



Operating instruction

Temperature calibrator TP 18 850 E

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1 Description of the temperature calibrator TP 18 850 E

The test instrument TP 18 850 E consists of two single enclosures, front size 192 x 192 mm and depth 410 mm or 510 mm. They are connected with each other and equipped with a portable handle.

The left enclosure contains a HT alloy block with a bore, diameter 18 mm (28 mm) and depth 100 mm (200 mm), which can be reached from the top, for the reception of the test piece. In this block the heating cartridge and the temperature sensor for the determination of the block temperature are installed accessible from the bottom.

The right enclosure contains the controller for control of the block temperature. A Solid state relays is used for the activation of the heating cartridge.

On the front plate is the controller, a switch for mains power and also a switch for fan. The controller is equipped with a 2-line, 4-digit, 7-segment LED for block temperature and set value.

On the right hand side of the instrument combination the IEC chassis mounting plug for the mains connection is available. Besides the mains power cable the fuse holder is located.



2 Safety instructions

The temperature calibrators of series TP 18.850 E correspond to the current state of technology. This refers to measuring accuracy, function as well as safe operation of the devices. To grant safe operation, competent and responsible behaviour of the operator is essential.

Fundamental safety regulation and operators duty of care

- Operate the equipment only in perfect functional conditions
- The national rules of safety and prevention of accidents have to be carefully observed as well as the following safety notes of this manual.
- The equipment is supplied via mains cables with a tension dangerous for humans. Person injuries can arise by inappropriate use.
- The perfect and safe operation of this equipment requires appropriate transport, professional storage, installation, assembly and use as directed, as well as careful operation and maintenance.
- The equipment must only be used as directed. Furthermore dangerous media must not be used and all specifications have to be kept.
- If disturbances can not be eliminated the equipment immediately is to be set out of operation and to be protected from inadvertent start-up.
- Only the manufacturer is permitted to carry out repair works. Interferences or changes at the equipment are inadmissible.

- Before exchanging the fuse, the equipment is to be separated from the mains supply by pulling the cable from the mains plug.
- Make this manual always available in a legible and complete form in situ of the equipment.
- Make sure that the operator of the equipment is instructed regularly in all applicable questions of industrial safety and environmental protection, as well as is acquainted with the operating instructions, in particular with the mentioned safety notes.
- **Temperature fuse**
For safety reasons the instrument has a temperature fuse for switching off the power for the heating if the temperature of the heating block is above 870 °C. After cooling down the heating block the unit is ready for working as before.
- The instrument has been projected and manufactured as a measuring and control device to be used according to EN61010-1 for the altitudes operation until 2000 m.
The use of the instrument for applications not expressly permitted by the above mentioned rule must adopt all the necessary protective measures.
- The instrument **CANNOT** be used in **dangerous environments (flammable or explosive)** without adequate protection.
- The installer must ensure that EMC rules are respected, also after the instrument installation, if necessary using proper filters.
- Whenever a failure or a malfunction of the device may cause dangerous situations for persons, things or animals, please remember that the plant has to be equipped with additional devices which will guarantee safety.
- **Attention:** Danger of burning (block and test piece).
Before transportation or touching the heating block the block has to be cooled down.

If you should have any problems or questions, please contact your local supplier or directly:



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3 Operation of the calibrator

The test instrument TP 18 850 E is a portable unit for service purposes, as well as for operating and laboratory tasks.

3.1 Adjustment of the handle

The handle can be adjusted into any required position from vertical to horizontal by pressing the lateral stop buttons.

3.2 Operating position

To guarantee an optimal temperature distribution in the heating block, the normal operating position for the instrument is the upright position

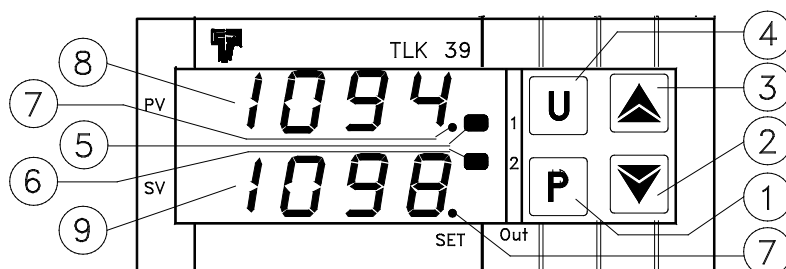
3.3 Adapter sleeves

It has to be made sure that the heat transmission resistance between the heating block and the test piece (thermometer, temperature sensor, temperature switch) is as low as possible. Therefore it is necessary to use exactly adapted pockets. The right bore is the outer diameter of the device under test + 0.5 mm.

