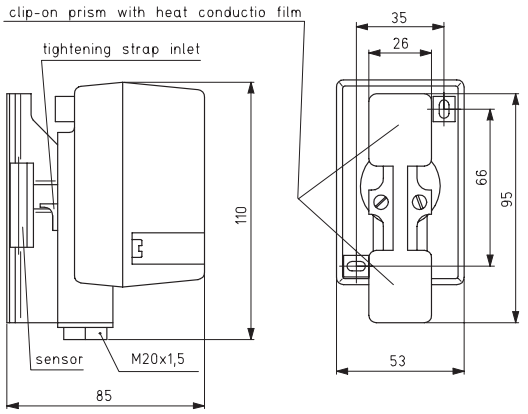
ATR 83.…



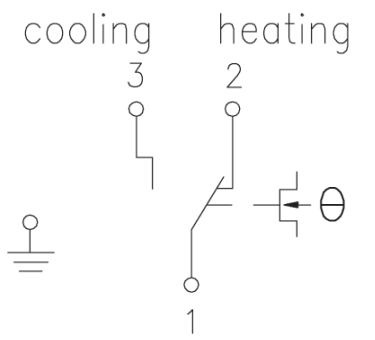
ATR 83.…



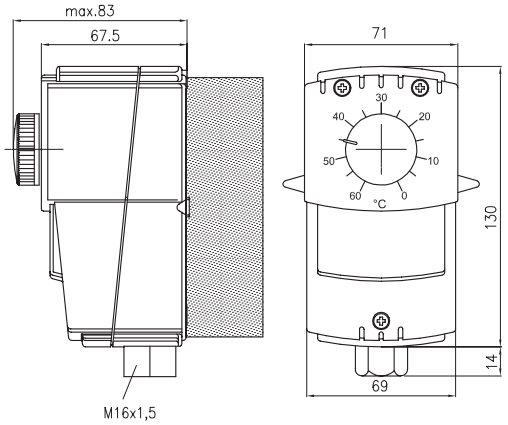
WR 81.11.



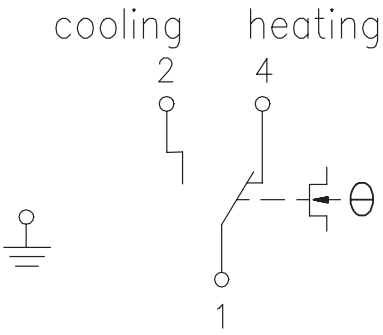
WR 81.11.



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

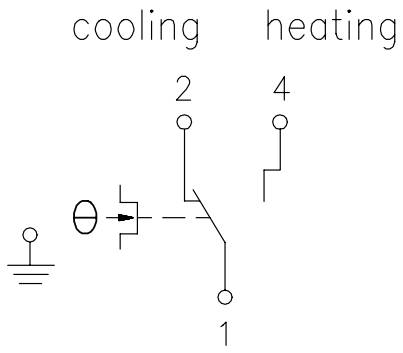
Type	Item no.	Capillary length	Features	PG
2-stage: 1st stage emits a signal 5 K before the switch-off point				
JTF-21* **	E 6090320	6 m	external setting, TR, IP 40, hysteresis in the stage approx. 1 K, hysteresis between the stages approx. 5 K	II
JTF-21/12* **	E 6090330	12 m	external setting, TR, IP 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

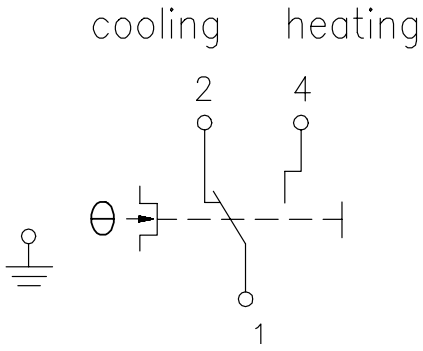
* Control function heating or cooling
** Control function heating or cooling, locked when the temperature is dropping
*** Control function heating or cooling, 1st stage emits a signal 5 K before the switch-off signal
**** Control function heating or cooling, 1st stage emits a signal 5 K before the switch-off 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

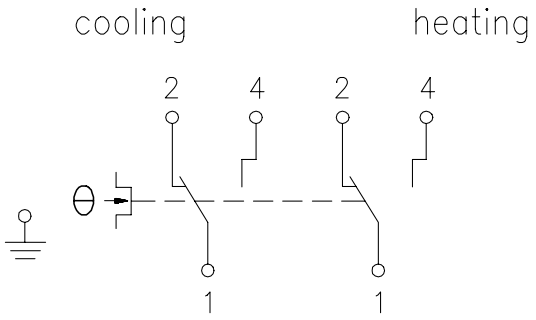
JTF-1/-3/-5



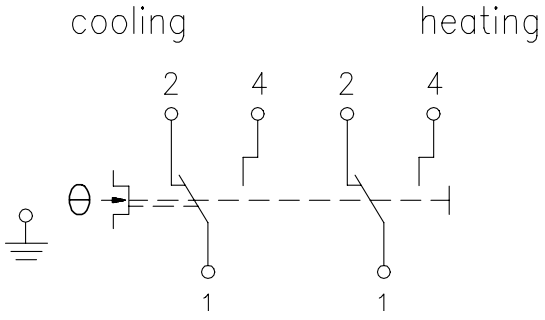
JTF-2/-4/-6



JTF-21/-25

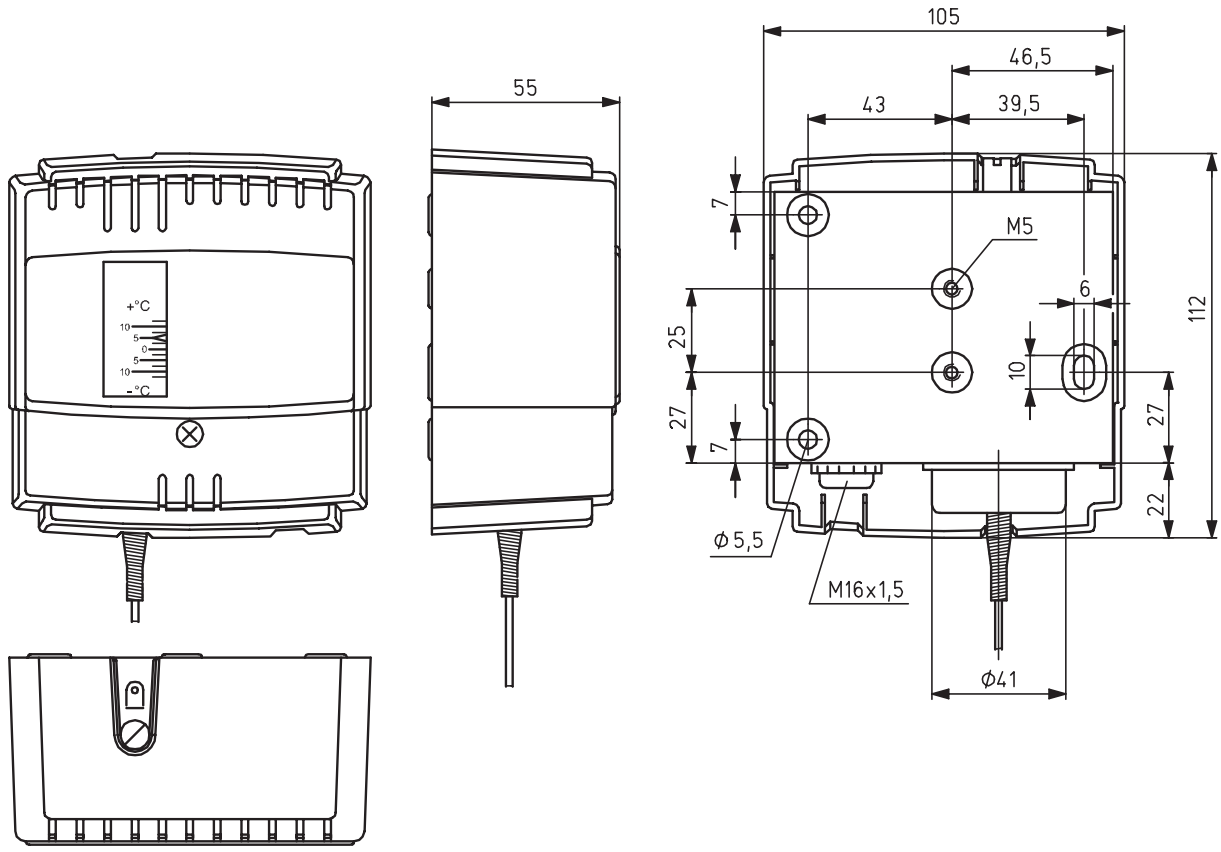


JTF-22

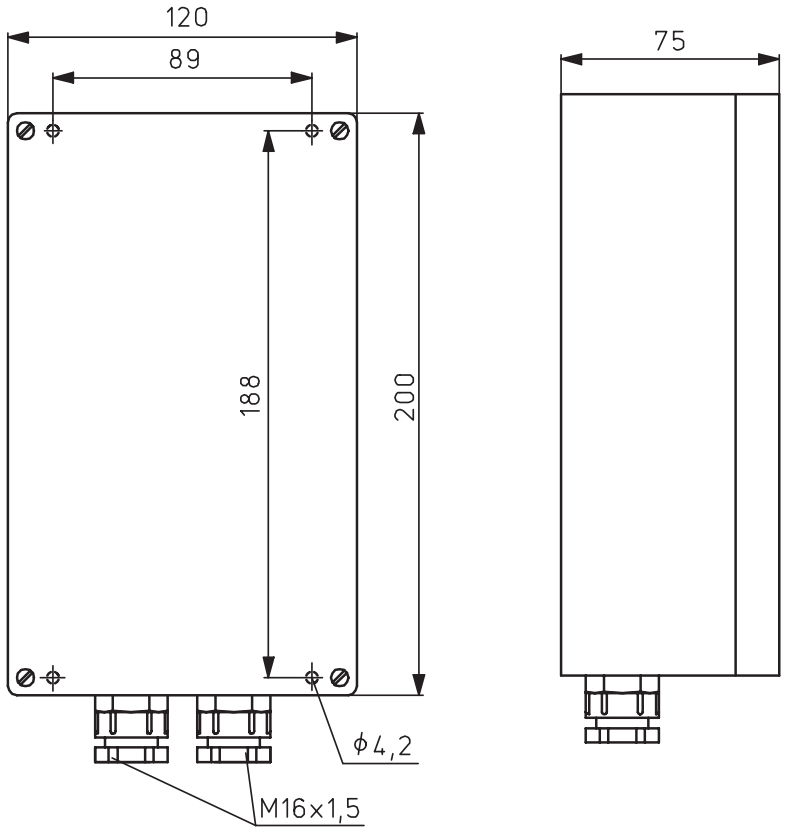


Frost protection thermostat JTF-1 … -25

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.

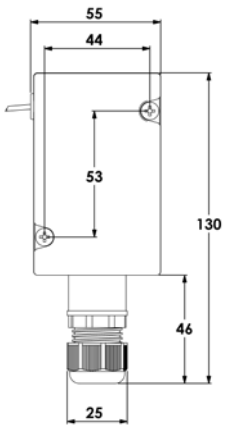
The capillary sensor is active over the entire length. If the ambient temperature falls below the set temperature (factory setting 3 °C) along at least 10% of the entire capillary length (type 105: 0.3 m, type 101: 0.6 m, type 112: 1.2 m), the contacts 1–2 will close. Contacts 1–3 are closed when switched 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.

