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JUMO safetyM TB/TW 08 Temperature limiter, monitor as per DIN EN 14 597

In the panel-mounting case to be fitted in the panel cut-out

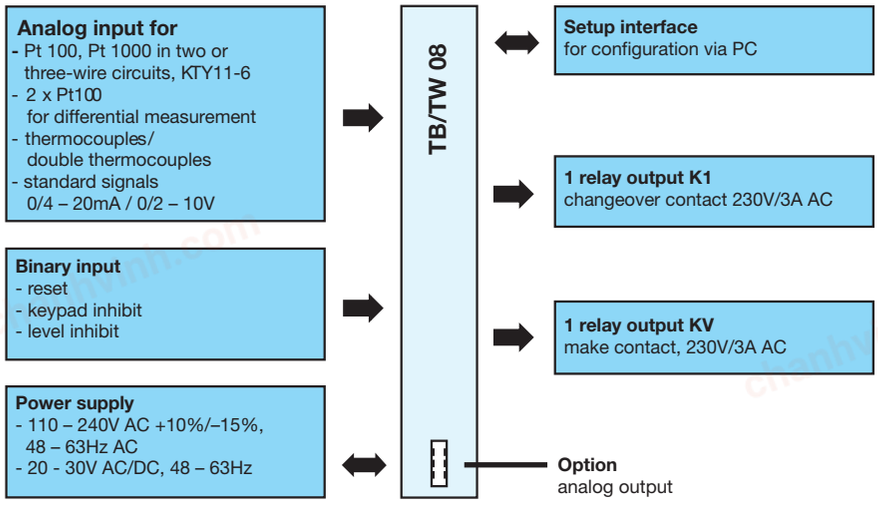


Type 701170/ ...

Brief description

The JUMO safety**M** TB/TW 08 is a freely programmable temperature limitation device.
The measuring input is freely programmable for RTD temperature probes, thermocouples as well as current and voltage signals.
TB/TWs are used to monitor thermal processes in the system for a set limit value.
If this value is exceeded, the installed relay (with fuse cut-out) switches the system to an operational safe status, the green OK LED extinguishes and the red K1 LED is lit.
If the system reaches the "Good" range again, the Reset key must be pressed for the TB. However, the TW automatically resets without external influence.
For an adjustable temperature, the KV relay can put out a pre-alarm prior to reaching the limit value, the switching behavior of which is additionally indicated by the KV LED.
The TB/TW 08 are designed for panel-mounting and are wired via plug-type screw-in terminals with a cable cross section of max. 2.5 mm^2.
A PC setup program is available as accessories, which can be used to set and save the probe type, measuring range, output behavior and lockings.

Block diagram



Special features

- Setup program for configuration and archiving via PC
- Digital input filter with adjustable filter time constant
- Pre-alarm absolute or adjustable as distance to the limit value
- Large voltage supply range of AC 110 ... 240V +10% /-15%
- Configurable as TB or TW
- 17 linearizations can be set
- Internal and external unlocking possible
- Input 2x Pt100 for differential value calculation
- Protection class on the front IP 65

Approval/approval marks (see Technical Data)

2012-07-01/00524703

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Technical Data

Analog inputs

RTD temperature probe

Designation		Measuring range	Accuracy[1]
Pt 100	DIN EN 60751	-200 … +850°C	0.1%
KTY11-6 PTC		-50 ... 150°C	1%
Pt 1000	DIN EN 60751	-200 … +850°C	0.1%
Connection type		2-wire, 3-wire circuit	
Detection rate		210ms	
Input filter		digital filter, 2st priority; filter constant can be set from 0 … 100s	
Special features		2xPt100 for differential value calculation, display can also be programmed in °F	

Thermocouples

Designation		Measuring range	Accuracy[1]
Fe-CuNi „L“	DIN 43710	-200 … +900°C	0.4%
Fe-CuNi „J“	DIN EN60584	-200 … +1200°C	0.4%
Cu-CuNi „U“	DIN 43710	-200 … +600°C	0.4%
Cu-CuNi „T“	DIN EN60584	-200 … +400°C	0.4%
NiCr-Ni „K“	DIN EN60584	-200 … +1372°C	0.4%
NiCrSi-NiSi „N“	DIN EN60584	-100 … +1300°C	0.4%
Pt10Rh-Pt „S“	DIN EN60584	0 … +1768°C	0.4%
Pt13Rh-Pt „R“	DIN EN60584	0 … +1768°C	0.4%
Pt30Rh-Pt6Rh „B“	DIN EN60584	300 … 1820°C	0.4%
W3Re-W25Re„D“		0 ... 2495°C	0.4%
Cold junction		Pt 100 internal	
Cold junction accuracy		± 1K	
Detection rate		210 ms, 420ms with double thermocouples (C112=1)	
Input filter		digital filter, 2st priority; filter constant can be set from 0 … 100s	
Special features		can also be programmed in °F	

1. The accuracy values refer to the maximum measuring range. Small measuring ranges lead to reduced linearization accuracy.

