Precision Temperature Calibrators

founded 1901
Dr. Siebert & Kühn GmbH & Co. KG

Series TP 38 000 / TP 38 000 E

Calibrating with every convenience

Working more cost-effectively, safely and reliably in the range from -30°C to 600°C

Thermometers, thermocouples and other temperature sensors are subject to mechanical, thermal and chemical stresses especially in industrial use. This leads with increasing time to a drift that is not predictable.

Since the temperature in industrial processes has become one of the most important indicators of quality, operating safety and service life, the calibration of temperature sensors on site has achieved special importance.

Inaccurate temperature measurements reduce product quality, increase the risk of failure and lead to increased energy consumption.

Only the regular calibration of the sensors provides information on the difference between actual and measured temperature and thus makes the specific drift behaviour visible.

Switchable languages

German English French Spanish

Our easy to transport and sturdy calibrators with laboratory accuracy for all areas of application:

- In test bays and development laboratories, temperature sensors have to be tested, adjusted or recalibrated before installation
- In sensor production, tolerances of thermocouples and resistance thermometers can be determined and documented clearly only by calibration.

Control panel with graphic display and keyboard

You can make all necessary entries very simply and quickly with the aid of the operator-friendly, self-explanatory menu structure on the calibrator display.

The block and set temperature as well as the difference and the variance of the stability are displayed on the two-coloured, graphic display.

In the TP 38 000 with precision measuring instrument, the measured temperatures of the test piece and of an externally connected calibration reference sensor are displayed in addition.

The measured values are displayed in the selected temperature unit of °C, °F or K.

It is also possible to display the physical test piece raw values in Ω, mV or mA.

You can switch over the menu languages at any time.

You program the calibrators with the aid of the keyboard with 14 keys or the PC.

The block temperature is programmed by keys and can be set accurately to 0.01 °C.

The CURSOR and SELECT keys serve for fast marking and selection of all further functions. The values are confirmed with the ENTER key or deleted with CLEAR.

Block and adapter sleeves

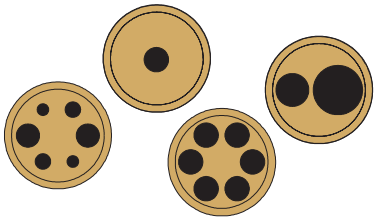
The calibrators work with an electronically controlled heating block made of brass or a heating / cooling block made of aluminium. A block bore 150 mm deep with a diameter of 28 mm serves for holding the test piece.

The homogeneous temperature zone (40 mm) in which the calibration should be performed is located in the lower region of the metal block.

Insulation ensures that the housing is only hand-warm, even if it is hot in the interior over a longer period. The optimum thermal coupling of block to test piece is achieved by the correct adapter sleeve, ideally the sleeve has an internal diameter 0.5 mm larger than the outside diameter of the test piece.

Four examples of possible bores in the adapter sleeve for holding the sensor are illustrated below.

Adapter sleeves with 28 mm diameter can be delivered with 1.5 mm to 25 mm bore in 0.5 mm steps.



Computer interface RS 232 C

A PC can be connected as an alternative to programming the calibrators on the keyboard.

The calibrators are equipped as standard with a RS 232 C serial interface.

The entire control of SIKA calibrators can be taken over by an external computer. All measured values are available in digital form at the interface.

All settings necessary for a calibration can be controlled remotely through the serial interface.

Our calibrator versions for every application

You as user have the possibility of choosing between four calibrators with different temperature ranges and equipment to be able to solve optimally your calibration, adjustment and testing tasks.	TP 38 000 	TP 38 000 E 
Certified safety by VDE	✪	✪
Step program (6 steps)	✪	✪
Automatic calibration procedures	✪	✪
Cycle program (99 cycles)	✪	✪
Gradient control	✪	✪
Temperature units °C, °F, K	✪	✪
Function display: stable, heating, cooling	✪	✪
Stability assessment variance of the stability	✪	✪
Temperature alarm / temperature limitation	✪	✪
Temperature lift -60°C for Peltier calibrators	✪	✪
Improved temperature homogenity	✪	✪
RS 232 C computer interface	✪	✪
SIKA test certificate	✪	✪
Input for RTD, TC, transmitter, switch	✪	☆
Self-detecting calibration reference sensors	✪	☆
Logger function (9 data sets)	✪	☆
Switch test program	✪	☆
Physical test piece raw values Ω, mV, mA	✪	☆
Transmitter supply 24 VDC	✪	☆
Calibration and testing software	☆	☆
Service and transport case, sturdy aluminium version	☆	☆
DKD certificate	☆	☆

