

JUMO GmbH & Co. KG
 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 Instrument Co. Ltd.
 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

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



Electronic Thermostat TE-1

Brief description

The TE-1 electronic thermostat is a temperature controller with ON/OFF action, in a housing for DIN rail or wall mounting. The relay at the controller output switches in accordance with the temperature at the probe (process value x) and the value that has been selected as the setpoint (w).

The setpoint is selected as an analog value on a scale, by means of a knob on the front of the controller. The knob is fitted with an adjustable stop for range restriction or limitation. An adjustable switching differential is a standard feature, as is zero-point adjustment.

Suitable probes that may be connected are platinum resistance sensors with a positive temperature coefficient to EN 60584 (Pt100) in 2-wire or 3-wire circuit, or thermocouples (NiCr-Ni) to EN 60584.



Types

Type	for connection to	Switching action
TE-1wO	Pt100 resistance thermometer as standard: 2-wire circuit	break action (SPST-NC) (standard) relay de-energized at $x \geq w$
TE-1wS		make action (SPST-NO) relay energized at $x > w$
TE-1tO	Thermocouple NiCr-Ni K	break action (SPST-NC) (standard) relay de-energized at $x \geq w$
TE-1tS		make action (SPST-NO) relay energized at $x > w$

Extra codes	code	description
	b3	front-panel mounting by means of 2 screws
	ka	terminal cover, IP40 protection
	sw	dust-tight and water-jet proof housing, polycarbonate, IP65 protection

Technical data

Electrical data

Supply voltage	as standard:	230 V AC +10/-15%, 48 – 63 Hz 115 V AC +10/-15%, 48 – 63 Hz 24 V DC +10/-15% other voltages on request
Contact rating		10 A, 250 V AC resistive load, 300000 operations at rated load 10 A, 24 V DC
Power drawn		max. 3 VA
Controller output		relay with floating changeover contact; for 3-wire circuit: only 1 break (SPST-NC) or 1 make (SPST-NO) to EN 61326
Electromagnetic compatibility		interference emission: Class B, interference immunity: to industrial requirements
Electrical connection		via screw terminals, max. conductor cross-section: 4 mm ²
Electrical safety	to EN 60730-1	overvoltage category III pollution degree 2
		for 24 V DC supply: SELV and PELV operation
		creepage distance equals air gaps: mains supply to electronics and probe \geq 6 mm mains supply to relay \geq 3 mm relay to electronics and probe \geq 6 mm

JUMO GmbH & Co. KG
 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 Instrument Co. Ltd.
 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

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



Measurement input: Pt100 resistance thermometer

Control ranges	Control range °C	Relay is de-energized at a probe temperature below:
	-50 to + 30 -20 to + 40 0 to + 50 0 to +100 0 to +150 0 to +200 0 to +300 0 to +400 0 to +500	- 85°C - 45°C - 25°C - 40°C - 65°C - 85°C -130°C -165°C -225°C
Probe cable error	When using a 2-wire temperature probe with a probe cable that is different from the standard types (lead resistance $R_L = 165 \text{ m}\Omega$), there will be an error of about 1°C per 0.39 Ω change in lead resistance. This means that, if the probe cable is extended using a 2-core copper cable, the following error will occur:	
	Core cross-section	Temperature change per meter of cable
	0.50 mm ² 0.75 mm ² 1.00 mm ² 1.50 mm ²	0.18 °C/m 0.12 °C/m 0.09 °C/m 0.06 °C/m
	In the case of a 3-wire circuit, the probe cable length is internally compensated.	
Measuring circuit monitoring	The resistance probe and the probe cable are monitored for break and short-circuit. In the event of a fault, the relay switches to the de-energized state.	

Measurement input: NiCr-Ni thermocouple

Control ranges	Control range °C
	+200 to + 600 +400 to + 800 +600 to +1000 +800 to +1200
Measuring circuit monitoring	The thermocouple and compensating cable are monitored for break.
Temperature compensation	provided as standard

Operating data

Switching point accuracy	± 2% of control range span
Switching differential	adjustable from 0.25 to 5%, factory-set to minimum value
Zero-point correction	enables the optimum matching of the switching point and probe accuracy to the respective working point or range
Permissible ambient temperature	in operation -10 to +50°C
Permissible storage temperature	-40 to +75°C
Ambient temperature error	< 0.5% per 10 °C
Climatic conditions	relative humidity ≤ 75% annual mean, no condensation

Housing

Enclosure protection to EN 60529	standard: IP20
	with extra code ka: IP40
	with extra code sw: IP65
Housing	plastic housing, polycarbonate; color: light gray, RAL 7035
Relay status indication	The yellow LED on the front indicates that the relay is energized.
Mounting	standard: on rail to EN 60715, 35 x 7.5 mm
Operating position	unrestricted
Weight	approx. 200 gm



Block diagram

Operation

The sensor signal of the temperature probe (1) is linearized and amplified at the input stage (2) and reaches the comparator (3) as process value x . The comparator forms the difference between the process value x and the setpoint w that was set on the setpoint knob (4), resulting in the control deviation $x_w = x - w$.