Direct current

Measuring range	Accuracy
0 … 20mA, voltage drop < 2V 4 … 20mA, voltage drop < 2V	0.2%
0 … 10V, input resistance > 100 kΩ 2 … 10V, input resistance > 100 kΩ	0.1%
Scaling	can be freely programmed within the limits
Measuring range	210 ms
Input filter	digital filter, 2st priority; filter constant can be set from 0 … 100s

Measuring circuit monitoring

	RTD temperature probe and KTY11-6	Double thermocouples	Thermocouples	Current 0 ... 20 mA, 4 ... 20mA Voltage 0 ... 10 V, 2 ... 10 V
Overrange and underrange	is detected LED K1 and KV are lit; "9999“ flashes in the display			
Probe and wire break	is detected LED K1 and KV are lit; "9999“ flashes in the display; relay output K1 is inactive			is detected at 4…20mA and 2…10V LED K1 and KV are lit; "9999“ flashes in the display Relay K1 is inactive
Probe short-circuit	is detected LED K1 and KV are lit; "9999“ flashes in the display; Relay output K1 is inactive		is **not** detected	

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Analog output

	Type of signal	Accuracy	Residual ripple	Load influence	Temperature coefficient	Load resistance
Current	4 ... 20 mA	≤ 0.5 %	± 0.5 %	± 0.01 mA	80 ppm/K	≤ 500 Ω
	0 ... 20 mA					
Voltage	2 ... 10 V	≤ 0.5 %	± 0.5 %	± 15 mV	80 ppm/K	≥ 500 Ω
	0 ... 10 V					

Binary input

Connection	Function
1 potential-free contact	Unlocking, keyboard locking, level locking can be configured

Relay outputs

Relay output KV	Relay (N/O) without shroud Contact rating of 3A /230V, 50 Hz ohmic load
Relay output K1	100000 operations at a performance of 3A /230V, 50Hz resistive load **Contact protection switching:** Fuse cut-out 3,15AT installed in the device

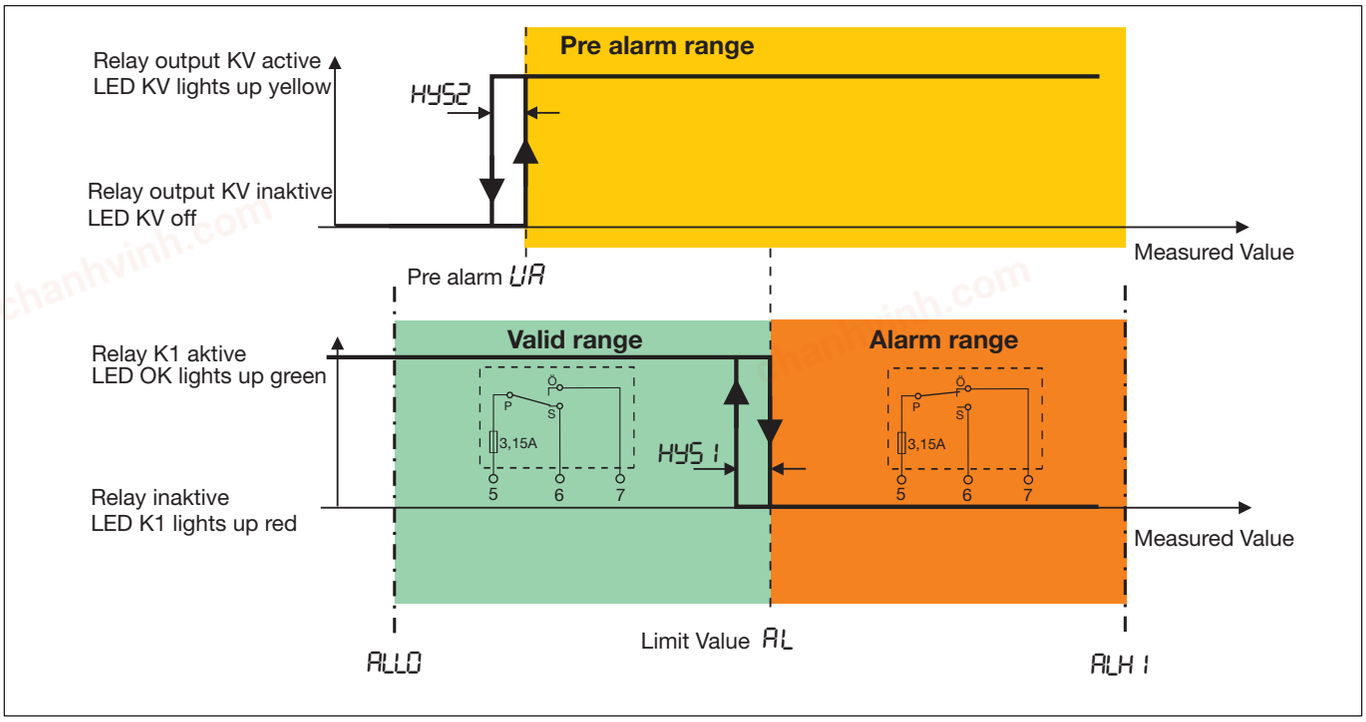
Voltage supply

Voltage supply	AC/DC 20 ... 30V, 48 ...63 Hz, AC 110 ... 240V +10% /-15%, 48 ... 63Hz
Power consumption	< 15 VA