✪ included in scope of supply

☆ not included in scope of supply but available optionally

Tested safety

For your safety, the calibrators are equipped with two electronic fuses working independently of one another.

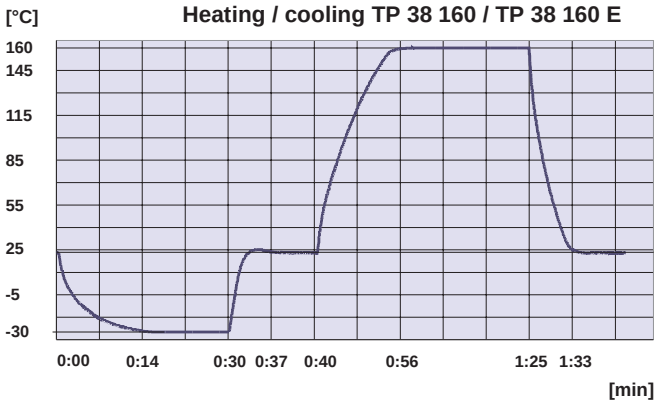
Protective conductor monitoring is used to control the base isolation of the heater. The monitoring unit works independently of the remaining control system and switches as soon as the calibrator is no longer connected with the protective conductor system. These special safety measures have been tested and certified by the VDE.

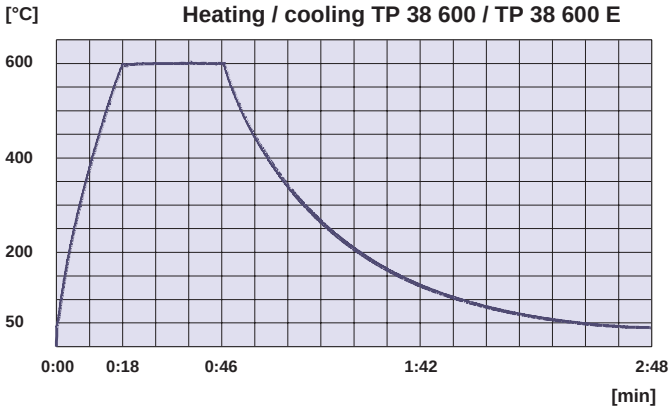
Testing equipment monitoring

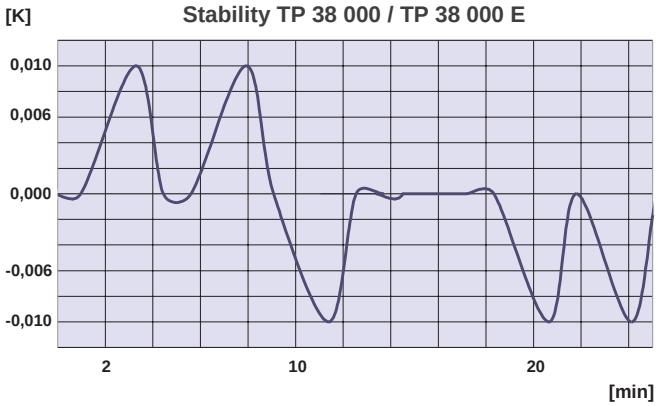
The SIKA calibrators can be delivered optionally with a certificate of the Deutsche Kalibrierdienst (DKD) or a SIKA works certificate.

Thus the calibrators are connected to the national standards and confirmed in a recognized manner as required in DIN ISO 9002 “QA element test equipment monitoring”.