The contact action O or S is determined internally, through links (5). The difference signal produced during a control deviation acts through the integrated amplifier (7) on the subsequent trigger stage (8). The switching differential x_{sd} of the trigger stage is adjusted by means of the potentiometer (9). The trigger output signal uses the transistor (11) to operate the relay, which has a floating changeover contact (12). In the case of type TE-1w in 3-wire circuit, only one make or one break contact is available. The "relay energized" status is indicated by the LED (10).

The measurement circuit monitor (6), which comes as standard, checks the probe and the probe cable for break or short-circuit. The voltage required to operate the modules is generated and stabilized in the power supply (13).

Electrical connection

Type TE-1 as standard	Type TE-1w 3-wire circuit					
		Connection for	Typ	Control status	Terminals	
		Relay output (41 not applicable with 3-wire circuit)	O	$x \geq w^*$	41 br�ak (SPST-NC) 42 common 43 make (SPST-NO)	
			S	$x \leq w$		
			Code		L1 line	
		Supply		AC	N neutral	
				DC	L+ L-	
		Resistance thermometer in 2-wire circuit		w	11 12	
		Thermocouple (NiCr-Ni)		t	11 12	
		Resistance thermometer in 3-wire circuit (Pt100)		w...-dl	11 12 14	

* x = process value, w = setpoint

JUMO GmbH & Co. KG
 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 Instrument Co. Ltd.
 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

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



Dimensions

<p>Type TE-1 is standard</p>	
<p>Extra code</p>	
<p>ka with terminal cover</p>	
<p>b3 for front-panel mounting</p>	
<p>SW housing, polycarbonate IP65 protection</p>	

Temperature probe see sectional catalog 90 "Transducers" for additional temperature probes and styles

JUMO GmbH & Co. KG
 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 Instrument Co. Ltd.
 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

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13032, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



Order details for the Electronic Thermostat TE-1

Stock items:

(delivery 3 working days after receipt of order)

Supply voltage 230 V AC +10/-15%, 48 – 63 Hz

Sales No.	Type	Control range °C	Probe input
60/60001962	TE-1w O	-50+30	Pt100 in 2-wire circuit
60/60001923	TE-1w O	-20+40	
60/60001924	TE-1w O	0+50	
60/60001925	TE-1w O	0+100	
60/60001953	TE-1w O	0+150	
60/60001954	TE-1w O	0+200	
60/60001955	TE-1w O	0+300	
60/60001956	TE-1w O	0+400	
60/60001961	TE-1w O	0+500	
60/60002137	TE-1t O	+200+600	
60/60002138	TE-1t O	+400+800	
60/60002139	TE-1t O	+600+1000	
60/60002140	TE-1t O	+800+1200	

Non-stock items:

Order code	(1) Basic type		
605501	TE-1		
	(2) Basic type extension		
11	TE-1 wO with break action	for Pt100 in 2-wire circuit	standard
12	TE-1 wS with make action	for Pt100 in 2-wire circuit	standard
21	TE-1 wO with break action	for Pt100 in 3-wire circuit	
22	TE-1 wS with make action	for Pt100 in 3-wire circuit	
31	TE-1 tO with break action	for thermocouples NiCr-Ni	
32	TE-1 tS with make action	for thermocouples NiCr-Ni	
	(3) Control ranges		
011	-50 to 30°C		
013	-20 to 40°C		
021	0 to 50°C		
025	0 to 100°C		
027	0 to 150°C	only with	
028	0 to 200°C	Pt100 resistance thermometer	
030	0 to 300°C		
031	0 to 400°C		
032	0 to 500°C		
086	200 to 600°C		
087	400 to 800°C		
088	600 to 1000°C	only with NiCr-Ni thermocouple	
089	800 to 1200°C		
	(4) Supply		
02	230 V AC +10/-15%, 48 – 63 Hz		
05	115 V AC +10/-15%, 48 – 63 Hz		
29	24 V DC +10/-15%		
	(5) Extra codes		
706	b3 front-panel mounting by 2 screws M3		
717	ka terminal cover, IP40 protection		
718	sw dust-tight and waterjet-proof housing, IP65 protection		

Order code

(1) / (2) - (3) - (4) / (5)
 605501 / .. - ... - .. / ...

Order example

605501 / 11 - 025 - 02 / 706

TE-1 wO with break action, for Pt100 in 2-wire circuit
 control range 0 to +100°C
 230 V AC +10/-15%, 48 – 63 Hz
 front-panel mounting by 2 screws M3