Approval/approval marks

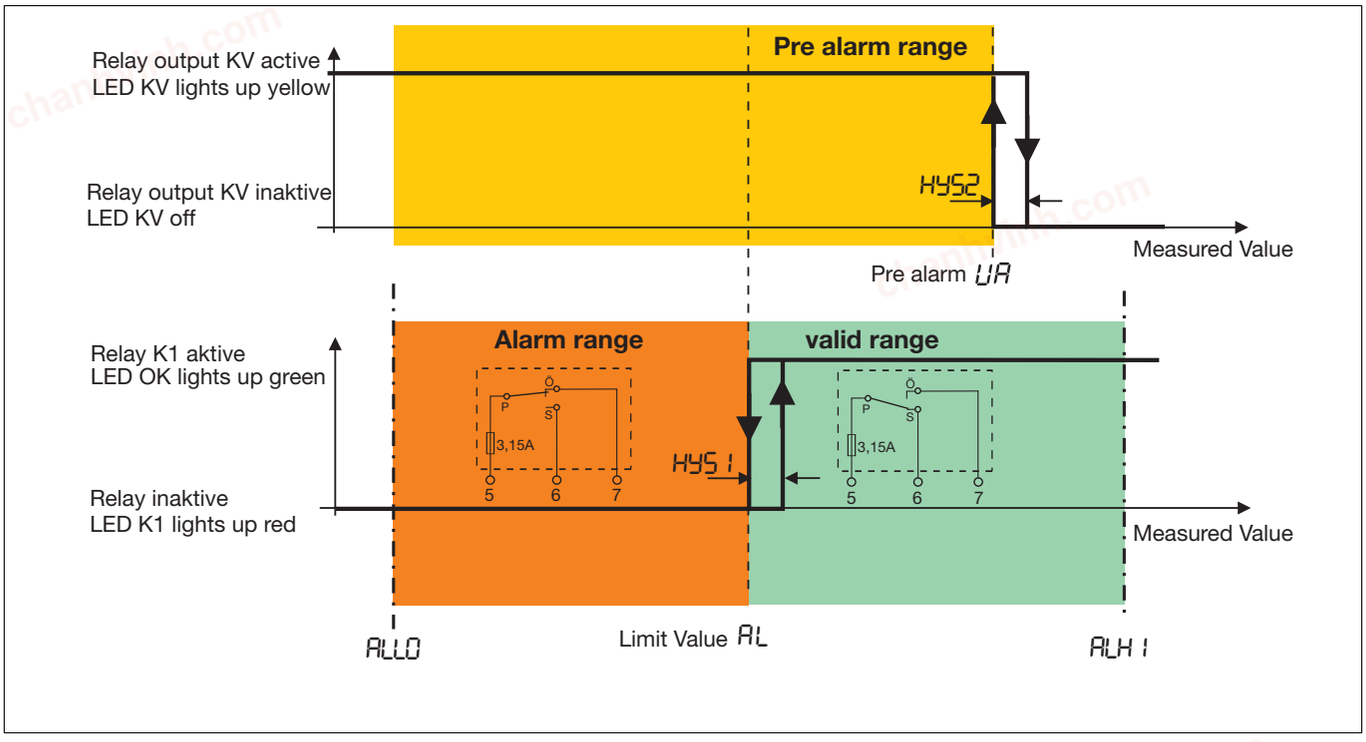
Approval marks	Inspection authority	Certificates/inspection numbers	Inspection basics	valid for
DIN	DIN CERTCO	TW/TB 1219	DIN EN 14597	all device versions
c UL us	Underwriters Laboratories	-	UL 60730-2-9 submitted	all device versions

Switching behavior inverse (ex-factory)

