



Measuring Instruments For Temperature



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Contact or non-contact measurement?

There are basically two main methods used for contact temperature measurements on objects. In the case of penetration/immersion measurements as well as air temperature measurements, measurement is only possible with contact probes. There are some applications where contact measurement is the most suitable method for measuring surface temperatures while there are other applications where non-contact temperature measurement has proven to be more suitable. A combination of both methods in one instrument is often found to be ideal.

Classical contact applications

- Objects with high heat capacity
 - Metals
- Objects with smooth surfaces
 - Polished steel plates
 - Polished heating pipes

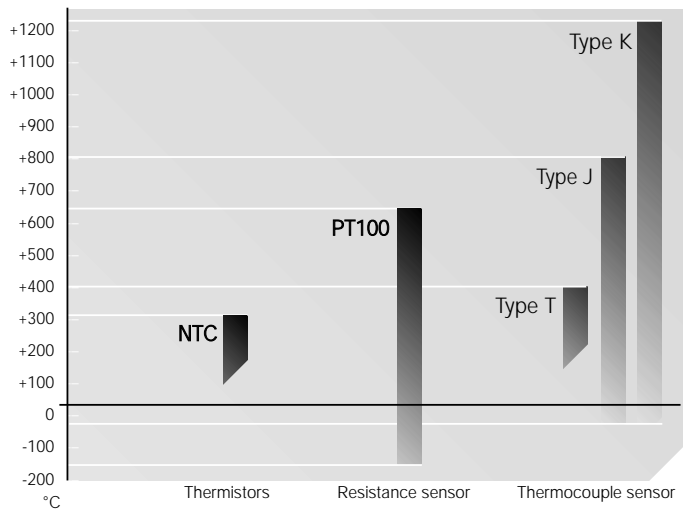
Selecting the right probe

The probe type is determined by the measuring task. The suitable temperature sensor is selected according to the following criteria:

- Measuring range
- Accuracy
- Design
- Response time
- Resistance

Testo has a range of sensor elements and thermometers available in order to be able to supply the probes needed for your applications:

- Thermocouple sensor
- Resistance sensor (PT 100)
- Thermistors (NTC)



Thermocouples

Temperature measurement using thermocouples is based on the thermoelectric effect. Thermocouples consist of two wires welded together. The wires are made of different metals or metal alloys. The basic values of the thermoelectric voltages and the maximum tolerances in thermocouples are defined in the IEC 584 standards. The most common thermocouple is NiCr-Ni (type designation K).

Resistance sensors (Pt100)

When measuring temperature with resistance sensors, use is made of the temperature sensitive resistance change in the platinum "resistance".

The measurement resistance is supplied with a constant current and the voltage drop, which changes with the resistance value via the temperature, is measured. Basic values and tolerances for resistance thermometers are defined in the IEC 751.

Thermistors (NTC)

Temperature measurement with thermistors is also based on a temperature sensitive change in the resistance of the sensor element. Unlike resistance thermometers, thermistors have a negative temperature coefficient (resistance decreases with increasing temperature). Properties and tolerances are not standardised.

Rule-of-thumb

Thermocouple probes are quick and have a wide measuring range. Resistance and NTC probes are slower but more accurate.

The wider the measuring range the more universal the applications.

Measurement range

First cross off the probe type which does not apply to your measuring range. The diagram below shows the application range of different temperature sensors.

Accuracy

Sensor	Temperature range	Class	Maximum tolerances	
			Fixed value	Referred to temperature
Thermocouple Type K	-40 to +1200 °C	2	±2.5 °C	±0.0075 • t
	-40 to +1000 °C	1	±1.5 °C	±0.004 • t
Type T	-40 to +350 °C	1	±0.5 °C	±0.001 • t
Type J	-40 to +750 °C	1	±1.5 °C	±0.004 • t
PT100	-100 to +200 °C	B	± (0.3 + 0.005 • t)	
	-200 to +600 °C	A	± (0.15 + 0.002 • t)	
NTC (Standard)	-50 to -25.1 °C		±0.4 °C	
	-25 to +74.9 °C	-	±0.2 °C	
	+75 to +150 °C		±0.5 % of reading	
NTC (High temp.)	-30 to -20.1 °C		±1 °C	
	-20 to 0 °C	-	±0.6 °C	
	+0.1 to +75 °C		±0.5 °C	
	+75.1 to +275 °C	- °C	±0.5 °C ±0.5 % of reading	

