TB 40-1
Temperature Limiter

Applicable for heating and cooling applications

For all types of thermocouples and resistance transducers

BluePort® Front interface and BlueControl Software

Maintenance manager and error list

Alarm reset via RESET-key

Alarm reset via digital

Type tested to the European *Pressure Equipment Directive*

universal line

APPLICATIONS

- All applications where an over or under temperature fault condition could present fire hazard or other hazard
- Heat generating plants with outflow temperatures up to 120°C (DIN 4751)
- Hot-water plants with outflow temperatures above 110°C (DIN 4752)
- Thermal transfer plants with organic transfer media (DIN 4754)
- Oil-heated plants (DIN 4755)

DESCRIPTION

Front interface and Engineering Tool

Via the BlueControl software incl. its simulation functions, and especially the convenient BluePort® front panel interface, the required set-up for a specific control task can be determined without a detailed study of the operating instructions.

Plug-in module

KS 40-1 controllers are built as plug-in modules. This enables them to be replaced very quickly without tools, and without disturbing the wiring. Off cause almost all adjustments can be done comfortably over the instrument front. (see page 4, BlueControl)

Password protection

The access to the limit value is protected with a password and the internal security switch.

TECHNICAL DATA

INPUTS

PROCESS VALUE INPUT INP1

Resolution:	> 14 bits
Decimal point:	0 to 3 decimals
Limiting frequency:	2 Hz
Digital input filter:	adjustable 0,000...9999 s
Scanning cycle:	100 ms
Measured value correction:	2-point or offset correction

Thermocouples (Table 1)

Input impedance:	≥ 1 MΩ
Effect of source resistance:	1 µV/Ω

Cold junction compensation

Max. additional error	± 0,5 K

Sensor break monitoring

Sensor current:	≤ 1 µA

Operating sense configurable (see page 2)

Resistance thermometer

Connection:	3-wire
Lead resistance:	max. 30 Ω
Input circuit monitor:	Break and short circuit

Resistance measuring range

The BlueControl software can be used to match the input to the sensor KTY 11-6 (characteristic is stored in the controller).

Physical measuring range:	0...4500 Ω
Linearization segments	16

Current and voltage signals

Span start, end of span:	anywhere within measuring range
Scaling:	selectable -1999...9999
Linearization:	16 segments, adaptable with BlueControl
Decimal point:	adjustable
Input circuit monitor:	12,5% below span start (2mA, 1V)

CONTROL INPUT DI1 (RESET)

Connection of a potential-free contact suitable for switching „dry" circuits.

Switched voltage:	2,5 V
Switched current:	50 µA

OUTPUTS

LC RELAY OUTPUT

Function

Interruption of heating or cooling power supply if the adjusted limit is reached.

Contacts:	Potential-free changeover contact
Max. contact rating:	500 VA, 250 VAC, 2A at 48...62 Hz, resistive load
Min. contact rating:	5 V, 10 mA AC/DC
Operating life (electric):	600.000 duty cycles with max. rating

RELAY OUTPUTS OUT1, OUT2

Function

Additional alarms with max, min or max and min monitoring with adjustable hysteresis

Signals which can be monitored:

- Process value (absolute)
- Difference between process value and adjusted limit value LC (relative)
- Sensor break or short circuit (Pt100)

Depending on selected input type, the input signal is monitored for break and short circuit.

Contacts:	2 NO contacts with common connection
Max. contact rating:	500 VA, 250 VAC, 2A at 48...62 Hz, resistive load
Min. contact rating:	6 V, 1 mA DC
Operating life (electric):	800.000 duty cycles with max. rating

Table 1 Thermocouple ranges

Thermocouple		Range		Accuracy	Resolution (∅)
L	Fe-CuNi (DIN)	-100...900°C	-148...1652°F	≤ 2 K	0,1 K
J	Fe-CuNi	-100...1200°C	-148...2192°F	≤ 2 K	0,1 K
K	NiCr-Ni	-100...1350°C	-148...2462°F	≤ 2 K	0,2 K
N	Nicrosil/Nisil	-100...1300°C	-148...2372°F	≤ 2 K	0,2 K
S	PtRh-Pt 10%	0...1760°C	32...3200°F	≤ 2 K	0,2 K
R	PtRh-Pt 13%	0...1760°C	32...3200°F	≤ 2 K	0,2 K
T	Cu-CuNi	-200...400°C	-328...752°F	≤ 2 K	0,05 K
C	W5%Re-W26%Re	0...2315°C	32...4199°F	≤ 2 K	0,4 K
D	W3%Re-W25%Re	0...2315°C	32...4199°F	≤ 2 K	0,4 K
E	NiCr-CuNi	-100...1000°C	-148...1832°F	≤ 2 K	0,1 K
B[1]	PtRh-Pt6%	0(400)...1820°C	32(752)...3308°F	≤ 3 K	0,3 K
Special		-25....75 mV		≤ 0,1 %	0,01 %

