

Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO House
Temple Bank, Riverway
Harlow, Essex CM 20 2TT, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

885 Fox Chase, Suite 103
Coatesville PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
e-mail: info@JumoUSA.com
Internet: www.JumoUSA.com



JUMO TB/TW

Temperature limiter, temperature monitor

with LC display for mounting on 35mm DIN rails



Brief description

The **JUMO** TB/TW is a freely programmable temperature limiting device.

The measurement input is freely configurable for resistance thermometers and thermocouples, as well as for current and voltage signals.

TB/TWs monitor thermal processes in systems for a set limit value. If this is exceeded, the built-in relay switches the system to a safe operational state and the LED K1 lights up.

When the system returns to the o.k. region, the reset button (on the TB) has to be released manually using an appropriate tool.

The TW, on the other hand, is reset automatically without any external action.

The 4.5V/20mA logic output produces a pre-alarm signal at an adjustable temperature before reaching the limit value, which is additionally indicated via the LED K2.

TB/TWs are mounted on DIN rails and wired up by means of screw terminals with 2.5mm² max. conductor cross-section.

A PC setup program is available as an accessory, which can be used to set and store probe type, range, output action and inhibits.



Overview of function

Measurement input

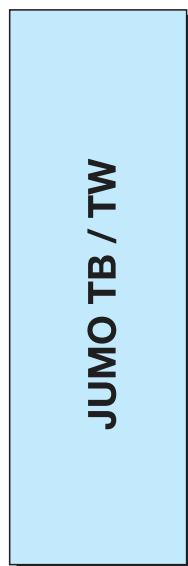
Pt100, Pt1000 in 2-wire or 3-wire circuit
2xPt100 for differential meas.
KTY11-6, thermocouples,
twin thermocouple
current input 0/4 — 20 mA
or
voltage input 0/2 — 10V

Logic input

- unlocking
- key locking
- level locking

Supply

110 — 240V AC +10% /-15%
48 — 63Hz,
20 — 53V AC/DC 48 — 63Hz



Setup interface

for configuration from PC

Relay output

changeover contact

Logic output

voltage/current
4.5V/20mA

LC display

2-line display for
visualizing measurement and
parameters

Type 701140/ ...

Key features

- Setup program for configuring and archiving via PC
- Clear, easy-to-read alphanumerical display
- Digital input filter with adjustable filter time constant
- Short 90 msec sampling interval
- Pre-alarm adjustable as absolute value or relative to limit value
- Wide supply voltage range
110 — 240V AC +10% /-15%V
- Configurable as TB or TW
- 17 linearizations can be set
- Internal and external locking options
- 2xPt100 input for differential measurement

Technical data

Input for resistance thermometer

Designation	Range	Accuracy ¹
Pt100 EN 60 751	-200 to +850 °C	0.1 %
KTY11-6 PTC	-50 to +150 °C	1 %
Pt1000 DIN	-200 to +850 °C	0.1 %
Connection circuit	2-, 3-wire	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 100sec	
Special features	2xPt100 for differential measurement, display can also be programmed in °F	

Input for thermocouple

Designation	Range	Accuracy ¹
Fe-Con L DIN 43 710	-200 to +900 °C	0.4 %
Fe-Con J EN 60 584	-200 to +1200 °C	0.4 %
Cu-Con U DIN 43 710	-200 to +600 °C	0.4 %
Cu-Con T EN 60 584	-200 to +400 °C	0.4 %
NiCr-Ni K EN 60 584	-200 to +1372 °C	0.4 %
NiCrSi-NiSi N EN 60 584	-100 to +1300 °C	0.4 %
Pt10Rh-Pt S EN 60 584	0 to +1768 °C	0.4 %
Pt13Rh-Pt R EN 60 584	0 to +1768 °C	0.4 %
Pt30Rh-Pt6Rh B EN 60 584	+300 to +1820 °C	0.4 %
W3Re-W25Re D	0 to +2495 °C	0.4 %
Cold junction	Pt100 internal	
Cold junction accuracy	± 1 °C	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 100sec	
Special features	can also be programmed in °F	

1. The accuracy refers to the maximum range span.

With smaller ranges and shorter spans, the linearization accuracy is reduced.