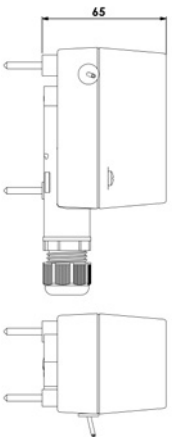
Type	Item no.	Capillary length	Features	PG
JTF-101	JA 044500	6 m	internal setting	II
JTF-103	JA 044600	1.8 m	sensor dimensions 9.5 x 93 mm, also for water-exposed use	II
JTF-105	JA 044700	3 m	internal setting	II
JTF-112	JA 044800	12 m	internal setting	II

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

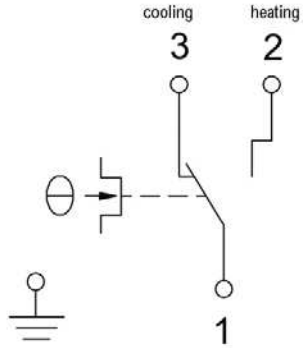
JTF-1xx



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).

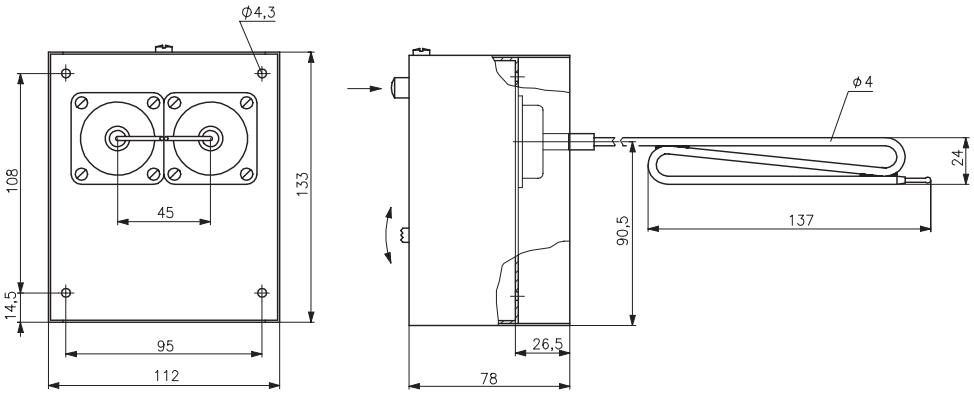
Air heater thermostat JTL-2…-11/JTL-8 NR…-17 NR

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

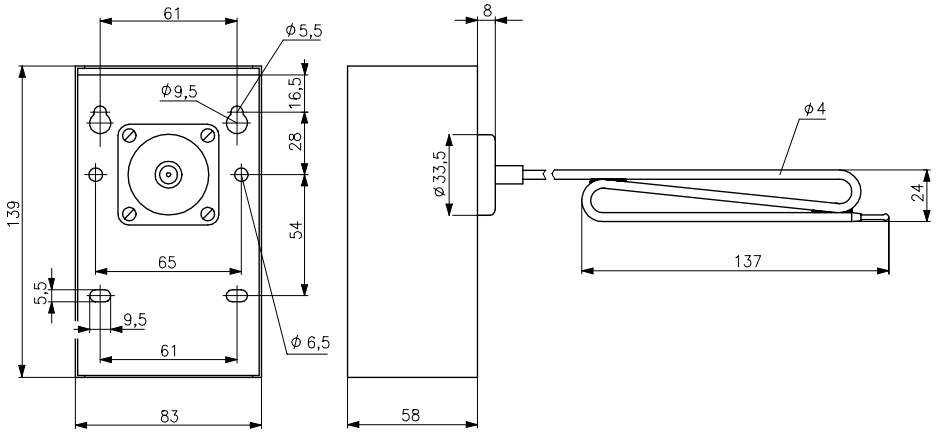
JTL-17 NR

JTL-2

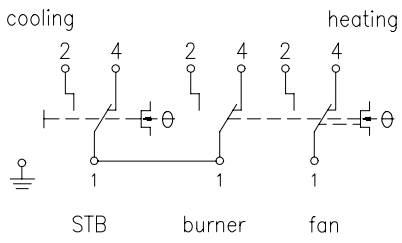
JTL-..NR



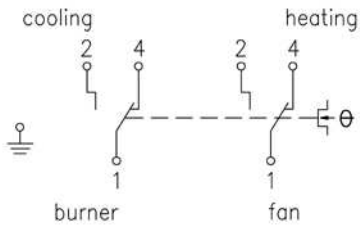
JTL-..



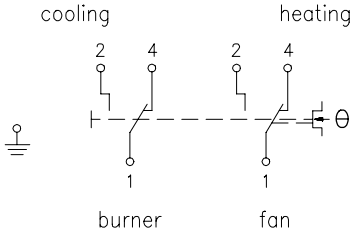
JTL-..NR



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).

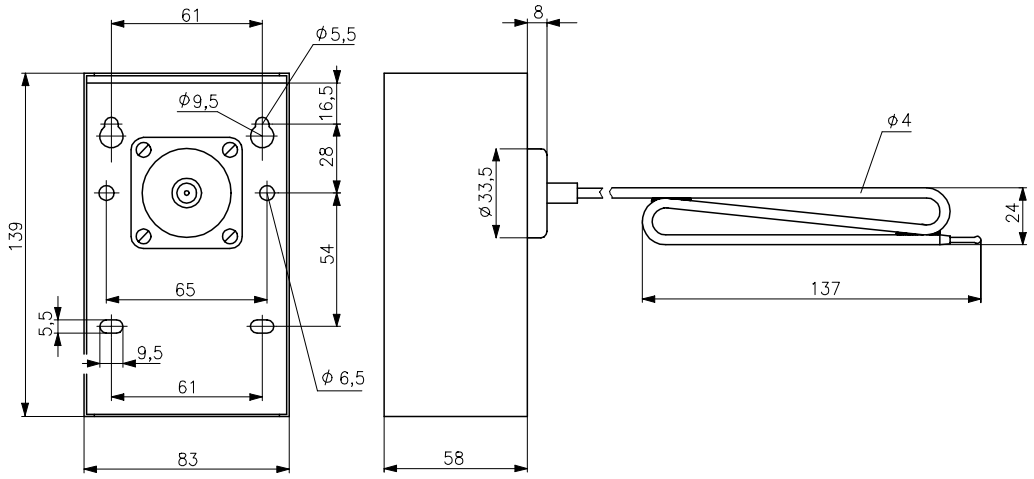
JTU-20

JTU-3 / -6

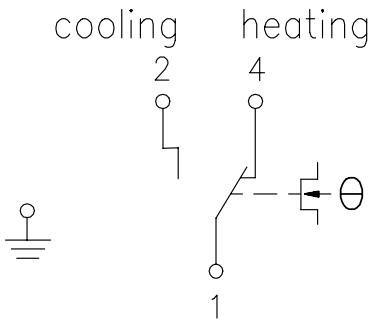
Duct thermostat JTU-1 … -50

Capillary system – **TÜV-tested**

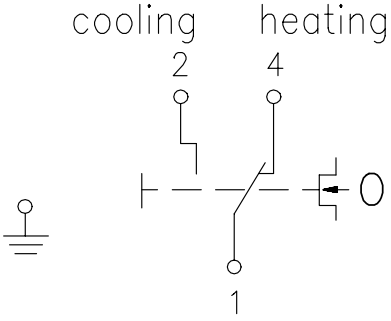
JTU-20



JTU-1, -5, -50



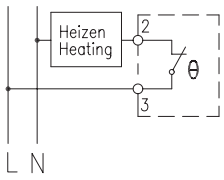
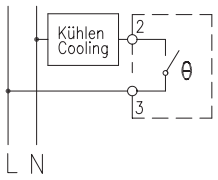
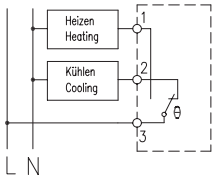
JTU-3 / -6 / -20



Control cabinet thermostats

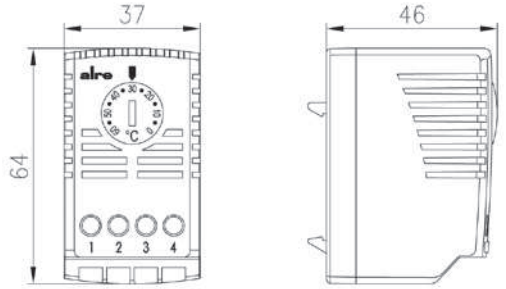
mechanical, bimetal

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

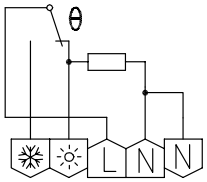
RTBSS



Control cabinet thermostats

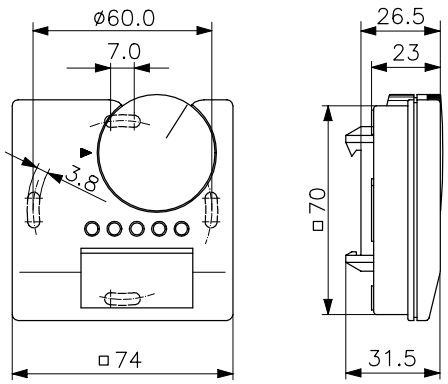
mechanical, bimetal

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

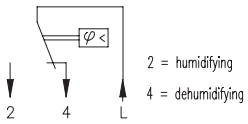
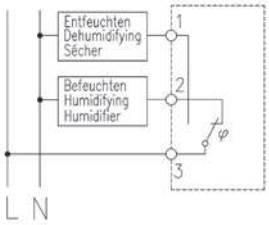
with changeover contact

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

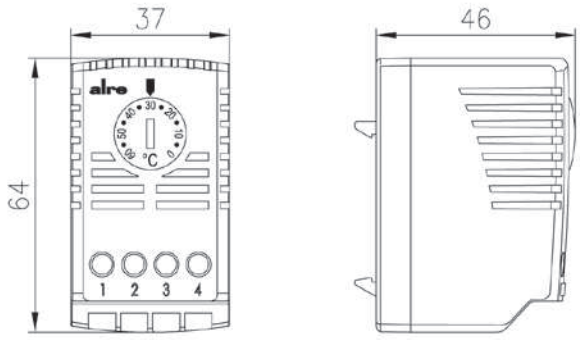
Application

Hygrostat for monitoring and controlling humidity in control cabinets and machines

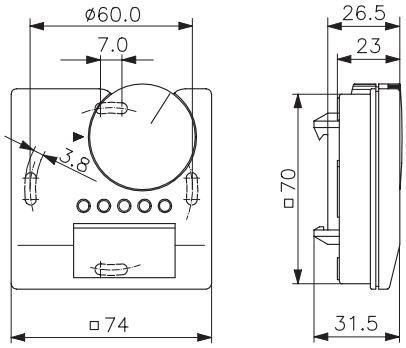
Type / image	Item no.	Features	Circuit diagram	PG
PHY 60.082 	A 261004	Ambient temperature: 10 … 60 °C Permissible atmospheric humidity: non-condensing Control range: 30 … 100% rel. humidity Hysteresis: approx. 4% rel. humidity Tolerances: +/- 3% rel. humidity at 50% rel. humidity Electrical connection: 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.