3.4 Control of temperature sensors

For the test of temperature sensors a separate temperature measuring unit is required for the connection of the test piece. By comparing the temperature of the external measuring unit with the block temperature you get an information about the status of the test piece. Please note that it takes a short time until the test piece has accepted the temperature of the block.

3.5 Front panel description



1 - Key P

This is used to access set point of the heating block and to confirm the selection.

2 - Key DOWN

This is used to decrease the values of the heating block

3 - Key UP

This is used to increase the values of the heating block

4 - Key U

no function for temperature calibrator

5 - Led OUT1

indicates the state of output for heating block

6 - Led OUT2

indicates the state of output for temperature fuse

7 - Led SET

no function for temperature calibrator

8 - Led AT/ST

no function for temperature calibrator

9 - Display PV

It normally indicates the temperature of the heating block.

During programming it indicates SP1 (Set Point 1)

10 - Display SV

It normally indicates the active Set value of the heating block

3.6 Switching on of the calibrator

⇒ After connection with the mains the fan starts immediately.

⇒ After switching on the mains power switch the controller starts with initialisation.

The upper display (PV) indicates tEst.

The lower display indicates the actual version of the controller e.a. rL 1.2

After 5 sec. the initialisation is complete and the standard mode is selected automatically.

The upper display (PV) indicates the actual heating block temperature

The lower display (SV) indicates the actual set value of the heating block

The installed electrical heating cartridge heats the brass block up from ambient temperature to the adjusted set point value.

3.7 Indication of the block temperature and set temperature

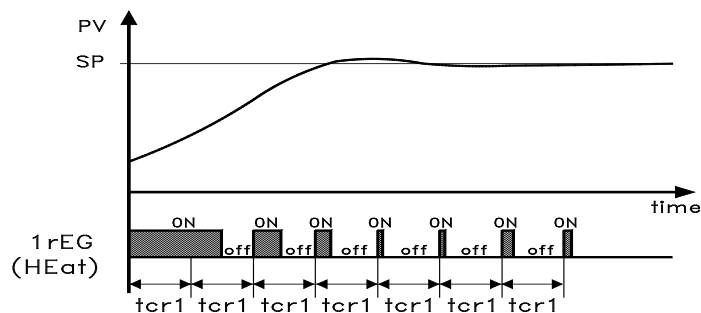
The red, 4-digit, 7-segment LED (PV) shows continuously the temperature of the heating block. If the adjusted set temperature in the heating block is reached, the heating energy radiated from the block is dispensed by short switching-on pulses of the heating cartridge, so that the temperature inside of the block is kept constant. The green, 4-digit, 7-segment LED (SV) shows the set temperature in the heating block.

3.8 Adjustment of the block temperature

The switch-on time of the heating is indicated by the red LED OUT1.

While during the heating-up period a permanent light shows the supply of heating energy. The flashing of the LED shows that the temperature of the heating block is close to the adjusted set temperature, and therefore the heating energy is now only supplied in short intervals.

The control is carried out as a PID control.



In order to obtain good stability of the temperature, the cycle time "tcr1" has a low value with a very frequent intervention of the control output.

3.9 Programming of the set point



IMPORTANT

Do not operate the calibrator in continuous operation (3 hours or longer) above temperatures of 650 °C.

Temperatures in this range should only be started up for a short time due to the load on the calibrator and should not be held permanently.

- ⇒ Push **key P**, then release it. The programming mode is activated. The **upper display** (PV) will visualise “**SP 1**” (Set Point 1). The **lower display** (SV) will indicate the **actual programmed value** of the heating block.
- ⇒ To modify the value, press **▲** key to increase the value of the heating block
- ⇒ To modify the value, press **▼** key to decrease the value of the heating block
- ⇒ Once the desired value has been reached, by pushing **key P** it is possible to exit the programming mode.

NOTE:

A) The keys **▲** and **▼** change the value 1°C at a time but if they are pressed for more than one second, the value increases or decreases rapidly and, after two seconds in the same condition, the changing speed increases in order to allow the desired value to be reached rapidly.

B) If no key is pressed for approx. 15 seconds, the display will return to normal functioning automatically.

4 Cooling down the heating block

Attention: Danger of burning (block and test piece).

Before transportation or touching the heating block the block has to be cooled down.

After switching on the instrument the installed fan starts to produce cool air, which leads to a sufficient thermic decoupling of the enclosure.

For a quicker cooling down of the heating block the fan can be switched to position 2 (S2) to produce a higher amount of cooling air.

5 Recalibration

The test instrument, series TP18000E, have been adjusted and checked before delivery with measuring means, which are based on nationally accepted standards (DKD-Laboratory).