Analog input for DC voltage, DC current

Range	Accuracy	Input resistance
0 — 20mA 4 — 20mA	0.1 %	$R_E < 4 \Omega$
0 — 10V 2 — 10V	0.1 %	$R_E > 100 \text{ k}\Omega$
Scaling	freely programmable within the limits	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 — 100sec	

Logic input

Connection	Function
Floating contact	Unlocking, key locking, level locking are configurable

Measuring circuit monitoring

	Resistance thermometer and KTY11-6	Thermocouple	Current / voltage
Over/underrange	is recognized	is recognized	is recognized
Probe/lead break	is recognized	is recognized	is recognized with 4 — 20mA and 2 — 10V
Probe short-circuit	is recognized	is recognized with twin thermocouples only	is recognized with 4 — 20mA and 2 — 10V

Supply

Supply voltage	20 — 53V AC/DC, 48 — 63 Hz 110 — 240V AC +10% /-15%
Power consumption	5 VA

Outputs

Relay, no contact protection circuit	150,000 operations at a contact rating of 3A/230V 50Hz resistive load
Logic output	4.5V/20mA logic signal, short-circuit proof

Switching action at limit value

Inverse switching action	
Logic output, pre-alarm Relay K1 LED K1	Logic output active LED K2 illuminated Logic output inactive and LED K2 off Relay K1 active Relay inactive LED K1 illuminated LED K1 off Pre-alarm region Alarm region Pre-alarm setpoint Limit value R_L Measurement $R_L LO$ $R_L HI$
Direct switching action	
Logic output, pre-alarm Relay K1 LED K1	Logic output active LED K2 illuminated Logic output inactive and LED K2 off Relay K1 active Relay inactive LED K1 illuminated LED K1 off Alarm region Pre-alarm region Pre-alarm setpoint Limit value R_L Measurement $R_L LO$ $R_L HI$

Test voltages to EN 60 730, Part 1

Between input or output and supply	
- with supply voltage 110 — 240V AC +10% /-15%	3.75kV/50Hz
- with supply voltage 20 — 53V AC/DC, 48 — 63 Hz	2.5kV/50Hz

Electrical safety

Clearance and creepage distances for normal environment to EN 60730-1, Table 20.1

Between mains supply and electronics and probe	≥ 8 mm
Between mains supply and relay	≥ 8 mm
Between relay and electronics and probe	≥ 8 mm

The instrument can be connected to SELV circuits.

Environmental influences

Ambient temperature range	0 to +55 °C
Storage temperature range	-30 to +70 °C
Temperature error	≤ ± 0.005 % per °C deviation from 23 °C ¹ with resistance thermometers ≤ ± 0.01 % per °C deviation from 23 °C ¹ with thermocouples, current, voltage
Climatic conditions	75 % rel. humidity, no condensation
EMC	EN 61 326
Interference emission	Class B
Noise immunity	industrial requirements