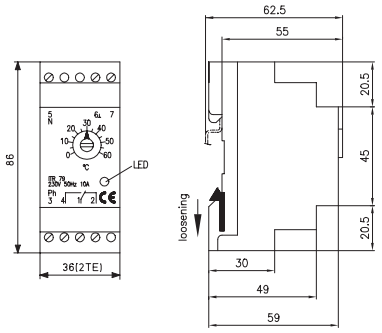
Type	Item no.	Control range	Features	PG
ITR 79.402	D 4780167	–35…+15 °C	Control function: heating, hysteresis adjustable: approx. 0.5…5 K, sensor: NTC 1 K (sensor 1), scale: degrees Celsius, display “heating” red	II
ITR 79.404	D 4780155	0…60 °C	Control function: heating, hysteresis adjustable: approx. 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

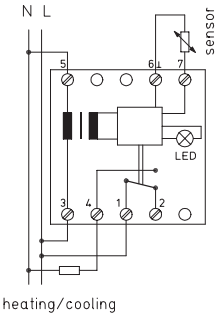
Controller for distributor assembly (DIN top hat rail) ITR 79

remote sensor, electronic

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

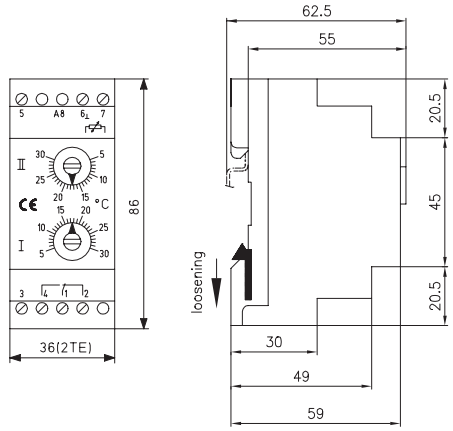


ITR 79.4.../.5.../.8...

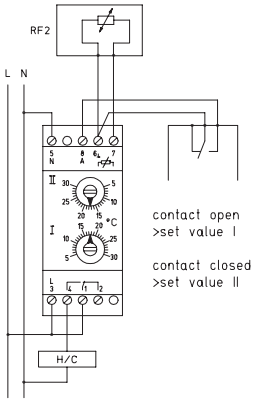


ITR 79.804

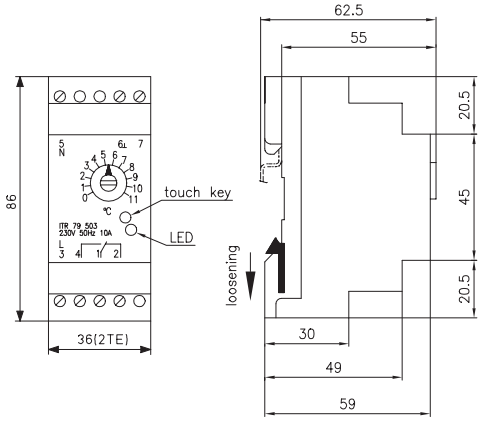
ITR 79.6



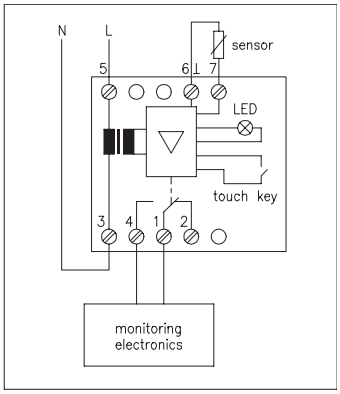
ITR 79.6



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

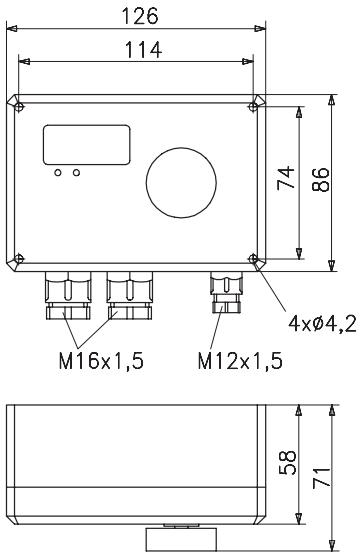
For controlling and/or monitoring the temperatures of liquid or gaseous media with digital actual value display. Suitable for surface-mounting in humid rooms, as a remote controller in industrial and agricultural applications.

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

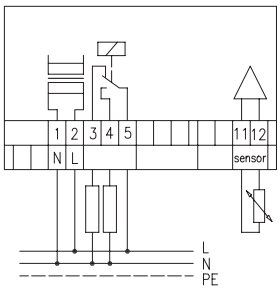
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

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

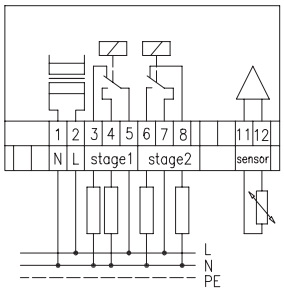
ETR 74



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.

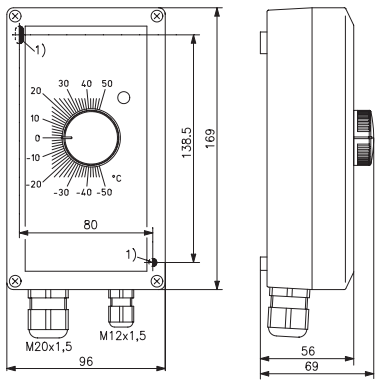
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

Safety and EMC: according to DIN EN 60730

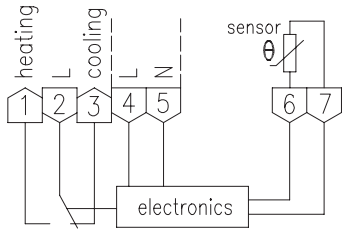
Type	Item no.	Control range	Features	Hysteresis adjustable	PG
ETR 77.008-5	D 4770014	–50 … +50 °C	IP 65, TW, internal setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.108-5	D 4770040	–50 … +50 °C	IP 54, TR, external setting, scale: degrees Celsius	0.5 … 5 K	II
ETR 77.009-5	D 4770026	0 … 100 °C	IP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

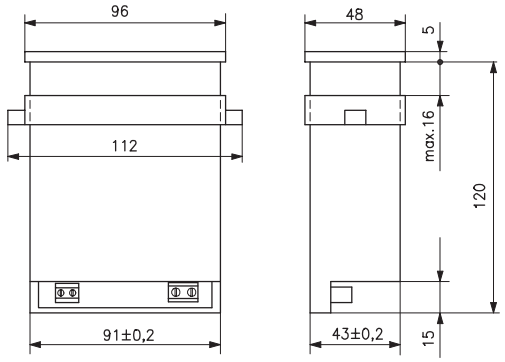
Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

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

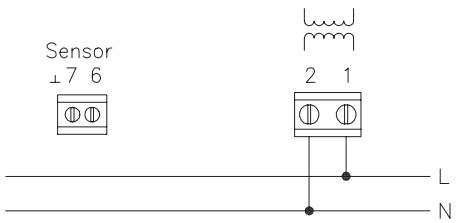
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

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

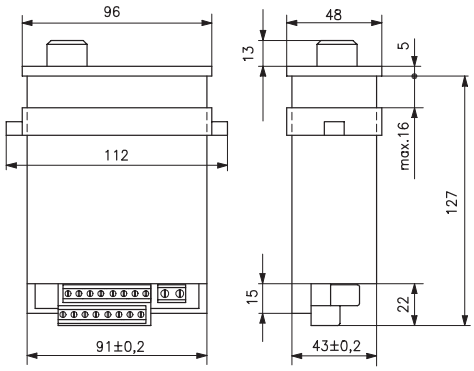
JDI-0



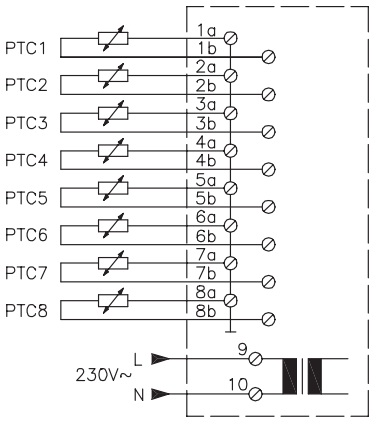
JDI-0



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).

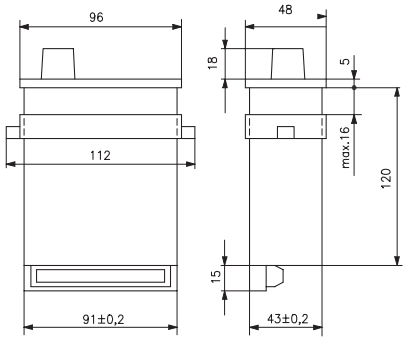
Note: Make sure the sensor line is routed in the protective duct. Parallel routing together with lines that carry alternating currents is not admissible.

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

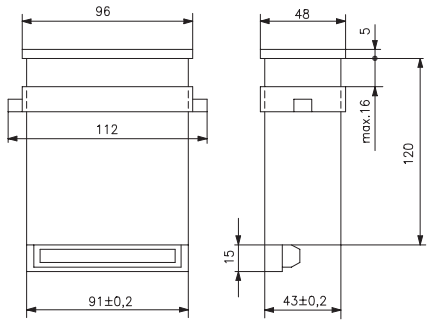
Type	Item no.	Control range	Display	PG
JDI-1	D 4780318	–40 … +120 °C	Display type: 7-segment, 3-digit excluding decimal place	II
JDI-10	D 4780539	–40 … +120 °C	Display type: 7-segment, 4-digit with decimal place	II

JDI-1

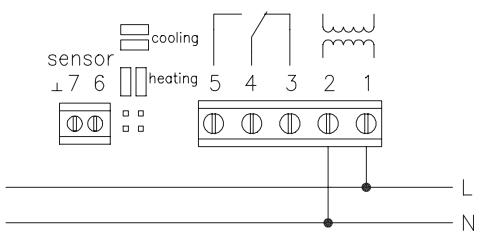
ITR-71



JDI-1 / -10

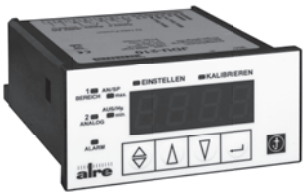


ITR 71 … +JDI-1 / -10



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)

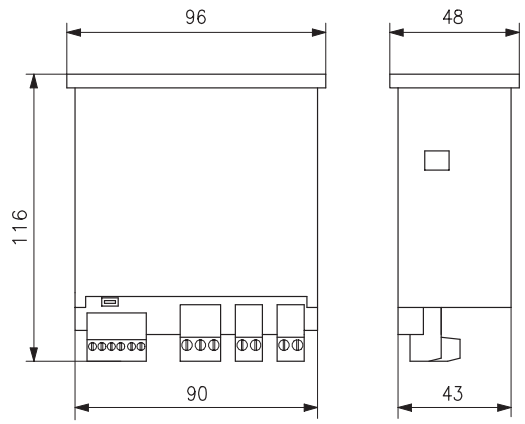
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

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

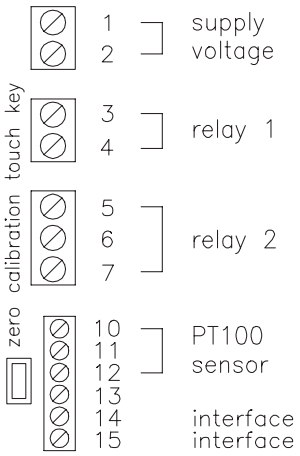
Replacement for old types JDI-2 / JDI-21

Type	Item no.	PG
JDI-22	G 8000398	III

JDI-22

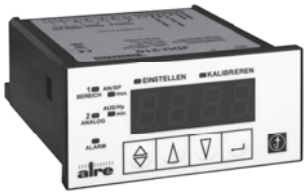


JDI-22



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.