Due to the DIN ISO 10 012 the instruments have to be checked depending on the area of application in adequate periodical intervals. We recommend to send us the instruments in intervals of 12 months at the latest or approx. 500 working hours to our plant for recalibration or readjustment.

6 Error signalling

Error	Reason	Action
----	Probe interrupted	Verify the correct connection between probe and instrument and then verify the correct functioning of the probe
uuuu	The measured variable is under the probe's limits (under-range)	
oooo	The measured variable is over the probe's limits (over-range)	
ErEP	Possible disturbance of the EEPROM memory	Push key "P"

In error conditions, the controller switches off the heating elements of the calibrator

7 Cleaning

We recommend cleaning of the instrument with a slightly wet cloth using water and not abrasive cleaners or solvents which may damage the instrument.

8 Disposal

Company SIKA Dr Siebert & Kühn GmbH and Co.KG provides for an adequate disposal of used temperature calibrators. For that purpose please send calibrators of series TP 18 850 E back to us freightfree.

9 Guarantee and repairs

The calibrator is under warranty against manufacturing flaws or faulty material, that are found within 12 months from delivery date. The guarantee is limited to repairs or to the replacement of the instrument.

The eventual opening of the housing, the violation of the instrument or the improper use and installation of the product will bring about the immediate withdrawal of the warranty's effects.

In the event of a faulty instrument, either within the period of warranty, or further to its expiry, please contact our sales department to obtain authorisation for sending the instrument to our company.

The faulty product must be shipped to SIKA with a detailed description of the faults found, without any fees or charge for SIKA, except in the event of alternative agreements.

10 Technical Data

Regulation of the heating block	with PID-regulator
Adjustment of the block temperature	with key „P“, ▲ and ▼ in 1°C steps automatic fine adjustment (auto. reset)
Adjustment range of the block temperature	between ambient temperature and 850 °C
Stability of the block temperature	+/- 0.5 K
Accuracy of the temperature indication	+/- 1 K
Accuracy of block temperature	+/- 0.5 K
Behavior in case of overtemperature	temperature fuse switches off the power of the heating block above 870 °C (hysteresys 1K)
Behavior in case of sensor break	switch off of the heating
Heating times*):	Cooling times*):
20 °C to 100 °C 2 min.	850 °C to 800 °C 3 min.
100 °C to 200 °C 3 min.	800 °C to 700 °C 5 min.
200 °C to 300 °C 3 min.	700 °C to 600 °C 7 min.
300 °C to 400 °C 3 min.	600 °C to 500 °C 7 min.
400 °C to 500 °C 4 min.	500 °C to 400 °C 9 min.
500 °C to 600 °C 4 min.	400 °C to 300 °C 13 min.
600 °C to 700 °C 5 min.	300 °C to 200 °C 19 min.
700 °C to 800 °C 8 min.	200 °C to 100 °C 37 min.
800 °C to 850 °C 7 min.	
*) An additional levelling time has to be considered.	
Heating block temperature indication (PV)	red, 4-digit, 7-segment LED, 7mm high
Set point indication of heating block (SV)	green, 4-digit, 7-segment LED, 7mm high
Range of indication	0 to 850 °C resolution 1K
Indication of sensor break	- - -
Sampling rate:	130 msec.
Outputs	1 x relay SPDT (8 A-AC1, 3 A-AC3 / 250 VAC) temperature fuse, 100.000 switches 1 x SSR drive (8mA/ 8VDC) control output
Power supply	230 V 50/60 Hz

Power consumption	approx. 2000 VA
Fuse	12.5 A T (230 VAC)
Operating temperature	0 ... 50 °C
Operating humidity	30 ... 95 RH% without condensation
Storage temperature	-10 ... +60 °C
Compliance:	2006/95/EC (EN 61010) 2004/108/EC (EN 61326-1)

Dimensions

	TP18 850E	TP18 850/28E	TP18 850/200E	TP18 850/28/200E
heating block				
bore	Ø18 mm	Ø 28 mm	Ø18 mm	Ø 28 mm
depths	100 mm	100 mm	200 mm	200 mm
housing				
wide	app. 430 mm	app. 430 mm	app. 430 mm	app. 430 mm
high	app. 192 mm	app. 192 mm	app. 192 mm	app. 192 mm
deep	app. 410 mm	app. 410 mm	app. 510 mm	app. 510 mm
weight	app. 14 kg	app. 14 kg	app. 16 kg	app. 16 kg

adapter sleeves for smaller Ø available from 1.5 mm up to 15.5 mm (25 mm) Ø in steps of 0.5 mm