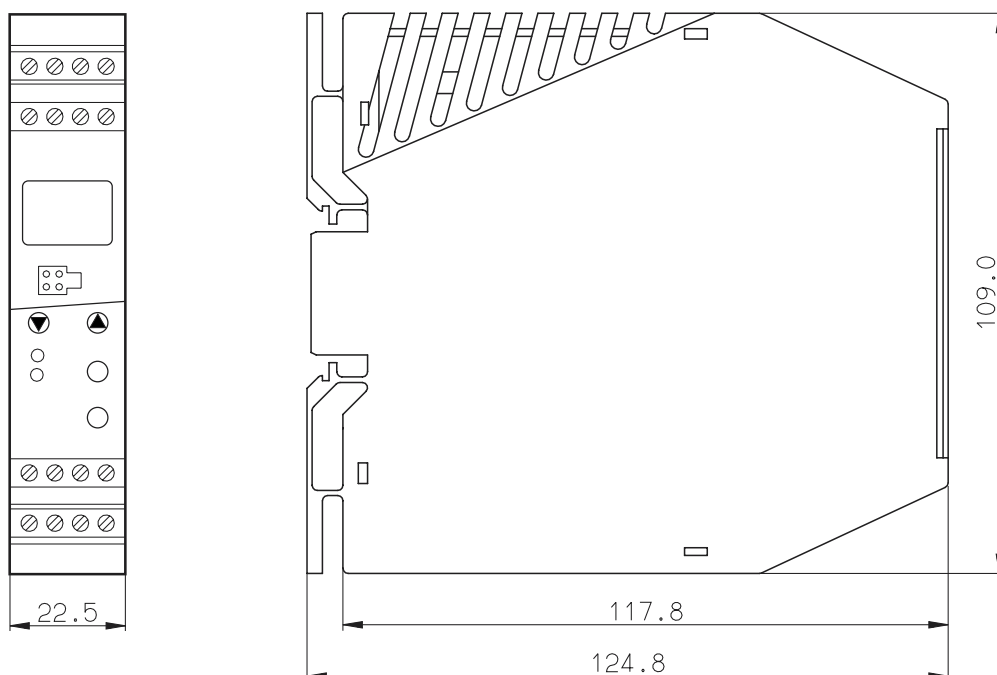
1. All data refer to the full scale value

Housing

Material	polyamide (PA 6.6)
Screw terminals	0.2 — 2.5mm ² screw terminal
Mounting	on 35mm x 7.5mm DIN rail to EN 50 022
Operating position	vertical
Weight	160g approx.

Dimensions

Type 701140/...



Connection diagram

	Supply as on nameplate	AC L1 line N neutral	DC L+ L-	
	Analog inputs	Thermocouple		
		Twin thermocouple		
		KTY11-6 PTC in 2-wire circuit For longer leads, resistance thermometers in 2-wire circuit must be changed over to c111=001 (3-wire circuit) and compensated with a resistor. Compensation condition: $R_{\text{lead}} = R_{\text{comp}}$		
		Resistance thermometer in 3-wire circuit		
		Resistance thermometer 2 x Pt100 in 2-wire circuit for differential measurement (no lead compensation possible)		
		0 – 20 mA, 0 – 10 V		
	Logic input	for connection to floating contact		
	Logic output	4.5 V/ 20 mA (short-circuit proof)		
	Relay output	relay without contact protection circuit		

DIN approved probes for operation in air

RTDs to Data Sheet 90.2006	Probe type	Temperature range	Nom. length mm	Process connection
90.271-F01	2 x Pt100	-170 to +700°C	500	sliding stop flange
90.272-F01			710	
90.273-F01			1000	
90 2006/55...	2 x Pt100	-170 to +700°C	500	sliding clamping thread G1/2
90 2006/55...			700	
90 2006/55...			100	
Thermocouples to Data Sheet 90.1006	Probe type	Temperature range	Nom. length mm	Process connection
90.019-F01	2 x NiCr-Ni, Type K	-35 to +800°C	500	sliding stop flange
90.020-F01			710	
90.021-F01			1000	
90.019-F11	2 x Fe-Con, Type L	-35 to +700°C	500	
90.020-F11			710	
90.021-F11			1000	
90.023-F01	2 x NiCr-Ni, Type K	-35 to +1000°C	500	
90.023-F02			355	
90.023-F03			250	
90.021	1 x PT10Rh-PT, Type S	0 to 1300°C	250	
90.022			355	
90.023			500	
90-D-021	2 x PT10Rh-PT, Type S	0 to 1300°C	250	
90-D-022			355	
90-D-023			500	
90.027	1 x PT30Rh-PT6Rh, Type B	600 to 1500°C	250	
90.028			355	
90.029			500	
90-D-027	2 x PT30Rh-PT6Rh, Type B	600 to 1500°C	250	
90-D-028			355	
90-D-029			500	