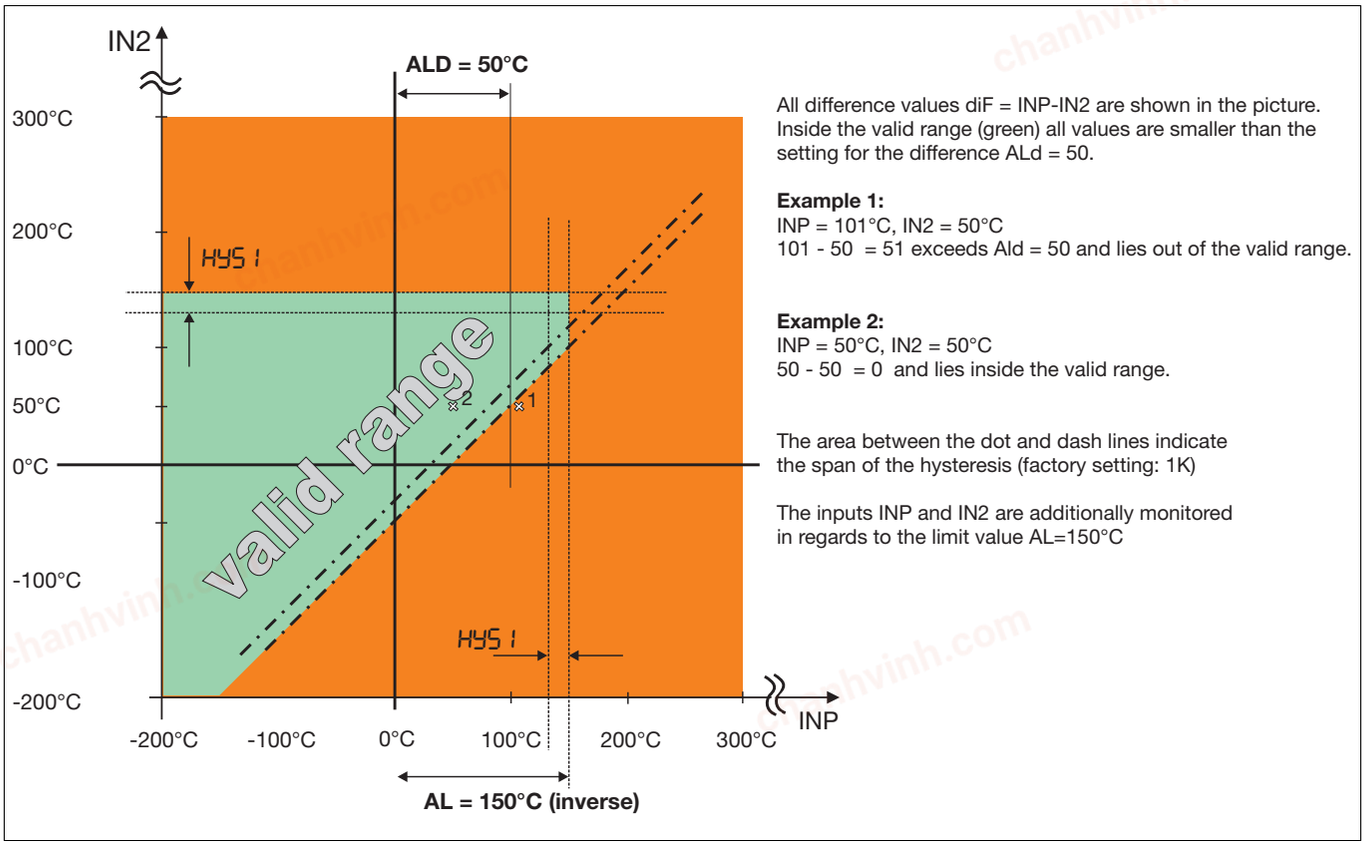


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Switching behavior, direct



Switching behavior with differential value calculation with prefix (ex-factory)



All difference values diF = INP-IN2 are shown in the picture. Inside the valid range (green) all values are smaller than the setting for the difference ALd = 50.

Example 1:
INP = 101°C, IN2 = 50°C
101 - 50 = 51 exceeds Ald = 50 and lies out of the valid range.

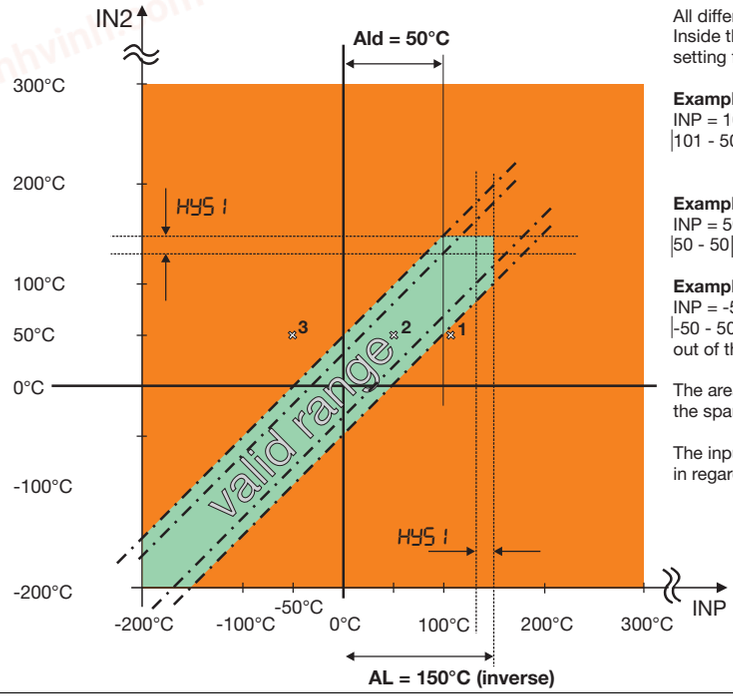
Example 2:
INP = 50°C, IN2 = 50°C
50 - 50 = 0 and lies inside the valid range.