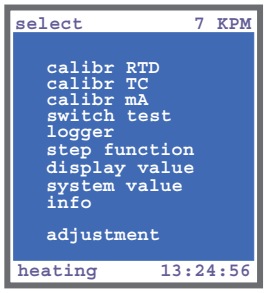
Heating, cooling and stability curves







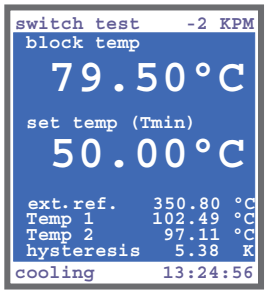
The menu structure, convenient and simple to operate



Select mode

The Select mode offers the central setting and selection possibility for all processes specific to the calibrator.

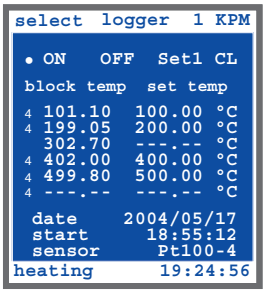
Here you select your test pieces and decide for logger function or step program. Further selection possibilities such as display values and system settings are also possible.



Switch test

You can perform here the automatic test of temperature switches and thermostats with self-detection of “normally open” or “normally closed”.

The switching point with rising temperature Temp 1, the switching point with falling temperature Temp 2 and the automatically calculated hysteresis of the calibrators TP 38 000 are displayed.

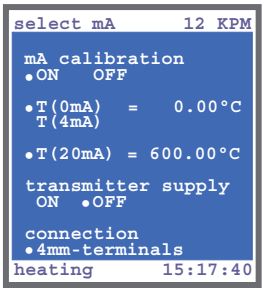


Select Logger

The calibrators TP 38 000 can be programmed for up to 9 completely automated calibrations. You make the settings of temperature steps, holding time and gradient directly at the calibrator or using the PC.

The block and test piece temperatures are stored and are available for download. Reading off on the display is possible at any time.

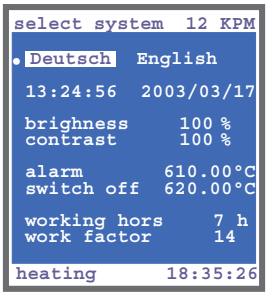
You can perform automatic calibrations directly on site, without a PC or laptop, and the certificate can be produced later.



Select mode for test piece selection

With the aid of clearly laid out screen pages, you select in the Select mode all important parameters, e.g. temperature, supply, connection for the calibration of a wanted test piece.

Resistance thermometers RTD, thermocouples TC, transmitters and switches can be selected as test pieces.



Select System mode

Here you can make general settings for the calibration system, such as selection of the languages, updating time and date etc.

Automate your calibration tasks with the aid of the SIKA calibration and testing software

An external computer can control the complete calibration systems via RS 232 C. Measured data acquisition and editing becomes child's play with the software package. You enter the test and calibration temperatures via PC, everything else runs automatically up to producing a calibration note or certificate.