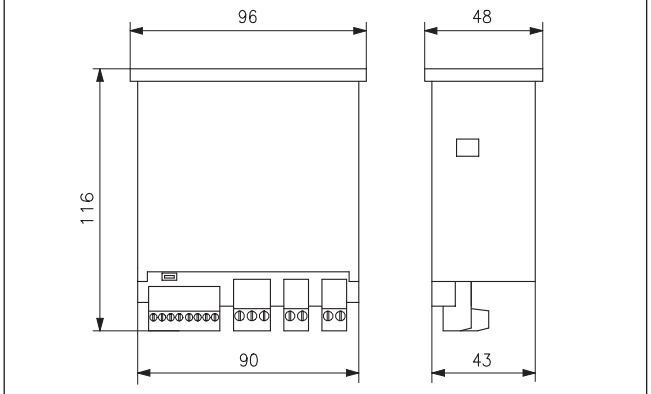
Relay pin assignment:
Relay 1: terminal 3–input
terminal 4–NO contact
Relay 2: terminal 5–input
terminal 6–NO contact
terminal 7–NC contact

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

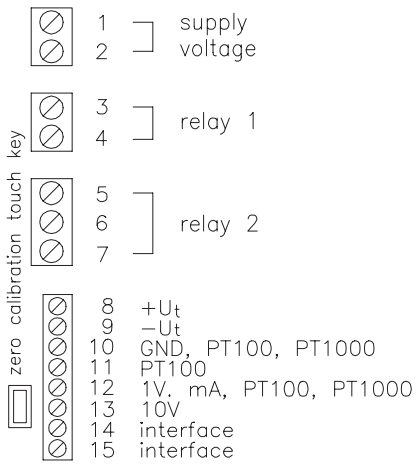
Accuracy:
PT 100/PT 1000: < 0.3% FS
+/- 1 digit at 25 °C, standard signal: < 0.2% FS
+/- 1 digit at 25 °C
Measurement rate:
PT: approx. 4 measurements/s
Standard signal: approx. 100 measurements/s
Resolution: 0.1 °C at –50.0…+200.0 °C,
1.0 °C at–200…+850 °C
Transducer power supply:
24 VDC +/- 5% max.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

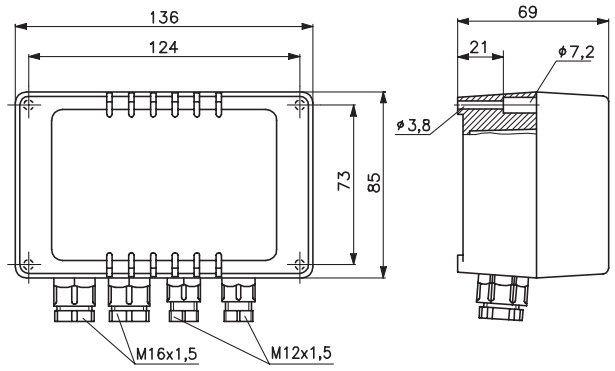
Sensors are not a part of the delivery scope. For available sensors, see the “Sensors” section.

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.

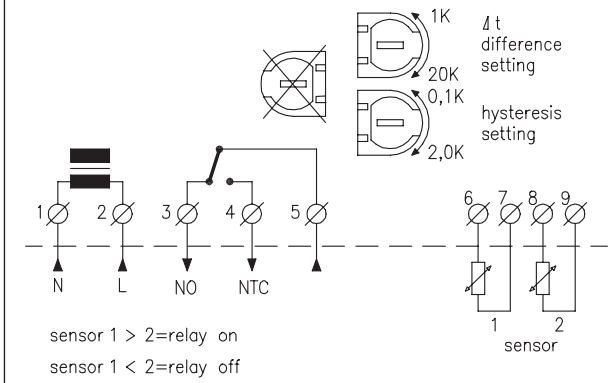
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

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.

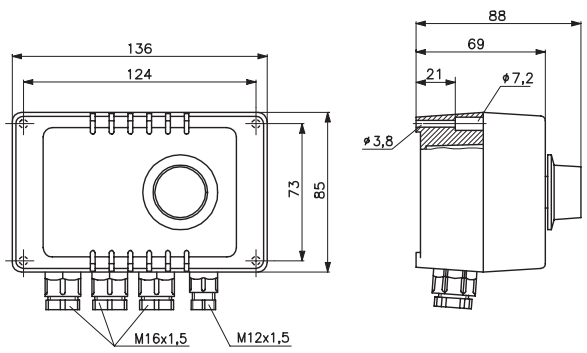
Sensors are not a part of the delivery scope
For available sensors, see the “Sensors” section.

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.

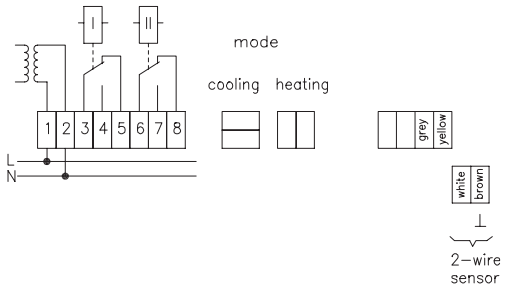
Note: The sensor line is to be routed in a protective duct. Parallel routing together with lines that carry AC voltage is not permissible.

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



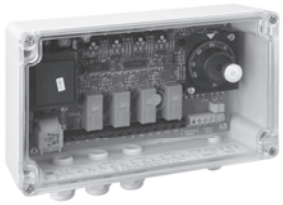
JBT-2.A



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.

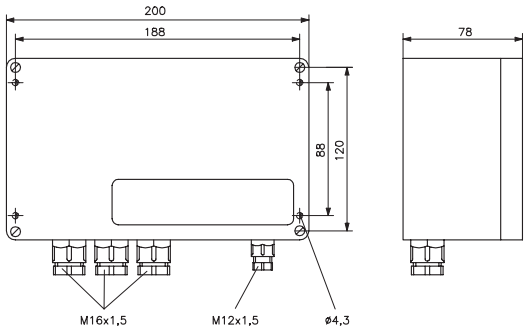
The specified sensor numbers mean that all sensors, e.g., KF or AF with this number can be used, e.g., KF-3 or AF-3.

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

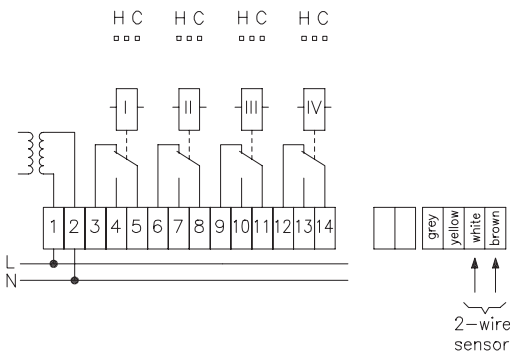
Type	Item no.	Features	PG
JBT-420 B	D 4760494		II

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

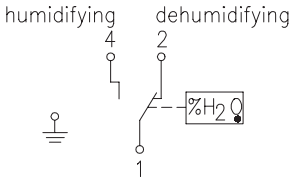
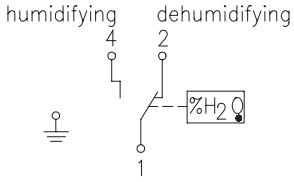
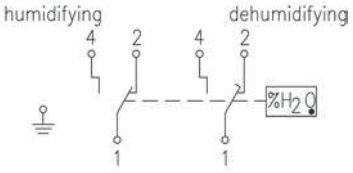
Duct assembly

Technical data

Housing colour:	grey (lower part like RAL 7016, upper part like RAL 7035)
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

Application

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.

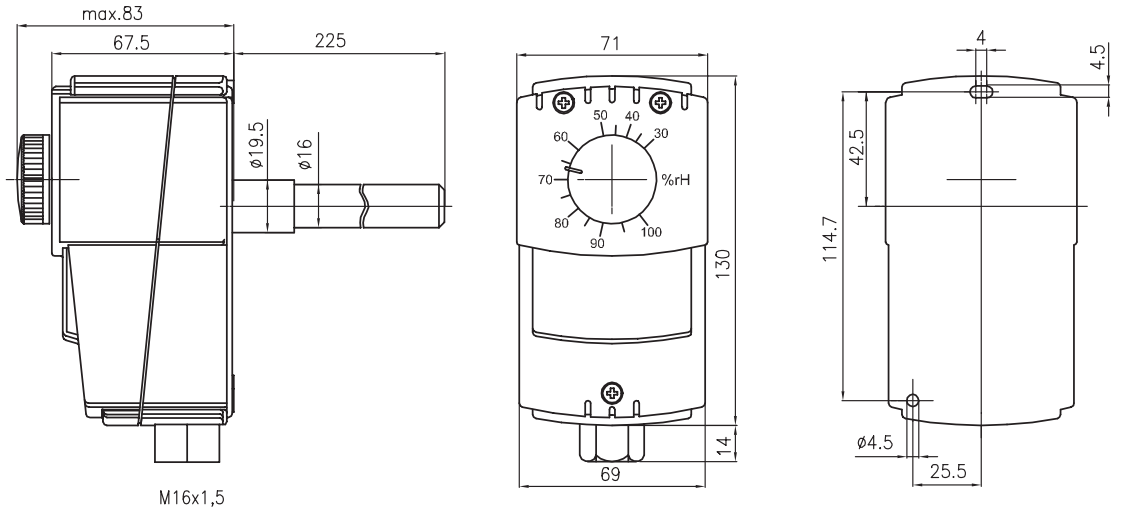
Type / image	Item no.	Features	Circuit diagram	PG
HI-1 	JA 010100	Control function: humidifying or de-humidifying Function type: controller external setting, mechanical range setting		II
HI-1F 	JA 010200	Control function: humidifying or de-humidifying Function type: monitor internal setting		II
HI-2 	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

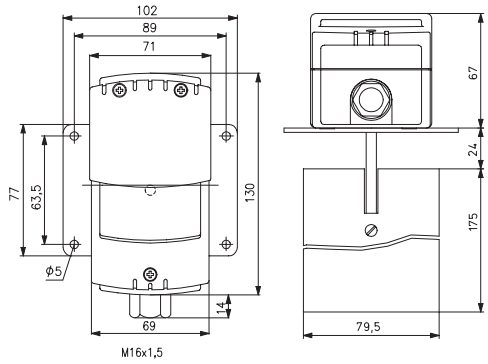
Monitoring of air flows in ducts, in air supply and air exhausting devices of fans or electrical heat registers.

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.

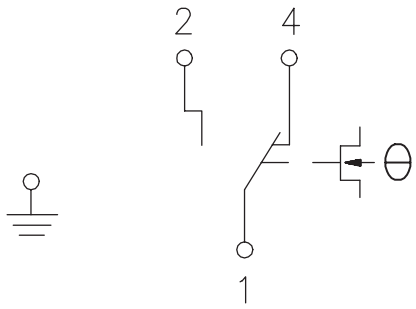
Type	Item no.	Min. switch-on value:	Min. switch-off value:	Max. switch-on value:	Max. switch-off value:	PG
JSL-1E	JA 070100	2 m/s	1 m/s	9.2 m/s	8 m/s	II

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.