The area between the dot and dash lines indicate the span of the hysteresis (factory setting: 1K)

The inputs INP and IN2 are additionally monitored in regards to the limit value AL=150°C

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Switching behavior with differential value as absolute value



All difference values diF = INP-IN2 are shown in the picture. Inside the valid range (green) all values are smaller than the setting for the difference ALd = 50.

Example 1:
INP = 101°C, IN2 = 50°C
|101 - 50| = 51 exceeds Ald = 50 and lies out of the valid range.

Example 2:
INP = 50°C, IN2 = 50°C
|50 - 50| = 0 and lies inside the valid range.

Example 3:
INP = -50°C, IN2 = 50°C
|-50 - 50| = 100 exceeds Ald = 50 and lies out of the valid range.

The area between the dot and dash lines indicate the span of the hysteresis (factory setting: 1K)

The inputs INP and IN2 are additionally monitored in regards to the limit value AL=150°C

Test voltages as per EN 60730, part 1

Input and output against voltage supply	
- at a voltage supply AC 110 ... 240V +10% /-15%	3.7kV/50Hz
- at a voltage supply AC/DC 20 ... 30V, 48...63 Hz	3.7kV/50Hz

Electrical safety

	Clearances and creep paths
Mains to electronic components and probe	≥ 6 mm / ≥ 8 mm
Mains to the relay	≥ 6 mm / ≥ 8 mm
Relay to electronic components and probe	≥ 6 mm / ≥ 8 mm
Relay to Relay	≥ 6 mm / ≥ 8 mm
Electrical safety	accord. to DIN EN 14597 (DIN EN 60730-2-9) Overvoltage category III, pollution degree 2
Protection type I	with internal separation to SELV current circuits

Environmental influences

Ambient temperature range	0 ... +55 °C
Storage temperature range	-30 ... +70 °C
Temperature coefficient	≤ ± 0.005 % / K dev. from 23 °C [1] for RTD temperature probes
	≤ ± 0.01 % / K dev. from 23 °C [1] for thermocouples, current, voltage
Ambient conditions	85 % rel. humidity without condensation (3K3 with extended temperature range as per DIN EN 60721-3-3)
EMC	according to DIN EN 14597 and standards from the standard series DIN EN 61326
Interference emission	Class B
Interference immunity	Test level for protective, regulation and control devices (RS) as per DIN EN 14597

1 All specifications referring to the measuring range limit value

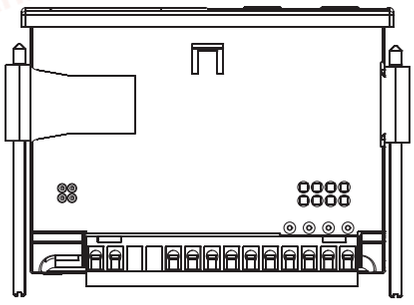
Housing

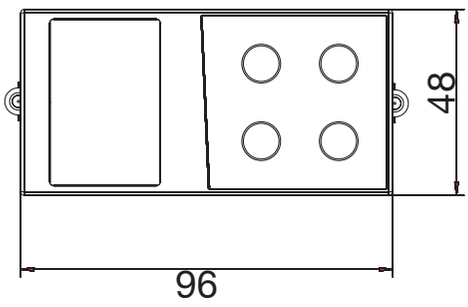
Material	Polycarbonate
Flammability class	UL 94 V0
Electrical connection	via plug-type screw-in terminals up to max. 2.5 mm^2
Installation	Panel mounting as per DIN IEC 61554
Installation position	vertical
Weight	approx. 175g
Protection type	as per DIN EN 60529, at the front IP 65, at the rear IP 20, degree of soiling 2

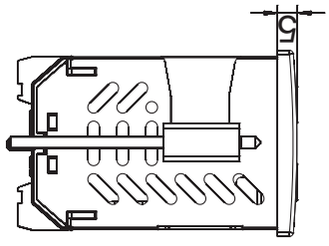
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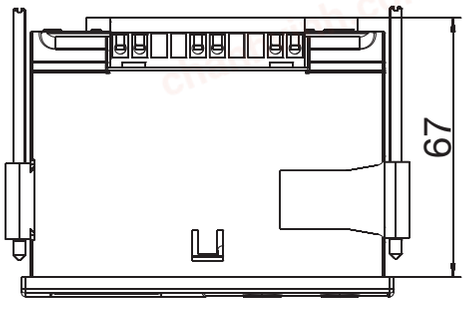
Dimensions

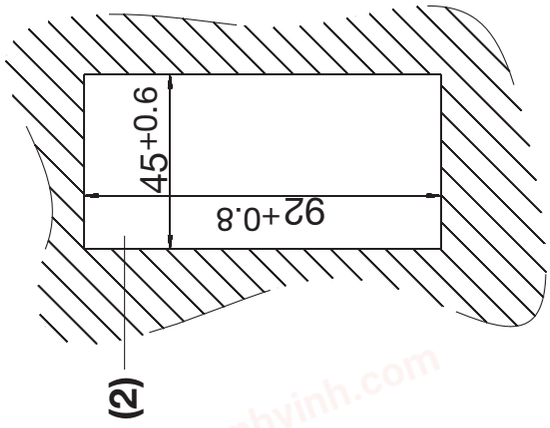
Type 701170/...