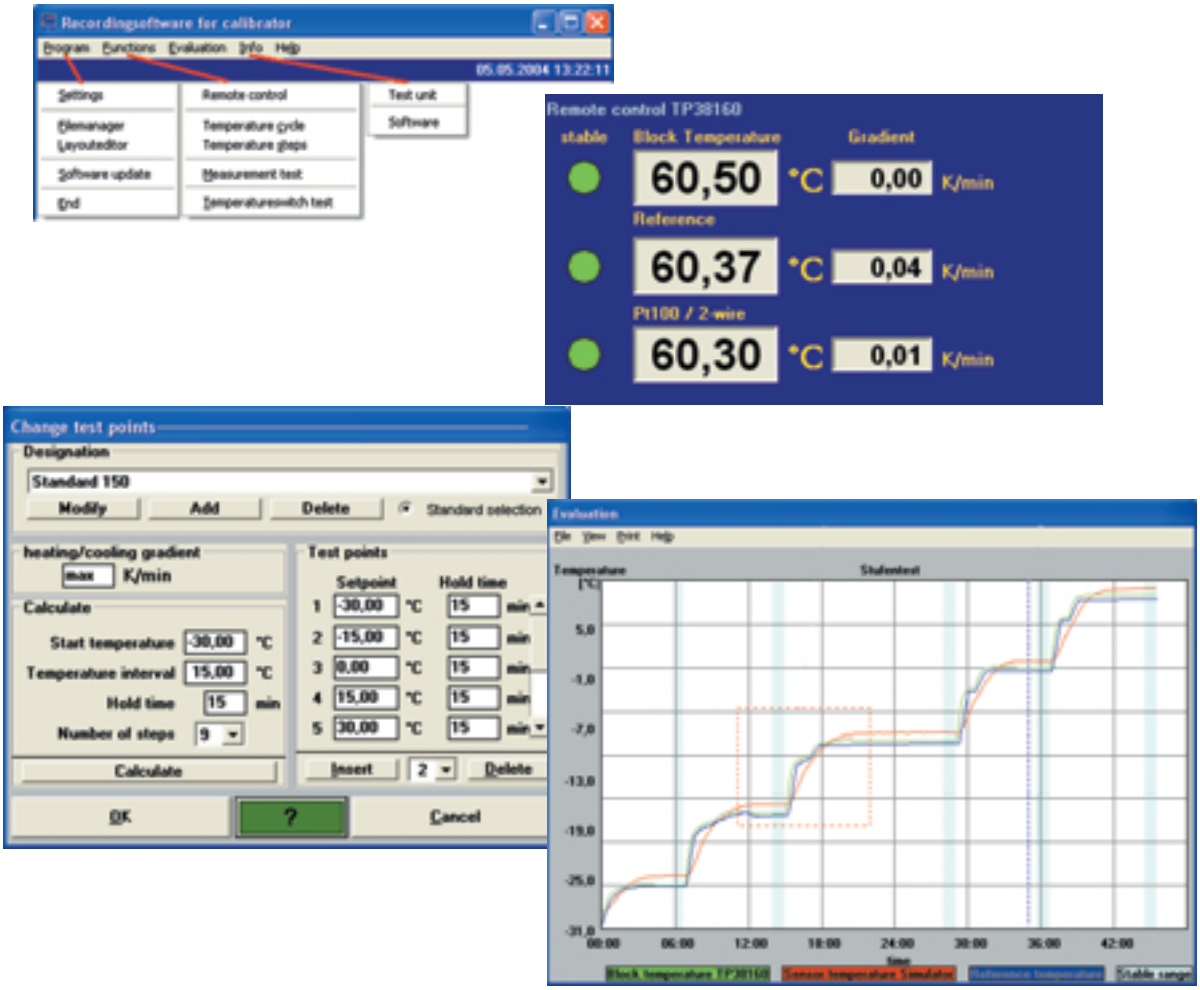
The calibrators of the TP 38 000 / TP 38 000 E series thus become a specially efficient tool in development, production, quality assurance and service.

Static and dynamic calibration and test routines as well as statistical evaluations of series tests can be programmed very simply and quickly in menu technique and performed automatically.

During the test mode the data of the block and test piece temperature as well as the switching point of temperature switches are transmitted continuously through the RS 232 C.

The software package presents the test data in tabular and graphical form. Customer-specific documentation is thus possible.

The stored test data can be transmitted to higher level quality data management systems (QDMS). Delivery and production quality can thus be monitored or increased quickly and clearly.