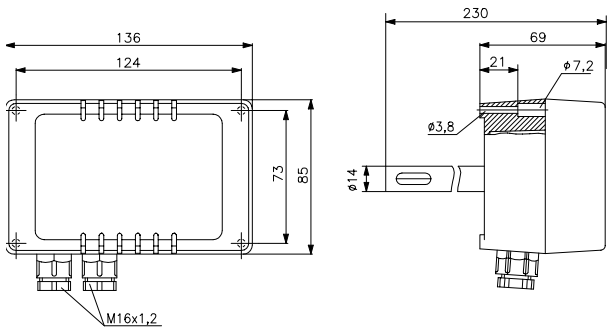
Airflow monitors JSL-20/21

electronic

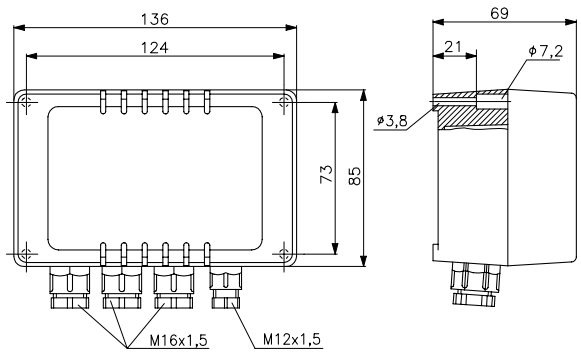
Function JSL-20xx: Contacts 4/5 close upon applying the supply voltage. When the switch-on delay lapses and the flow speed is greater than the set value, the relay remains actuated; else the relay is deactivated (contacts 4/3 close). If during operation the flow speed drops below the set value, the relay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

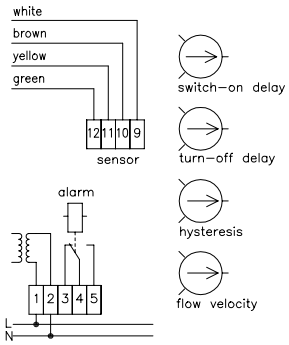
JSL-20 K



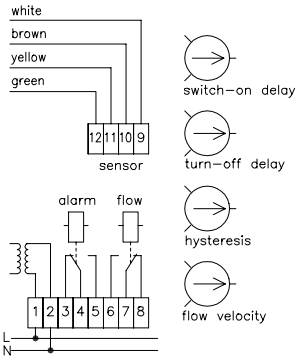
JSL-20/-21



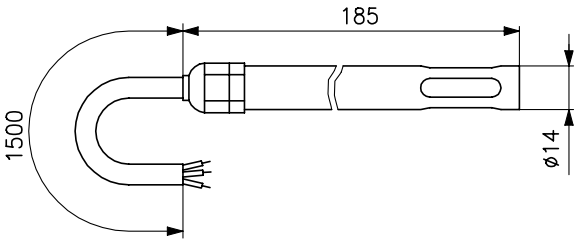
JSL-20



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

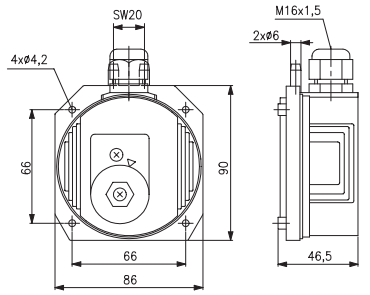
Differential pressure switch JDW-3…10/JDL-111…116

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

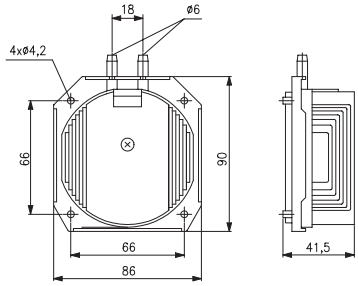
Accessories

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

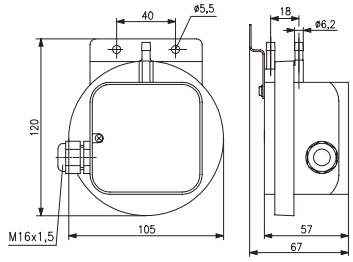
JDW-3/-5/-10



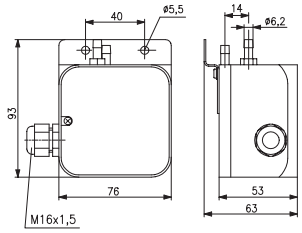
JDL-113



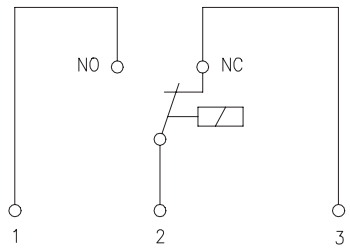
JDL-111



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

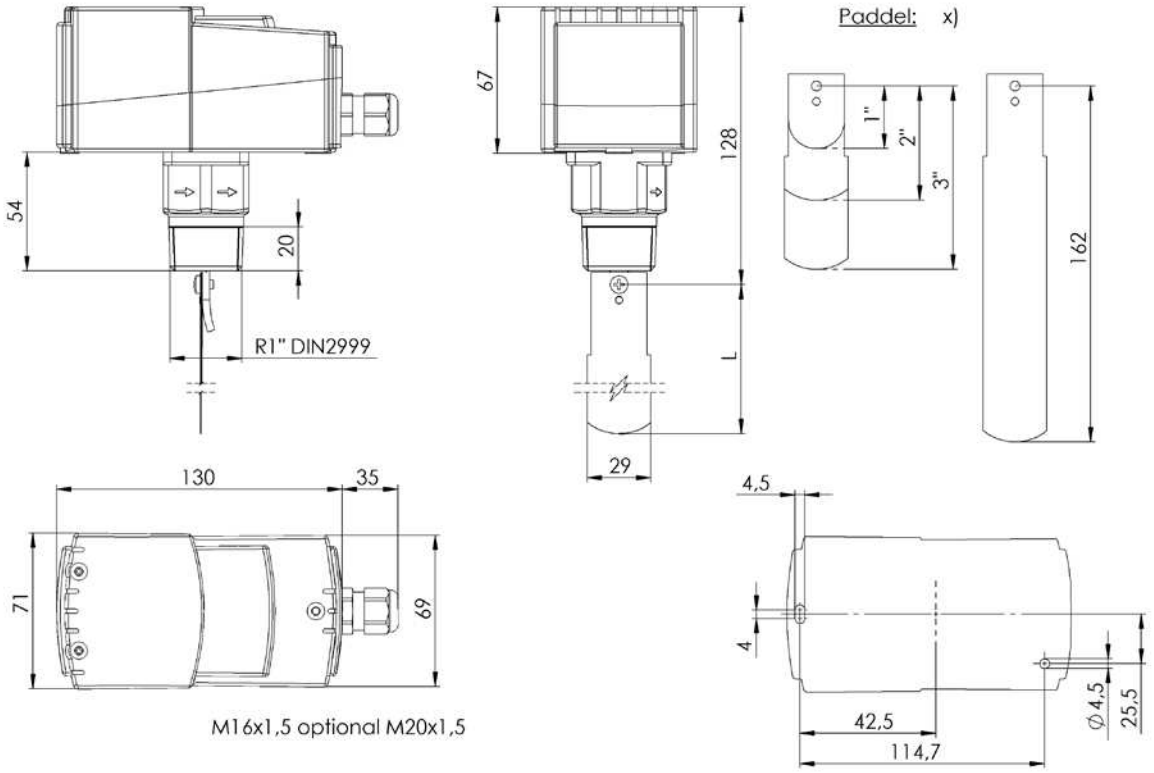
* for 1“ = paddle 1
for 2“ = paddle 1 and 2
for 3“ to 8“ = paddles 1, 2 and 3

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)

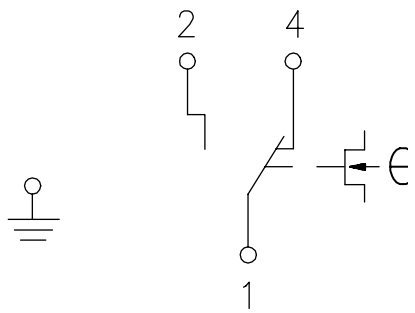
** device types for low flow volume (see switching value table) “RE”

*** 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.

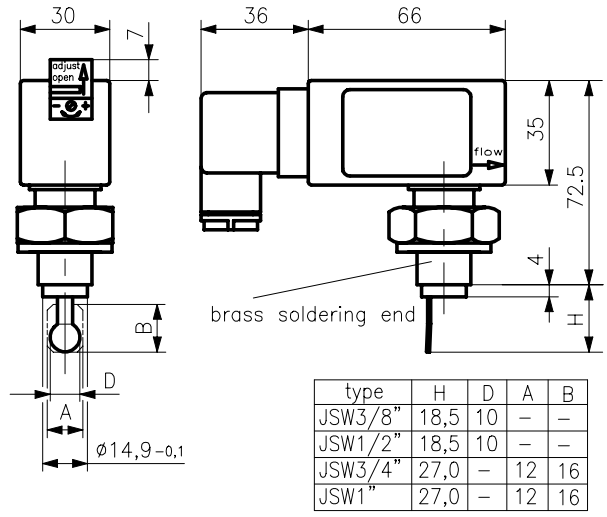
Type	Item no.	Pipe	DN	Max.	Switching point dropping*	Switching point rising	ΔI/min	PG
JSW-1/2	H 530944	½"	15	20 l/min	5…6.5 l/min	5.5…7 l/min	0.5	III
JSW-3/4	H 530945	¾"	20	40 l/min	7…9.5 l/min	9…11 l/min	2	III
JSW-1	H 530946	1"	25	60 l/min	13.5…16.5 l/min	17…20.5 l/min	3.5	III

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

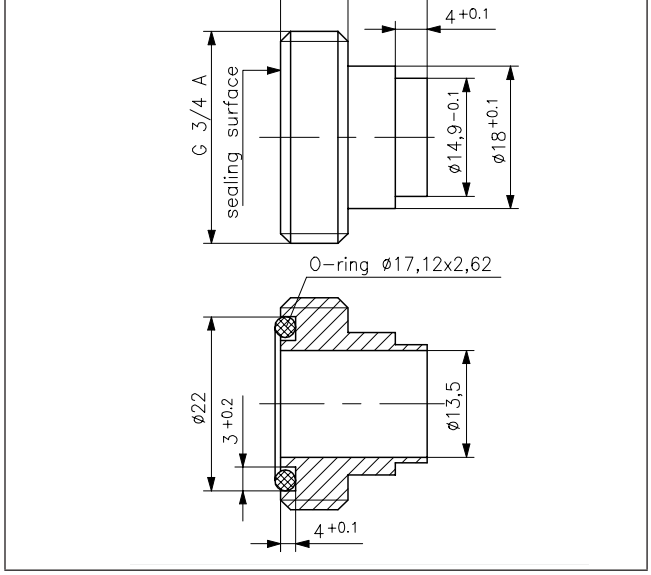
with device plug

JSW

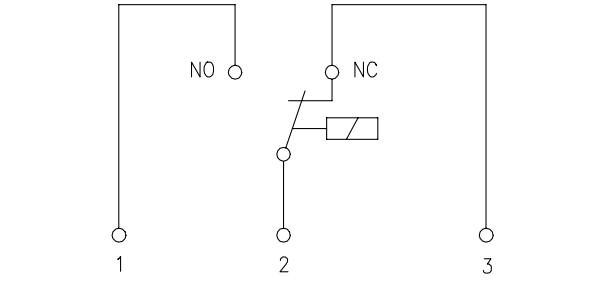


type	H	D	A	B
JSW3/8"	18,5	10	–	–
JSW1/2"	18,5	10	–	–
JSW3/4"	27,0	–	12	16
JSW1"	27,0	–	12	16

JSW



JSW

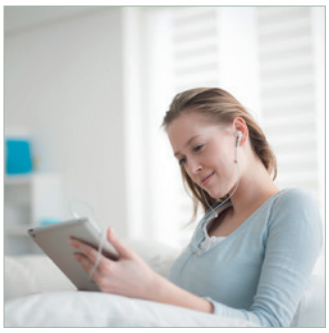


The device works according to the principle of a spring-loaded paddle with magnetic control of a microswitch. When in rest position or if the switch-off value is undershot (= “dropping switching point”), contacts 2 and 3 are closed and can be used as signal contacts. Upon reaching the upper switching 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

Pressure / differential pressure

Humidity

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

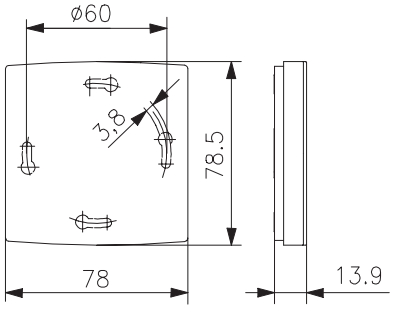
Temperature measurement in living spaces and office spaces.