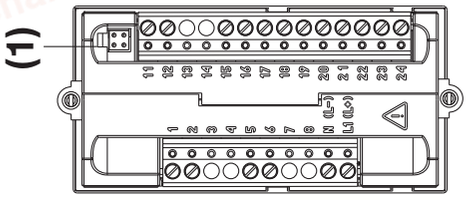












(1) Connection for PC interface via adapter (setup program).

(2) Panel cut-out for installation

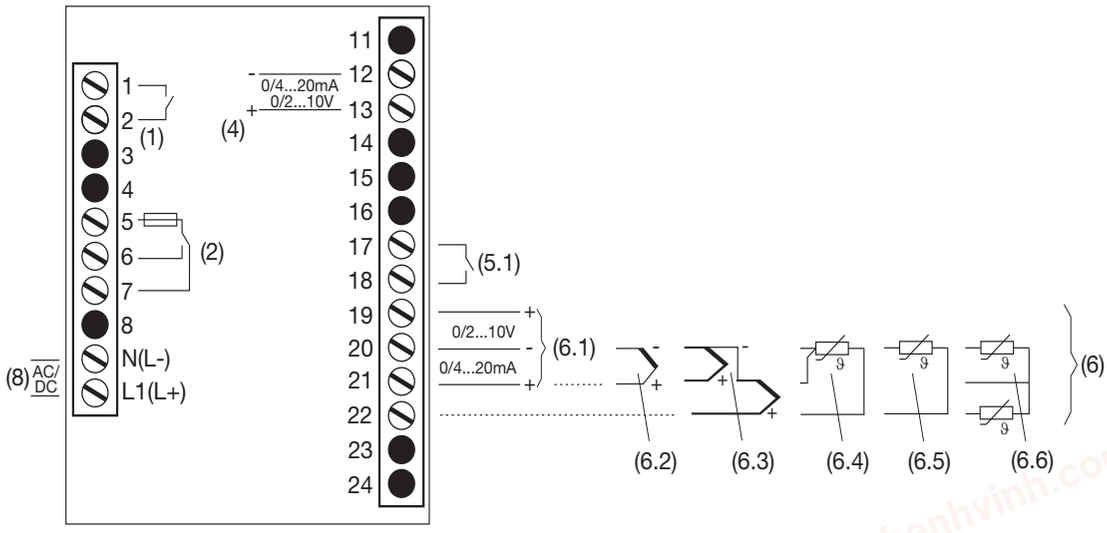
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Connection diagram

The connection diagram contained in the data sheet provides preliminary information about the connection possibilities. Only use the installation instructions or the operating manual for the electrical connection. The knowledge and the correct technical execution of the safety information/ instructions contained in these documents are prerequisite for installation, electrical connection and commissioning/ start-up as well as for safety during operation.

Lead	Admissible cross section
1 wire	≤ 2.5 mm²
fine-strand, with core-end ferrule	≤ 1.5 mm²

Connection via plug-in terminal strips.



Voltage supply as per rating plate	(8)	**AC** L1 Line conductor N Neutral	**DC** (L+) (L-)
Analog inputs	(6.2) **(6.3)**	Thermocouple/ **Double thermocouple** **(safety tested)**	
	(6.5)	**RTD temperature probe in 2-wire circuit** **(safety tested)** or KTY11-6 PTC in 2-wire circuit ☝ Enter the lead resistance for RTD temperature probes in 2-wire circuit when using greater line lengths. ⇒ Setup program: *edit⇒ extended configuration*	
	(6.4)	**RTD temperature probe in 3-wire circuit** **(safety tested)**	
	(6.6)	RTD temperature probe 2 x Pt100 in 2-wire circuit for differential value calculation (no lead compensation possible) INP (terminal 22 and 21) IN2 (terminal 21 and 20)	
	(6.1)	0... 20 mA **(4) ... 20 mA (safety tested)**	
		0(2) ... 10 V	
Binary input	(5.1)	for connection to potential-free contact	
Analog output **(extra code)**	(4)	**configurable:** 0... 20 mA, (4) ... 20 mA (ex-factory), 0 ... 10 V or 0(2) ... 10 V	
Relay output KV	(1)	Relay (N/O) without shroud	
Relay output K1	(2)	Relay (change-over contact element) with fuse cut-out	