(1) values applied above 400°C

Table 2 RTD's

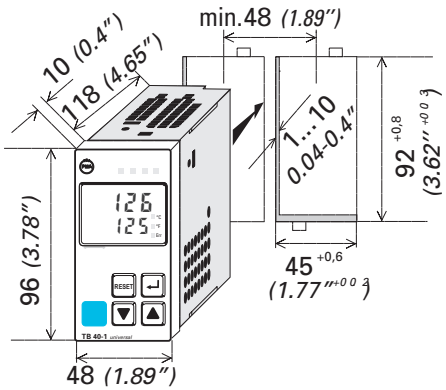
Type	Sensor current	Range		Accuracy	Resolution (∅)
Pt100	0,2 mA	-200...850°C	-328...1562°F	≤ 1 K	0,1 K
Pt1000		-200...200°C	-328...392°F	≤ 2 K	0,1 K
Resistance*		4500 Ω		≤ 0,1 %	0,01 %

** The characteristic of a KTY 11-6 is preadjusted (-50...150°C)*

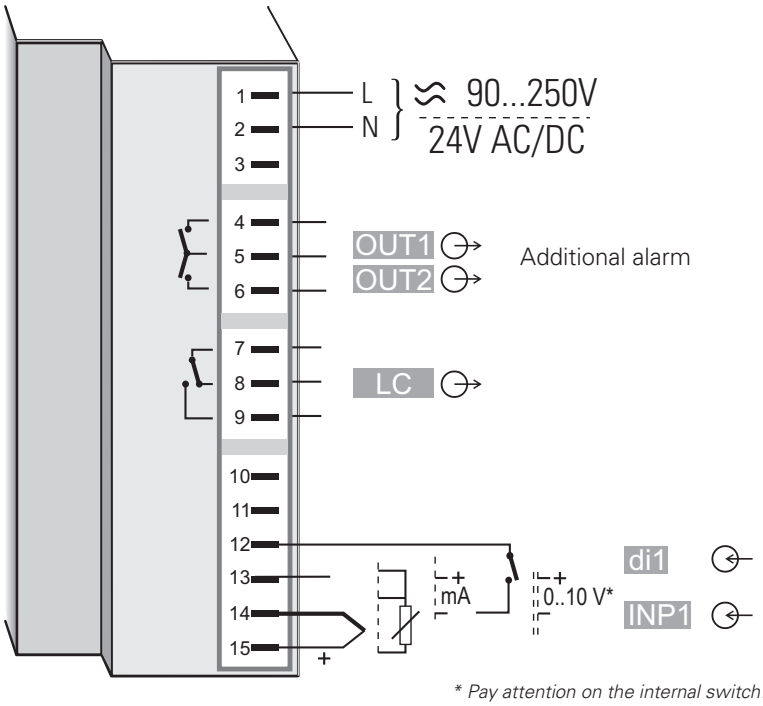
Table 3 Current and voltage

Range	Input resistance	Accuracy	Resolution (∅)
0-10 Volt	≈ 110 kΩ	≤ 0,1 %	0,6 mV
0-20 mA	49 Ω (voltage requirement≤ 2,5 V)	≤ 0,1 %	1,5 µA

Dimensions (mm):



Electrical connections:



** Pay attention on the internal switch!*

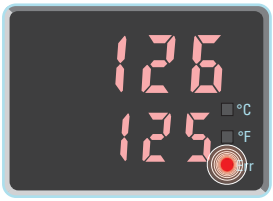
MAINTENANCE MANAGER

Display of error signals, warnings, and latched limit messages in the error list. Signals are latched, and can be reset manually.

Possible signals in the error list:

Sensor break, short circuit, reversed polarity
latched limit messages
Re-calibration warning
Internal fault (RAM, EEPROM, ...)

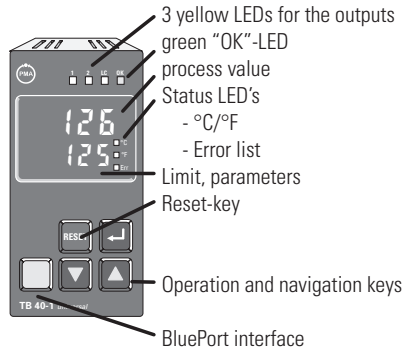
Flashing Error LED indicates active alarm in the error list:



OPERATION AND DISPLAY

Display

Process value:	LED with 7 segments, 10,5 mm
Lower display:	LED with 7 segments, 7,8 mm



POWER SUPPLY

Depending on version:

AC SUPPLY

Voltage:	90...260 VAC
Frequency:	48...62 Hz
Power consumption	approx. 7 VA

UNIVERSAL SUPPLY 24 V UC

AC voltage:	20,4...26,4 VAC
Frequency:	48...62 Hz
DC voltage:	18...31 V DC
Power consumption:	approx: 7 VA (W)

BEHAVIOUR WITH POWER FAILURE

Configuration, parameters, and adjusted limits:
Non-volatile storage in EEPROM

BluePort® FRONT INTERFACE

Connection of PC via PC adapter (see „Accessories"). The BlueControl software is used to configure, set parameters, and operate the TB 40-1.