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.

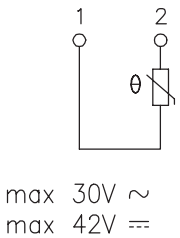
Please follow the EMC directives. Avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

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.

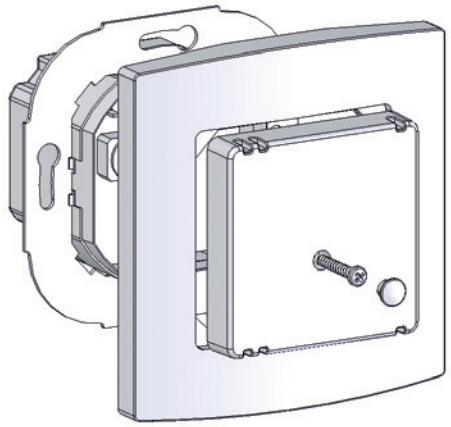
Sensor	Type	Item no.	Surface finish	PG
PT-100	FUFP 100-0000	SN 090000	glossy	III
PT-1000	FUFP 1000-0000	SN 090001	glossy	III
Ni-1000	FUFN 1000-0000	SN 090002	glossy	III
Ni-1000 TK 5000	FUFN 1000 TK 5000-0000	SN 090003	glossy	III
LM 235Z	FUFLM-0000	SN 090150	glossy	III
NTC 2K25 “Sensor 0”	FUFC 225-0000	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

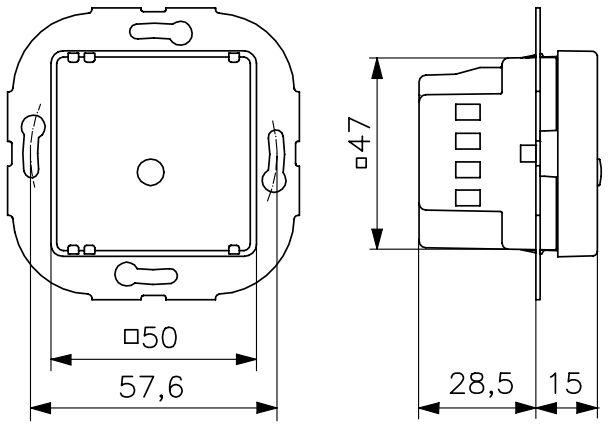
Room temperature sensors – flush-mounted FUF

for measuring the temperature in dry rooms

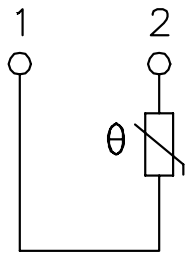
FUF with alre frame “Berlin”



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

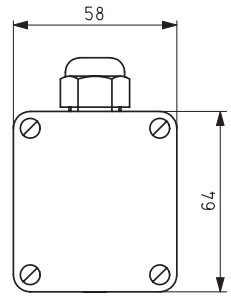
The AF outdoor temperature sensors are used for temperature measurement in the outdoors, in damp environments, in cold storage rooms and greenhouses as well as in industrial applications and are specially protected against dust and moisture. If there is direct incident sunlight on the sensor housing,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

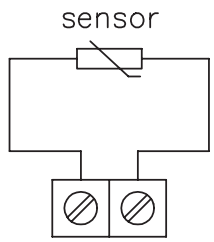
Sensor	Type	Item no.	PG
PT 100	**AFP 100**	G 9040010	III
PT 1000	**AFP 1000**	G 9040020	III
NI 1000	**AFN 1000**	G 9040030	III
NI 1000 TK 5000	**AFN 1000 TK 5000**	G 9040040	III
LM 235 Z	**AFLM**	G 9040130	III
NTC 2K25 “Sensor 0”	**AF-0**	G 9040360	III
NTC 1K “Sensor 1”	**AF-1**	G 9040370	III
NTC 47K “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

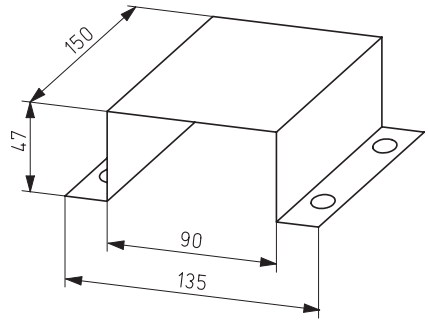
Dimension drawing



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.

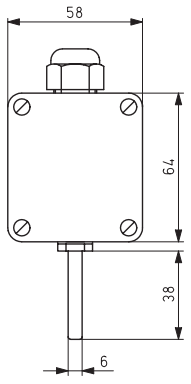
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

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

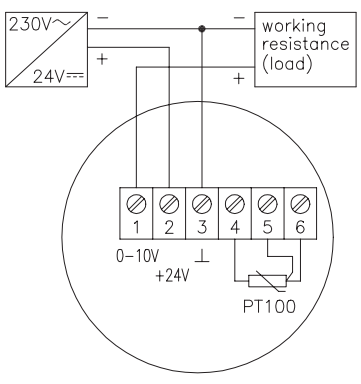
Type (active)	Item no.	Output signal	Measurement range	PG
MTRVD-965.758	G 9040711	0–10 V	–50 ... +50 °C, 0 ... 50 °C, –20 ... +80 °C, 0 ... 100 °C	III
AFHM/4–20	G 9040300	4–20 mA	–50 ... +50 °C	III
AFHM/2/4–20	G 9040351	4–20 mA	0 ... 50 °C	III

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

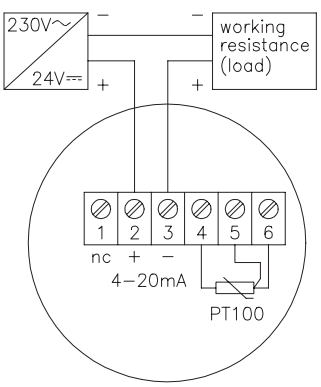
Dimension drawing



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.

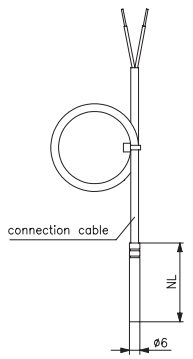
If used in liquid media, integration in an immersion sleeve is necessary.

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	
Sensor dimensions:	see dimension schematic
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.

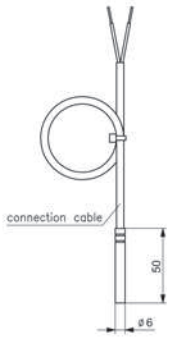
Application

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).

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.

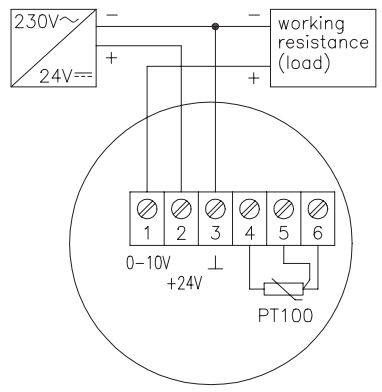
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

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

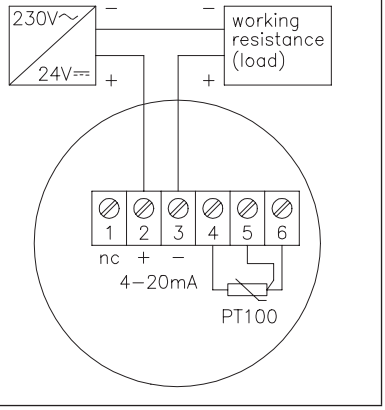
Contact temperature sensor, active	Item no.	Features	PG
MTRKK-965.758	G 9050350	**Measurement ranges:** –50 … +50 °C, 0 … +50 °C, –20 … +80 °C, 0 … +100 °C **Operating voltage:** 24 VDC **Output signals:** continuous 0–10 VDC, continuous 4–20 mA **Sensor type:** PT-100 2-conductor (0–10 V), 3-conductor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

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

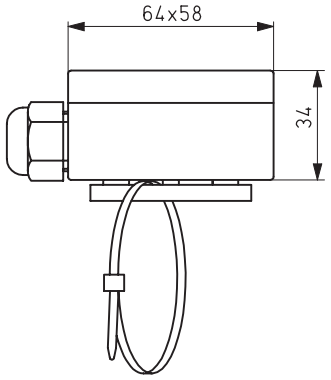
Connection diagram 0–10 V



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.

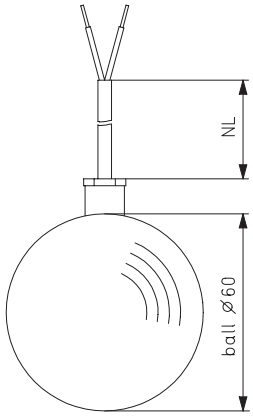
Application

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.

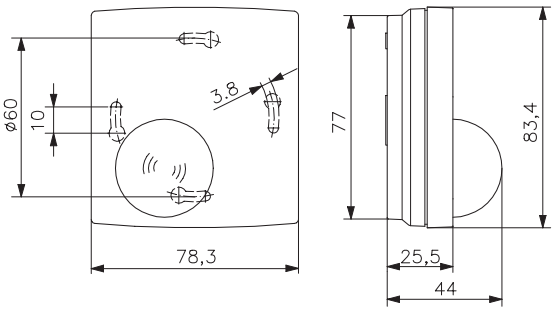
Application

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.