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Probes for air

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
902006/65-228-1003-1-15-500-668/000	-	1 x Pt100	-170 ... +700°C	500	
902006/65-228-1003-1-15-710-668/000	-			710	
902006/65-228-1003-1-15-1000-668/000	-			1000	
902006/55-228-1003-1-15-500-254/000	-	1 x Pt100	-170 ... +700°C	500	
902006/55-228-1003-1-15-710-254/000	-			710	
902006/55-228-1003-1-15-1000-254/000	-			1000	
902006/65-228-2003-1-15-500-668/000	90.271-F01	2 x Pt100	-170 ... +700°C	500	Stop flange, movable
902006/65-228-2003-1-15-710-668/000	90.272-F01			710	
902006/65-228-2003-1-15-1000-668/000	90.273-F01			1000	
902006/55-228-2003-1-15-500-254/000	-	2 x Pt100	-170 ... +700°C	500	movable G1/2 compression clamp
902006/55-228-2003-1-15-710-254/000	-			710	
902006/55-228-2003-1-15-1000-254/000	-			1000	
Thermocouples Data Sheet 90.1006					
901006/65-547-2043-15-500-668/000	90.019-F01	2 x NiCr-Ni, Type „K“	-35 ... +800°C	500	Stop flange, movable
901006/65-547-2043-15-710-668/000	90.020-F01			710	
901006/65-547-2043-15-1000-668/000	90.021-F01			1000	
901006/65-546-2042-15-500-668/000	90.019-F11	2 x Fe-CuNi, Type „L“	-35 ... +700°C	500	
901006/65-546-2042-15-710-668/000	90.020-F11			710	
901006/65-546-2042-15-1000-668/000	90.021-F11			1000	
901006/66-550-2043-6-500-668/000	90.023-F01	2 x NiCr-Ni, Type „K“	-35 ... +1000°C	500	
901006/66-550-2043-6-355-668/000	90.023-F02			355	
901006/66-550-2043-6-250-668/000	90.023-F03			250	
901006/66-880-1044-6-250-668/000	90.021	1 x PT10Rh-PT, Type „S“	0 ... 1300°C	250	
901006/66-880-1044-6-355-668/000	90.022			355	
901006/66-880-1044-6-500-668/000	90.023			500	
901006/66-880-2044-6-250-668/000	90-D-021	2 x PT10Rh-PT, Type „S“	0 ... 1300°C	250	Stop flange, movable
901006/66-880-2044-6-355-668/000	90-D-022			355	
901006/66-880-2044-6-500-668/000	90-D-023			500	
901006/66-953-1046-6-250-668/000	90.027	1 x PT30Rh-PT6Rh, Type „B“	600 ... 1500°C	250	
901006/66-953-1046-6-355-668/000	90.028			355	
901006/66-953-1046-6-500-668/000	90.029			500	
901006/66-953-2046-6-250-668/000	90-D-027	2 x PT30Rh-PT6Rh, Type „B“	600 ... 1500°C	250	
901006/66-953-2046-6-355-668/000	90-D-028			355	
901006/66-953-2046-6-500-668/000	90-D-029			500	

Probes for water and oil

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
90.2006/10-402-1003-1-9-100-104/000		1 x Pt100	-40 ... +400°C	100	G1/2 screw connection
90.2006/10-402-2003-1-9-100-104/000		2 x Pt100		100	
902006/54-227-2003-1-15-710-254/000	90.272-F02	2 x Pt100	-170 ... 550°C	65...670	movable G1/2 compression clamp
902006/54-227-1003-1-15-710-254/000	90.272-F03	1 x Pt100		65...670	
902006/10-226-1003-1-9-250-104/000	90.239	1 x Pt100	-170 ... 480°C	250	G1/2 screw connection
902006/10-226-2003-1-9-250-104/000	90-D-239	2 x Pt100		250	
Thermocouples Data Sheet 90.1006					
901006/54-544-2043-15-710-254/000	90.020-F02	2 x NiCr-Ni, Type „K“	-35 ... 550°C	65...670	movable G1/2 compression clamp
901006/54-544-1043-15-710-254/000	90.020-F03	1 x NiCr-Ni, Type „K“		65...670	
901006/54-544-2042-15-710-254/000	90.020-F12	2 x FeCuNi, Type „L“		65...670	
901006/54-544-1042-15-710-254/000	90.020-F13	1 x FeCuNi, Type „L“		65...670	