DIN approved probes for operation in water and oil

RTDs to Data Sheet 90.2006	Probe type	Temperature range	Fitting length mm	Process connection
90.2006/10...	1 x Pt100	-40 to +400°C	100	G1/2 thread
90.2006/10...	2 x Pt100		100	
90.272-F02	2 x Pt100	-170 to +550°C	65 — 670	sliding clamping thread G1/2
90.272-F03	1 x Pt100		65 — 670	
90.239	1 x Pt100	-170 to +480°C	250	G1/2 thread
90-D-239	2 x Pt100		250	
90.239-F01	1 x Pt100	-40 to +480 °C	100	weld-in pocket
90.239-F11			160	
90.239-F21			220	
90.239-F03	1 x Pt100	-40 to +400 °C	190	
90D239-F03	2 x Pt100	-40 to +400 °C	190	
90.239-F02	2 x Pt100	-40 to +480 °C	100	
90.239-F12			160	
90.239-F22			220	
90.239-F07	3 x Pt100	-40 to +400 °C	100	
90.239-F17			160	
90.239-F27			220	
90.280-F30	1 x Pt100	-170 to +480°C	220	
90.280-F31			160	
90.280-F32			100	
Thermocouples to Data Sheet 90.1006	Probe type	Temperature range	Fitting length mm	Process connection
90.020-F02	2 x NiCr-Ni, Type K	-35 to +550°C	65 — 670	sliding clamping thread G1/2
90.020-F03	1 x NiCr-Ni, Type K		65 — 670	
90.020-F12	2 x Fe-Con, Type L		65 — 670	
90.020-F13	1 x Fe-Con, Type L		65 — 670	
90.111-F01	1 x Fe-Con Type L	-35 to +480°C	220	weld-in pocket
90.111-F02	2 x Fe-Con Type L		220	

Order details

		(1)	Basic version	
		701140	JUMO temperature limiter (TB) / temperature monitor (TW)	
		(2)	Basic type extension (programmable)	
		0151	Temperature monitor, inverse	
		0152	Temperature monitor, direct	
		0153	Temperature limiter, inverse	
		0154	Temperature limiter, direct	
X		888	programmable, factory-set	
X		999	programmable, configuration to customer specification ¹	
		(3)	Measurement input	
		001	Pt100 in 3-wire circuit	
		003	Pt100 in 2-wire circuit	
		005	Pt1000 in 2-wire circuit	
		006	Pt1000 in 3-wire circuit	
		024	2xPt100 for differential measurement	
		037	W3Re-W25Re	D
		039	Cu-Con	T
		040	Fe-Con	J
		041	Cu-Con	U
		042	Fe-Con	L
		043	Ni-CrNi	K
		044	Pt10Rh-Pt	S
		045	Pt13Rh-Pt	R
		046	Pt30Rh-Pt6Rh	B
		048	NiCrSi-NiSi	N
		052	0 — 20 mA	
		053	4 — 20 mA	
		063	0 — 10 V	
		071	2 — 10 V	
		601	KTY11-6	
X		888	programmable, factory-set	
X		999	programmable, configuration to customer specification ¹	
		(4)	Supply	
X		23	110 — 240V AC +10% /-15%, 48 — 63Hz	
X		22	20 — 53V AC/DC, 48 — 63Hz	
		(5)	Approvals	
X		000	no approval	
X		061	UL approval	

 factory-set

1. For configuration to customer specification, please specify in plain text

	(1)	(2)	(3)	(4)	(5)
Order code					
Order example	701140	- 888	- 888	- 22	- 000

Standard accessory

- 1 Operating Manual

Accessories

- Setup program
- **PC interface with TTL/RS232C converter and adapter (4-pole socket)**
for connecting the TB/TW to a PC
- External reset button, Sales No. 70/97097865