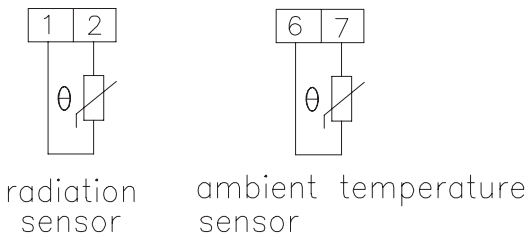
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

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

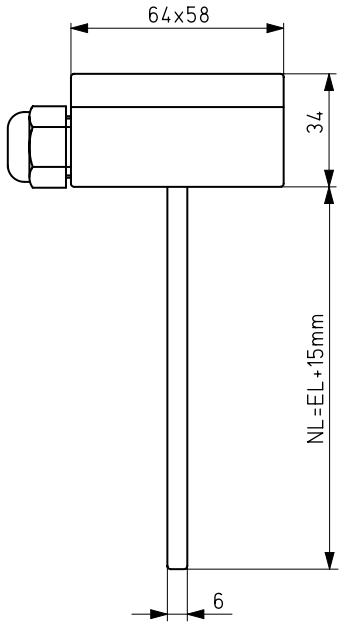
Assembly-type duct sensor EKF / GFL

with passive output

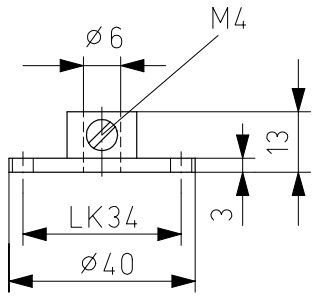
Sensor	Type (Fitting length 215 mm)	Item no.	PG
“Sensor 0” NTC 2K25	**GFL-0**	G 9060010	III
“Sensor 1” NTC 1 K	**GFL-1**	G 9060020	III
“Sensor 2” NTC 47K	**GFL-2**	G 9060030	III
“Sensor 3” NTC 8K	**GFL-3**	G 9060040	III
“Sensor 4” NTC 10K	**GFL-4**	G 9060050	III
“Sensor 5” NTC 50K	**GFL-5**	G 9060060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

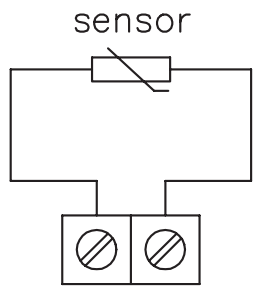
Dimension schematic, assembly-type duct sensor



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

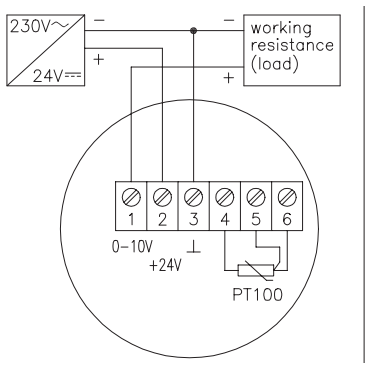
Stainless steel V4A: immersion sleeves made of stainless steel V4A can be found in the “Miscellaneous” section

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

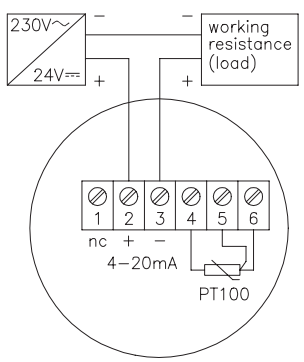
Fitting length	Type	Item no.	PG
65 mm (NL) (for 50-mm immersion sleeve)	**MTRKK-965.758/50 mm**	G 9142171	III
115 mm (NL) (for 100-mm immersion sleeve)	**MTRKK-965.758/100 mm**	G 9142181	III
165 mm (NL) (for 150-mm immersion sleeve)	**MTRKK-965.758/150 mm**	G 9142191	III
215 mm (NL) (for 200-mm immersion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

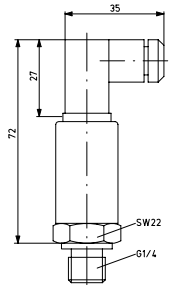
MUD … transducer for liquid and gaseous media 0–10 V or 4–20 mA

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

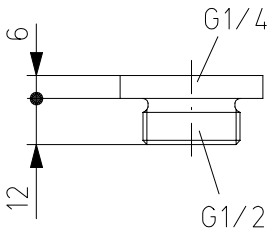
Conversion table for pressure

	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**

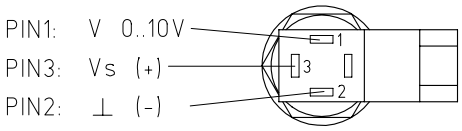
Dimension drawing



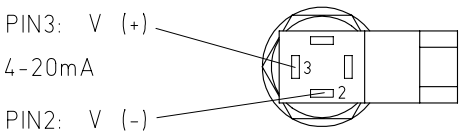
Adapter for MUD



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.

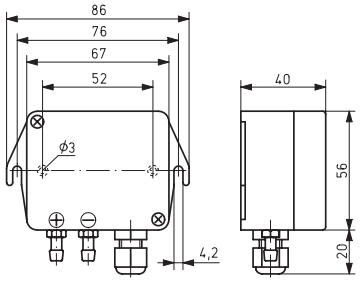
The types MDEKD replace the types DF.

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).

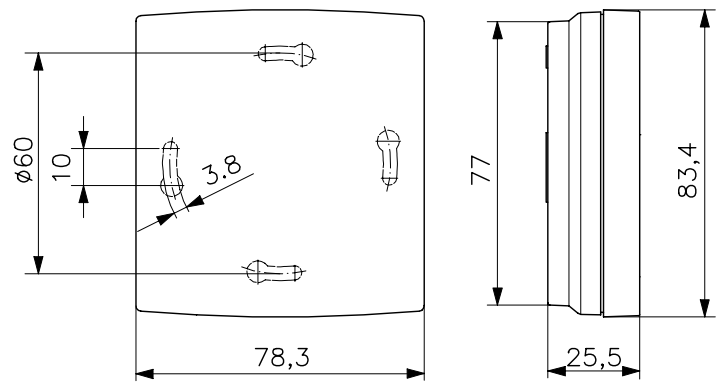
Usable in refrigeration, air conditioning, ventilation and process engineering as a room or duct sensor.

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

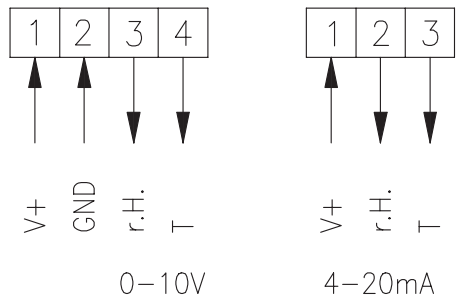
The temperature-humidity-transmitter is used in building automation, refrigeration and air-conditioning, as well as in clean room technology, in greenhouses, medicine rooms and in meteorological applications.

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

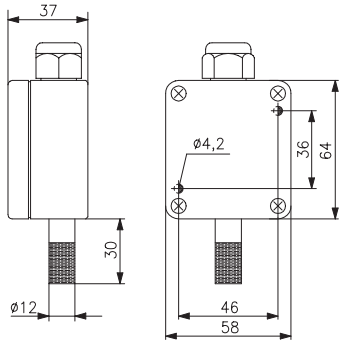
Please follow the EMC directives, avoid parallel routing with mains voltage-bearing wires, or use shielded wires.

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

Individuality straight off the rack.

ACCESSORIES AND MISCELLANEOUS
Additions for your range of services.




Perfect control technology can be made even more perfect through our accessories – we have an extensive selection to choose from. Exact installation is achieved with the assistance of the technical explanatory notes, assembly aids, as well as tips concerning proper use.

Here you will not only find the whole range of accessories, but rather also valuable tips for professionals.

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		Application
Colour:	cream white, like RAL 9001	Sauna controllers for dry saunas or dry/wet saunas.
Housing material:	ABS	
Mains voltage:	400 VAC, 3/N 50 Hz	Load expansion possible with LG 9/18 (18 kW) or LG 9/30 (30 kW).
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	

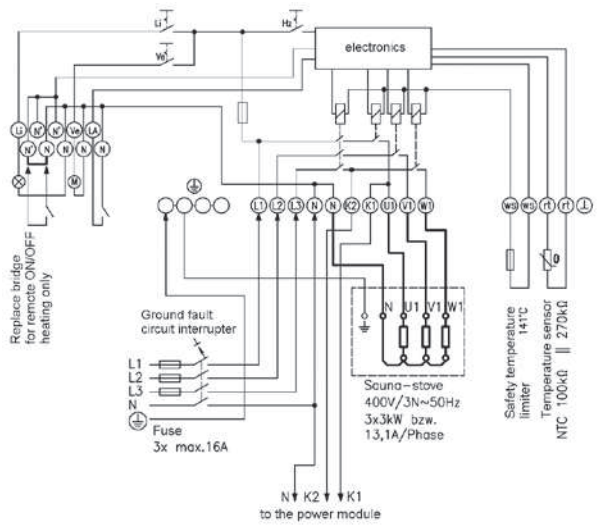
Type/image	Item no.	Features	PG
Saunatherm VU 	D4700653	Sauna controller for dry saunas (Finnish) Control range: 30 … 120 °C Switch: “Fan On/Off” Indicators: “HEATING”, “ON/OFF”, “Pre-selection timer”	III
Hygrotherm VU 	D4700736	Sauna controller for dry saunas (Finnish) or wet saunas Control range, dry 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

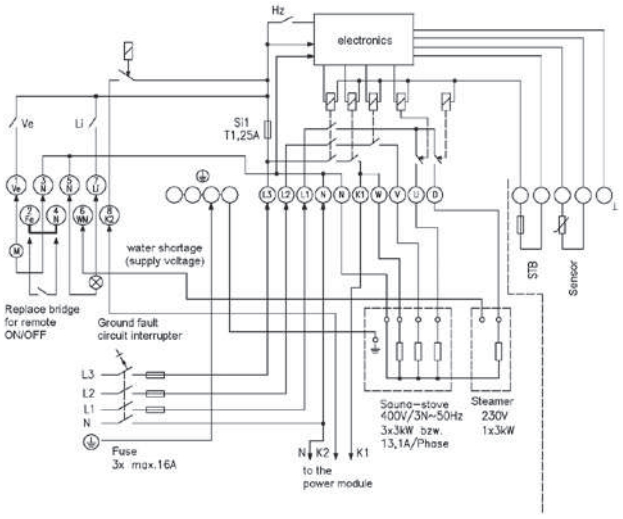
For dry and wet saunas

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

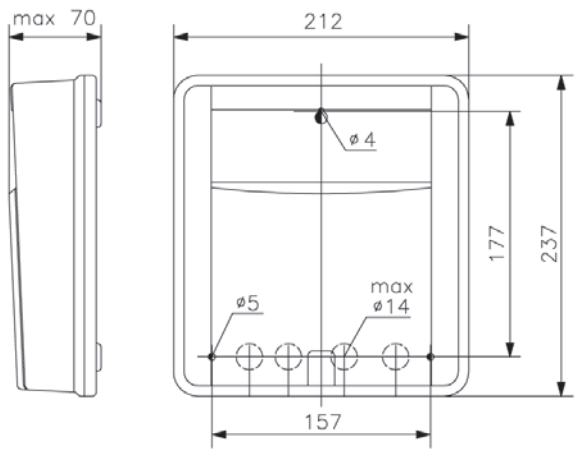
Circuit diagram, Saunatherm VU



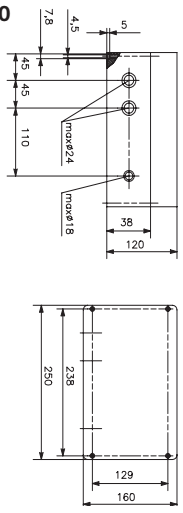
Circuit diagram, Hygrotherm VU



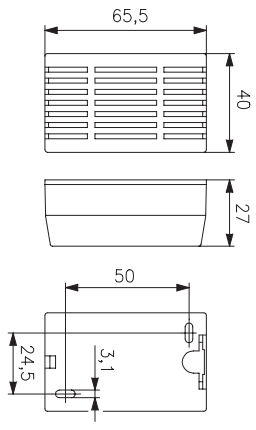
Sauna controllers, LG 9/18



LG 9/30



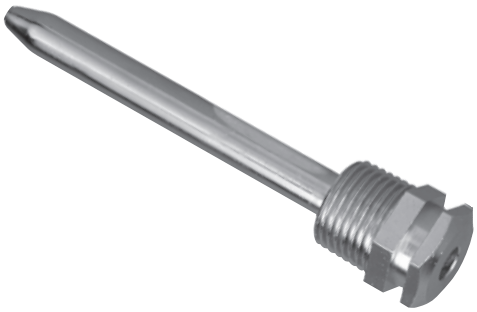
Sensor/STB



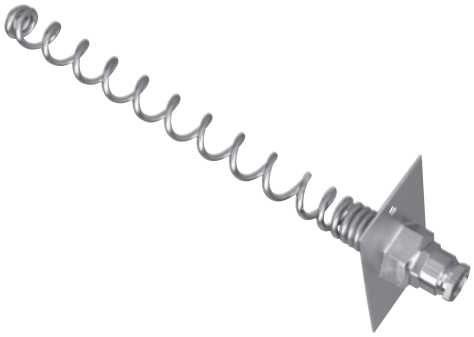
Immersion sleeves / protecting coils for KR/LR 80/85 and for sleeve sensors and cable temperature sensors