Technical data of TP 38 000 with integrated measuring instrument

Unit type	TP 38 160	TP 38 600
		
Temperature range	-30 °C to 160 °C	40 °C to 600 °C
Tolerance	+/-0.1 °C up to 100 °C then 0.1 % of the measured value	
Stability	0.01 °C to 0.05 °C	0.03 °C to 0.1 °C
Resolution	0.01	
Display		
Versions	Monochrome, graphic display	
Displays	Block and set temperature, difference, variance, min. and max. temperatures	
Languages switchable	German / English / French / Spanish	
Units	°C / °F / K / Ω / mV / mA	
Operating elements	Membrane keyboard	
Additional displays	Test piece temperature including the physical values Temperature of the external calibration reference sensor	
Block		
Block material	Aluminium	Brass
Block bore	28 mm	
Immersion depth	150 mm	
Adapter sleeves	Inside diameter 1.5 mm to 25.0 mm in 0.5 mm steps	
Equipment features		
Temperature steps Gradient control Computer interface Logger function Precision measuring instrument	Step tests, calibration runs Implementation of ramp functions Serial RS 232 C incl. transmission protocol 9 data sets with 6 values each RTD, TC, mA, switch, calibration reference sensors	
General data		
Power supply	100...240 VAC, +/-10 %, 50/60 Hz	230 VAC, +/-10 %, 50/60 Hz 100...115 VAC, +/-10 %, 50/60 Hz
Power consumption	approx. 400 W	approx. 1000 W
Dimensions (D x W x H)	approx. 348 x 153 x 347 mm	
Weight	approx. 12 kg	approx. 10 kg
Options		
Service case, software, certificate, external calibration reference sensors		

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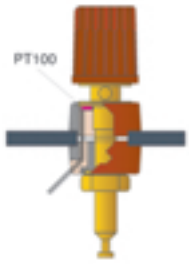
Technical data of TP 38 000 E

Unit type	TP 38 160 E	TP 38 600 E
		
Temperature range	-30 °C to 160 °C	40 °C to 600 °C
Tolerance	+/-0.1 °C up to 100 °C then 0.1 % of the measured value	
Stability	0.01 °C to 0.05 °C	0.03 °C to 0.1 °C
Resolution	0.01	
Display		
Version	Monochrome, graphic display	
Displays	Block and set temperature, difference, variance, min. and max. temperatures	
Languages switchable	German / English / French / Spanish	
Units	°C / °F / K	
Operating elements	Membrane keyboard	
Block		
Block material	Aluminium	Brass
Block bore	28 mm	
Immersion depth	150 mm	
Adapter sleeves	Inside diameter 1.5 mm to 25.0 mm in 0.5 mm steps	
Equipment features		
Temperature steps Gradient control Computer interface	Step tests, calibration runs Implementation of ramp functions Serial RS 232 C incl. transmission protocol	
General data		
Power supply	100...240 VAC, +/-10 %, 50/60 Hz	230 VAC, +/-10 %, 50/60 Hz 100...115 VAC, +/-10 %, 50/60 Hz
Power consumption	approx. 400 W	approx. 1000 W
Dimensions (D x W x H)	approx. 348 x 153 x 347 mm	
Weight	approx. 12 kg	approx. 10 kg
Options		
Service case, software, certificate, retrofit precision measuring instrument		

SIKA precision measuring instrument

… extends your calibration possibilities

Already integrated or easy to retrofit



The 4 mm connections for plug, cable shoes and open cable ends as well as a DIN and Mini DIN thermocouple connection are available for connecting the test piece free of thermal voltages.

Resistance thermometers, thermocouples, temperature transmitters and switches must be operated in the calibration with a measuring instrument which measures and displays as temperature the output signals such as resistance values, thermal voltages and norm signals.

Use of our TP 38 000 with an integrated precision measuring instrument is unproblematic.

The measuring instrument can be retrofitted at any time at SIKA in an existing TP 38 000 E.

The switchable measuring input facilitates calibration, adjustment and testing of:

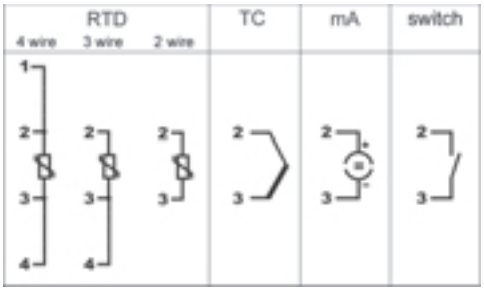
- Resistance thermometers (RTD)
  Pt 100, Pt 500 and Pt 1000 in 2, 3 or 4 wire
- Thermocouples (TC) of the types
  K, J, N, E, R, T, B, S, L and U
- Current signals 0(4)-20 mA of temperature transmitters (mA) with and without transmitter supply
- Temperature switches and thermostats with “normally open” and “normally closed” contacts

The precision measuring instruments permit the simultaneous connection of a test piece and of an external calibration reference sensor.