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Note: Because of the high response accuracy, **only use thermowells** (pockets) that are **included in the scope of delivery**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
902006/53-505-2003-1-12-190-815/000	90D239-F03	2 x Pt100	-40 ... +400 °C	190	
902006/53-507-2003-1-12-100-815/000	90.239-F02	2 x Pt100 (arranged one below the other in protection tube)	-40 ... +480 °C	100	
902006/53-507-2003-1-12-160-815/000	90.239-F12			160	
902006/53-507-2003-1-12-190-815/000				190	
902006/53-507-2003-1-12-220-815/000	90.239-F22			220	
902006/53-507-1003-1-12-100-815/000	90.239-F01	1 x Pt100	-40 ... +480 °C	100	weld-in sleeve
902006/53-507-1003-1-12-160-815/000	90.239-F11			160	
902006/53-507-1003-1-12-220-815/000	90.239-F21			220	
902006/53-505-1003-1-12-190-815/000	90.239-F03	1 x Pt100	-40 ... +400 °C	190	
902006/53-505-3003-1-12-100-815/000	90.239-F07	3 x Pt100	-40 ... +400 °C	100	
902006/53-505-3003-1-12-160-815/000	90.239-F17			160	
902006/53-505-3003-1-12-220-815/000	90.239-F27			220	
902006/40-226-1003-1-12-220-815/000	90.280-F30	1 x Pt100	-170 ... +480°C	220	weld-in sleeve
902006/40-226-1003-1-12-160-815/000	90.280-F31			160	
902006/40-226-1003-1-12-100-815/000	90.280-F32			100	
Thermocouples Data Sheet 90.1006					
901006/53-543-1042-12-220-815/000	90.111-F01	1 x Fe-CuNi Type „L“	-35 ... 480°C	220	weld-in sleeve
901006/53-543-2042-12-220-815/000	90.111-F02	2 x Fe-CuNi Type „L“		220	

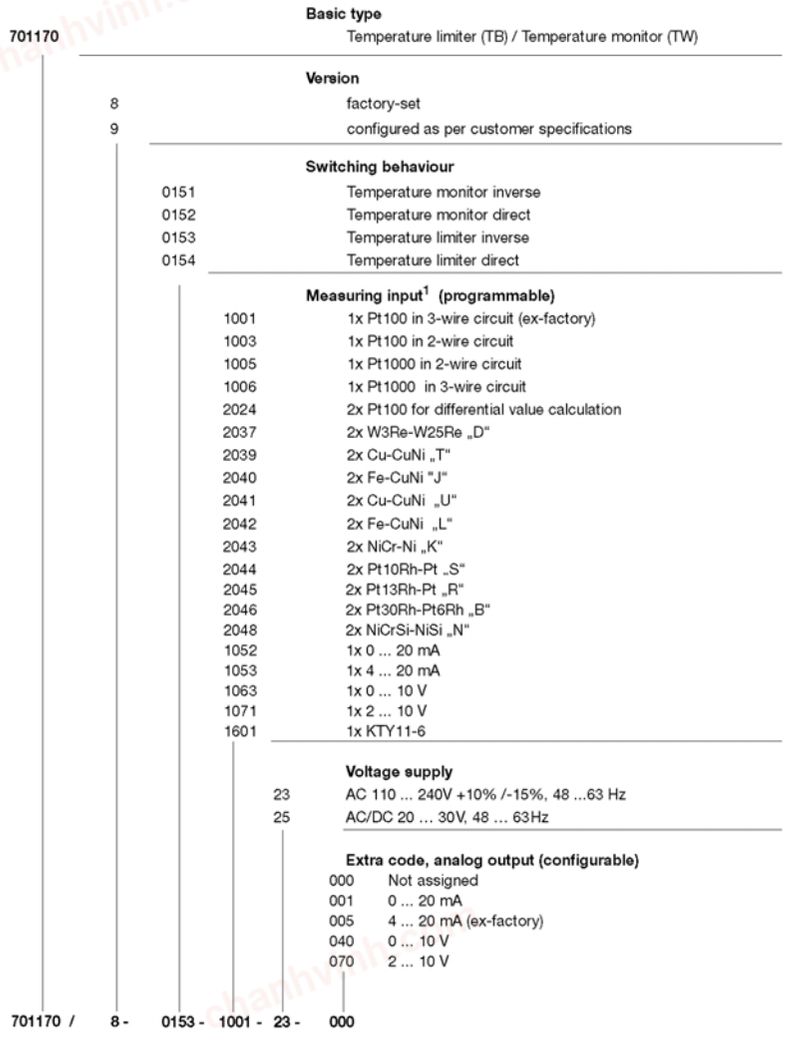
Probes for water, oil, and air

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Install. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
90.2006/10-390-1003-1-8-250-104/000	90.210-F95	1 x Pt100	max. 300°C	250	
Thermocouples Data Sheet 90.1006					
901006/45-551-2043-2-xxxx-11-xxxx		2 x NiCr-Ni, Type „K“	max. 1550°C	50...2000	

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Order details



1. The first number on the measuring input means single probe "1" or double probe "2"

Scope of delivery

1 JUMO safety**M** TB/TW 08 (including seal and fastening elements)
1 Operating manual B701170.0

Accessories

Article	Sales No.
Setup program, multilingual	70/00548543
PC interface with TTL/RS232C converter and adapter (socket connector)	70/00350260
PC interface with USB/TTL converter, adapter (socket connector) and adapter (pins)	70/00456352
External unlocking button RT	70/97097865

Stock versions

Order code	Sales No.
701170/8-0153-1001-25/005.00	70/00531468
701170/8-0153-1001-23/000.00	70/00534932
701170/8-0153-1001-25/000.00	70/00534933
701170/8-0153-1001-23/005.00	70/00547738