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

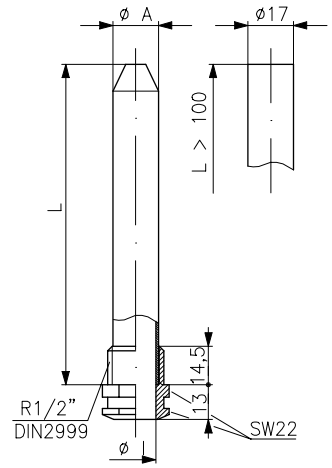
Type	Item no.	Length of L	Cable gland	Diameter I x A*	Material	PG
Protecting coil for capillary fastening in the air duct (JET / JMT / JTF / WR 81) and all sleeve sensors HF and cable temperature sensors KF						
SW-200	C 1809219	200 mm	7.8 mm	11 x 17 mm	steel, nickel-plated	II
SW-200-12	C 1809220	200 mm	11.8 mm	11 x 17 mm	steel, nickel-plated	II

* I = minimum inner diameter
A = nominal outer diameter

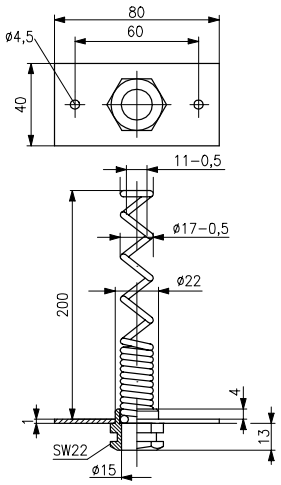
Immersion sleeves / protecting coils for KR/LR 80/85 and for sleeve sensors and cable temperature sensors

For industrial applications and heating technology

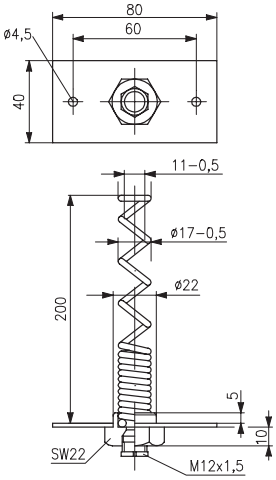
THK / NTHK



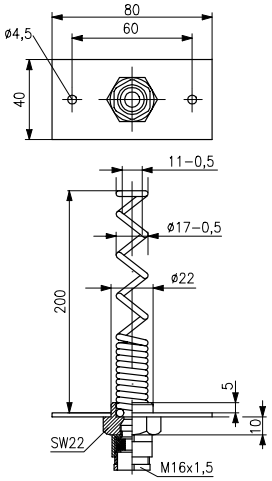
SWK



SW-200



SW-200-12



Immersion sleeves for capillary / frost protection thermostats / HF / screed mounting

For industrial applications and heating technology

TH / NTH

THF

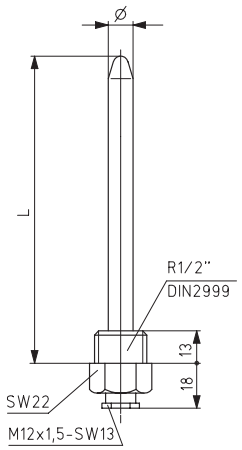
Type	Item no.	Length of L	Diameter l x A**	Material	Max. pressure (P/bar)	PG
For sensors HF / KF Ø 7 mm, capillary and frost protection thermostats JET / JMT / WR 81 und JTF (for JTF, only type TH / NTH-140)						
TH-55	C 1809296	55 mm	8 x 10 mm	nickel-plated brass	20	II
TH-100	C 1809310	100 mm	8 x 10 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
** l = minimum inner diameter
A = nominal outer diameter

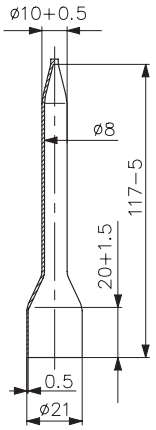
Cu protective sleeve for sleeve sensor HF / cable temperature sensor KF Ø 7.7 mm for screed mounting

THF	C 1809515	II

TH / NTH



THF

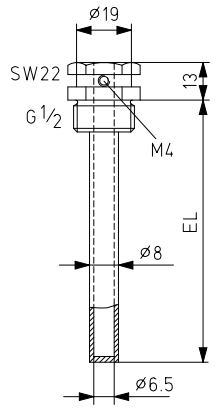


Immersion sleeves / mounting flange for HF, KF, EKF and IKF

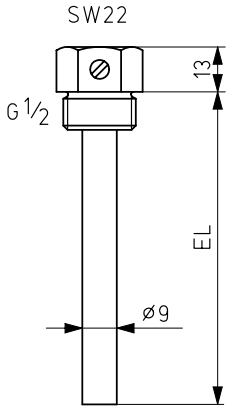
for sleeve sensors Ø 6 mm PVC and silicone, assembly-type and industrial duct sensors

For sensor technology

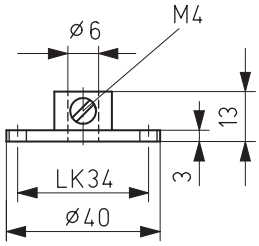
THMs



THV



MF



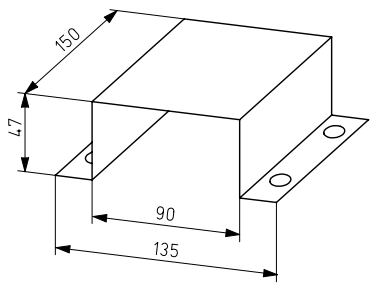
Type	Item no.	Fitting length EL	Diameter I x A*	Max. pressure (P/bar)	PG
Immersion sleeves, nickel-plated, with recess					
THMs/50	G 9990010	50 mm	6,5 x 8 mm	20	II
THMs/100	G 9990020	100 mm	6,5 x 8 mm	20	II
THMs/150	G 9990030	150 mm	6,5 x 8 mm	20	II
THMs/200	G 9990040	200 mm	6,5 x 8 mm	20	II
THMs/250	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

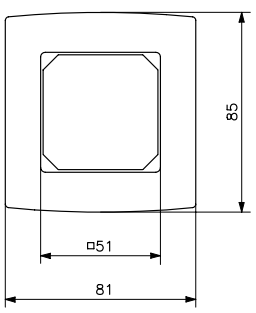
Accessories for heating technology / air conditioning technology / plant engineering and sensors

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”



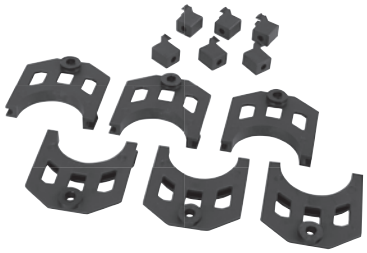
Accessories for heating technology / air conditioning technology / industrial applications and sensors

FS-HI

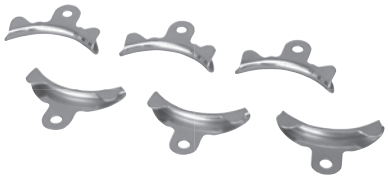
FS2-HI

JZ-04

JZ-05/6 K



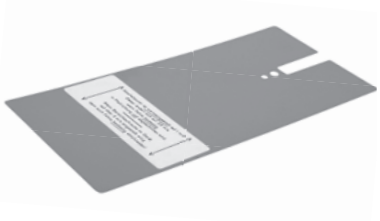
JZ-05/6 M



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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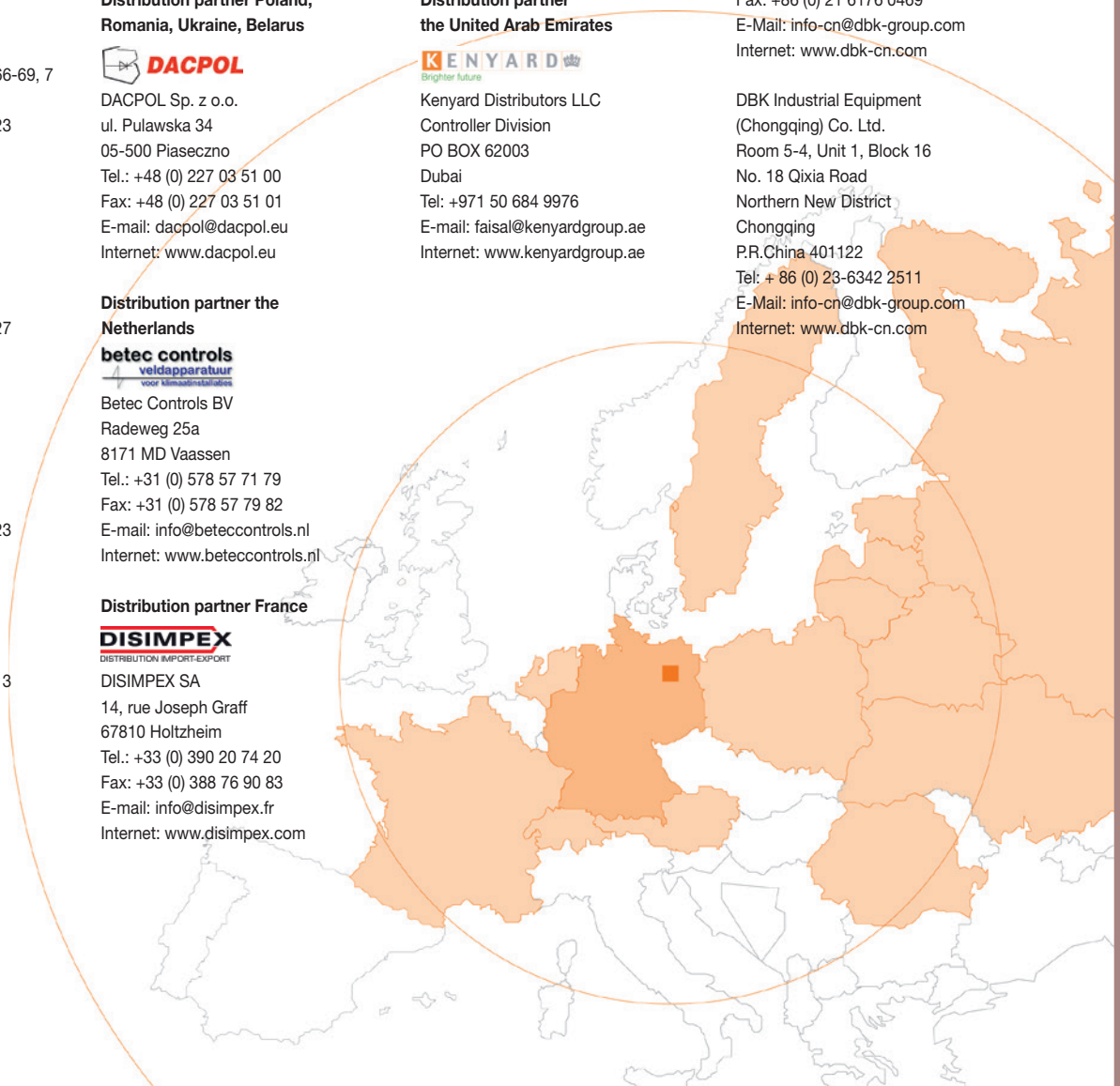

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