Calibration with external calibration reference sensors offers advantages especially for short probes, since both sensors are introduced at the same depth in the bore. The temperature of the external calibration reference sensor, of the test piece and the difference between the two appear on the display. Thus this calibration can also be performed simply.

The measuring instrument is available in two versions:

- Retrofittable without difficulty in the TP 38 000 E
- Available as desktop model TT 38 048



Technical data

	Version	Measuring range	Tolerance
Resistance thermometer according to DIN EN 60751			
Pt 100 Pt 500 Pt 1000	2, 3, 4 wire	-90.00 °C to 850.00 °C	+/-0.005 % FS +/- 0.01 °C
Connection possibility through 4 mm connections free of thermal voltage			
Thermocouples according to DIN EN 60584 / DIN 43710			
Type K	NiCr-NiAl	-90.00 °C to 999.99 °C 1000.0 °C to 1370.0 °C	+/-0.007 % FS +/-0.01 °C +/-0.005 % FS +/-0.1 °C
Type J	FeCu-Ni	-90.00 °C to 900.00 °C	+/-0.005 % FS +/-0.01 °C
Type N	NiCrSi - NiSiMg	-90.00 °C to 999.99 °C 1000.0 °C to 1370.0 °C	+/-0.007 % FS +/-0.01 °C +/-0.005 % FS +/-0.1 °C
Type E	NiCr-CuNi	-90.00 °C to 700.00 °C	+/-0.005 % FS +/-0.01 °C
Type R	Pt13Rh - Pt	0.00 °C to 999.99 °C 1000.0 °C to 1760.0 °C	+/-0.05 % FS +/-0.01 °C +/-0.03 % FS +/-0.1 °C
Type T	Cu-CuNi	-90.00 °C to 400.00 °C	+/-0.01 % FS +/-0.01 °C
Type B	Pt30Rh-Pt6Rh	0.00 °C to 999.99 °C 1000.0 °C to 1820.0 °C	+/-0.05 % FS +/-0.01 °C +/-0.03 % FS +/-0.1 °C
Type S	Pt10Rh-Pt	0.00 °C to 999.99 °C 1000.0 °C to 1760.0 °C	+/-0.05 % FS +/-0.01 °C +/-0.03 % FS +/-0.1 °C
Type L	Fe-CuNi	-90.00 °C to 900.00 °C	+/-0.005 % FS +/-0.01 °C
Type U	Cu-CuNi	-90.00 °C to 600.00 °C	+/-0.01 % FS +/-0.01 °C
Automatic comparison point compensation between 0 °C and 60 °C Possibility of connection through 4 mm connections free of thermal voltage and DIN and Mini DIN thermocouple connection			
Standard signal input			
Current (switchable)	mA	0(4)...20 mA	+/-0.015 % FS +/-0.01 mA
Transmitter supply 24 VDC, I max = 30 mA Possibility of connection through 4 mm connections free of thermal voltage			
Temperature switch			
Automatic detection of an edge change, determining the hysteresis, Independent detection normally closed / normally open Possibility of connection through 4 mm connections free of thermal voltage			
Calibration reference sensor connection			
Pt 100	4-wire	-90.00 °C to 850.00 °C	+/-0.005 % FS +/- 0.01 °C
Polynomial correctable through internal parameters or through external EEPROM in sensor Possibility of connection through 7-pin built-in socket			

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Precision measuring instrument desktop model TT 38 048

Device type	TT 38 048
	
Display range	-9999 to 99999 digit
Tolerance	according to version and measuring range
Resolution	0.01 °C to 999.99 °C then 0.1 °C
Display	
Version	Monochrome, graphic display
Displays	Block and set temperature, difference, variance, min. and max. temperatures
Languages switchable	German / English / French / Spanish
Units	°C / °F / K / Ω / mV / mA
Operating elements	Membrane keyboard
Additional displays	Test piece temperature including the physical values Temperature of the external calibration reference sensor
Equipment features	
Computer interface Logger function	2 x serial RS 232 C incl. transmission protocol 9 data sets with 6 values each
General data	
Power supply	100…240 VAC, +/- 10 %, 50/60 Hz
Power consumption	approx. 100 W
Dimensions (D x W x H)	approx. 348 x 153 x 200 mm
Weight	approx. 2 kg
Options	
Service case, software, certificates, external calibration reference sensors	