ENVIRONMENTAL CONDITIONS

Protection modes

Front panel:	IP 65
Housing:	IP 20
Terminals:	IP 00

Permissible temperatures

For specified accuracy:	0...60°C
Warm-up time:	< 15 minutes
For operation:	-20...65°C
For storage:	-40...70°C

Humidity

75% yearly average, no condensation

Shock and vibration

Vibration test Fc (DIN 68-2-6)

Frequency:	10...150 Hz
Unit in operation:	1g or 0,075 mm
Unit not in operation:	2g or 0,15 mm

Shock test Ea (DIN IEC 68-2-27)

Shock:	15g
Duration:	11ms

Electromagnetic compatibility

Complies with EN 61 326-1

- Complies with the immunity requirements for continuous, unattended operation
- Complies with the emmission requirements class B for rural areas
- Surge disturbances may increase the measurement error

GENERAL

Housing

Material:	Makrolon 9415, flame-retardant
Flammability class:	UL 94 V0, self-extinguishing

Plug-in module, inserted from the front

Safety tests

Complies with EN 61010-1 (VDE 0411-1):
Over voltage category II
Contamination class 2
Working voltage range 300 VAC
Protection class II

Certifications

Type test to DIN 3440 and Pressure Equipment Directive 97/23/EC

Can therefore be used in:

- Heat generating plants with outflow temperatures up to 120°C to DIN 4751
- Hot-water plants with outflow temperatures above 110°C to DIN 4752
- Thermal transfer plants with organic transfer media to DIN 4754
- Oil-heated plants to DIN 4755

UL certification (applied for)

Electrical connections

Depending on version:

- Flat-pin connectors 1 x 6,3 mm or 2 x 2,8 mm to DIN 46 244
- Screw terminals for conductor cross-section from 0,5 to 2,5 mm²

Mounting

Panel mounting with two fixing clamps at top/bottom or left/right
Close mounting possible

Mounting position:	not critical
Weight:	0,27 kg (9.52 oz)

Accessories supplied with unit

Operating instructions
2 fixing clamps

ACCESSORY EQUIPMENT

BlueControl (Engineering Tool)

PC-based program for configuring, setting parameters, and operating (commissioning) the TB 40-1 temperature limiter. Moreover, all the settings are saved, and can be printed on demand.
Depending on version, a powerful data acquisition module is available, complete with trend graphics.
Software requirements:
Windows 95/98/NT/2000.
The built-in simulation serves to test the settings.

Configurations that can only be implemented via the BlueControl software (not via the front-panel keys):

- Customer-specific linearizations
- Adjustment of limits for operating hours and switching cycles
- Switch-over to 60 Hz mains frequency
- Disable operator actions and operating levels, plus password definition

Hardware requirements:

A PC adapter (see „Accessories“) is required for connecting the controller.

Updates and demo software can be downloaded from:
www.pma-online.de

ORDERING INFORMATION

TB40-	1		-	0	0	0			-		00
Flat-pin connectors	**0**										
Screw terminals	**1**										
90..250V AC		**0**									
24VAC / 18..30VDC		**1**									
Standard configuration							**0**				
Configuration to specification							**9**				
no manual								**0**			
manual german								**D**			
manual english								**E**			
manual french								**F**			
Standard										**0**	
UL certified										**U**	
DIN 3440 + Pressure Equipment Directive 97/23/EC certified										**D**	

ACCESSORIES

Description		Order no.
PC adapter, for connecting BlueControl software to the BluePort®		9407-998-00001
Standard rail adapter		9407-998-00061
Operating manual	german	9499-040-63418
Operating manual	english	9499-040-63411
Operating manual	french	9499-040-63432
BlueControl Mini	german/english/french	www.pma-online.de
BlueControl Basic	german/english/french	9407-999-11001
BlueControl Expert	german/english/french	9407-999-11011

PMA
Prozeß- und Maschinen- Automation GmbH
P.O. Box 31 02 29
D-34058 Kassel
Tel.: +49 - 561- 505 1307
Fax: +49 - 561- 505 1710
E-mail: mailbox@pma-online.de
Internet: http://www.pma-online.de

Your local representative:

Printed in Germany - Edition 0207- Subject to change without notice - 9498 737 40413