High-performance calibration reference sensors

SIKA® founded 1901
Dr. Siebert & Kühn GmbH & Co. KG

The intelligent and the inexpensive solution, TFEE and TFEG

TFEE

To be able to fully utilize the precision of the calibrators, SIKA has developed the intelligent TFEE.

These reference sensors have an EEPROM with linearization specific to the probe in the handle.

After the measuring instrument is switched on or after each sensor change, the probe-specific calibration data are transmitted to the measuring instrument and form the basis when determining the measured value.

TFEG

Apart from the intelligent TFEE, SIKA also offers the less expensive TFEG.

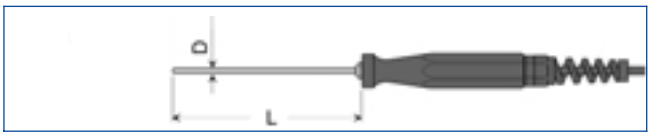
These calibration reference sensors are equipped with a Pt 100 sensor of different accuracy. With this sensor, the DIN characteristic is used as a basis for determining the measured values.

Probe-specific linearizations can be set via the keyboard on the calibrator and are then available for this sensor.

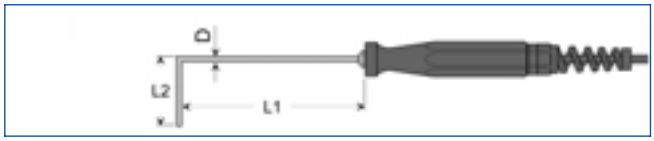
An accuracy which was previously considered as unrealistic is achieved with these two probe-specific Pt 100 linearizations in combination with the precision of the measuring input.

Both types of probe are available in different forms

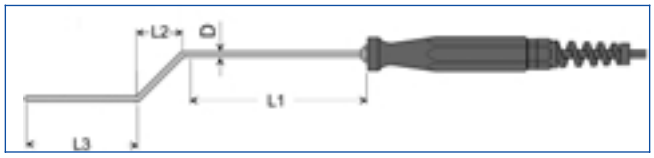
- straight



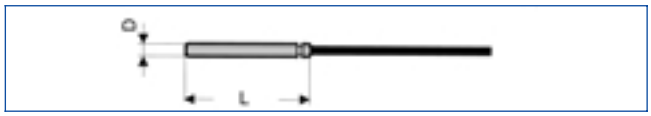
- 90° angled



- 45° offset



- Cable version



Technical data

TFEE	Measuring range	Tolerance
Pt 100 with probe-specific linearization through EEPROM in the handle		
High precision	-30.00 °C to 400.00 °C 400.00 °C to 600.00 °C	0.03 °C to 0.06 °C 0.06 °C to 0.3 °C
Version	straight 90° angled 45° offset	D = 3 mm, L = 300 mm D = 3 mm, L1, L2 customer specific D = 3 mm, L1, L2, L3 customer specific

TFEG	Measuring range	Tolerance	
Pt 100 without probe specific linearization			
Precision	-30.00 °C to 250.00 °C	1/10 DIN	+/-0.03 °C +/- 0.0005*[T]
Standard probe	-30.00 °C to 400.00 °C	1/3 DIN	+/-0.1 °C +/- 0.0017*[T]
High temperature	-30.00 °C to 600.00 °C	DIN Class B	+/-0.3 °C +/- 0.005*[T]
Version	straight 90° angled 45° offset Cable version	D = 3 mm, L = 300 mm D = 3 mm, L1, L2 customer specific D = 3 mm, L1, L2, L3 customer specific Teflon, Tmax = 250 °C, D = 5 mm, L = 50 mm	