t = Measured temperature

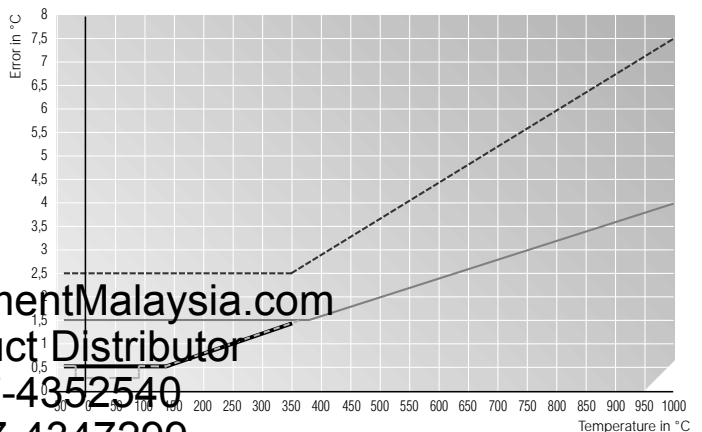
Accuracy: Thermocouple

Data for thermocouples to EN 60584-1 (formerly IEC 584-1). Two values are given. One fixed value in °C and one formula.

The larger value always applies. Data for Pt100 to EN 60751 (formerly IEC 751). There is no standardization for NTC sensors.

In the case of thermocouples, Accuracy Class 1 applies to the measurement range -40 to +1000 °C. In the range -200 to -40.1 °C, Class 3 $\Delta \pm 2.5$ °C or 0.015 |t| applies.

- Type J + Type K; Class 1 (Type J only to +750°C)
- - - Type J + Type K; Class 2 (Type J only to +750°C)
- - - Type T; Testo probes



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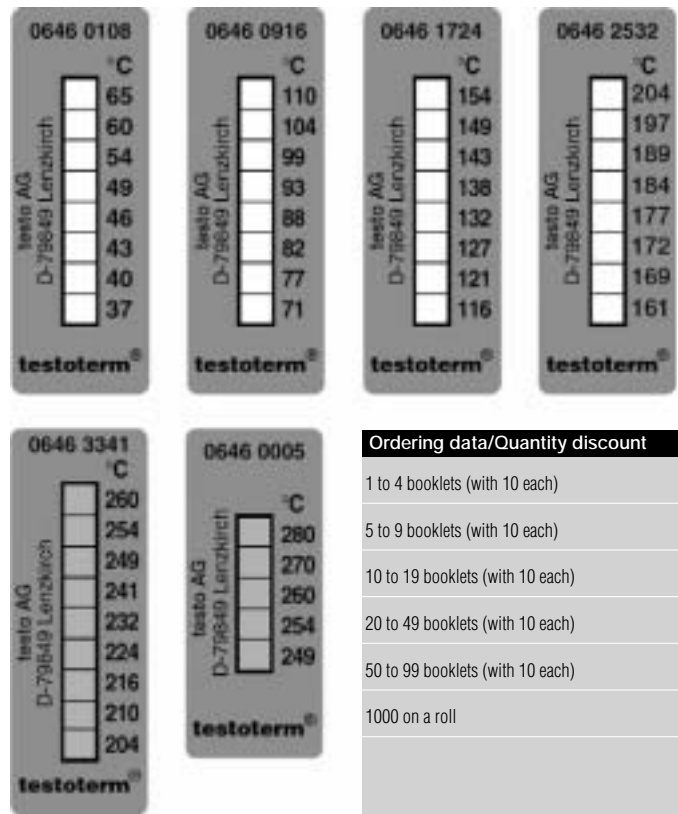
Thermometer strips

testoterm thermometer strips are self-adhesive foils with temperature sensitive elements for temperature control and regulation. Used, for example, for measurements on moving parts, for long-term monitoring and on small parts.

+37 to +65 °C	Part no. 0646 0108
+71 to +110 °C	Part no. 0646 0916
+116 to +154 °C	Part no. 0646 1724
+161 to +204 °C	Part no. 0646 2532
+204 to +260 °C	Part no. 0646 3341
+249 to +280 °C	Part no. 0646 0005

Self-adhesive foils

- Irreversible change in colour within 1 second
- Practical booklet with 10 thermometer strips
- Thermometer strips available on rolls, e.g. for labelling machines



Technical data

Accuracy: From +43°C to +154°C: $\pm 1.5^\circ\text{C}$; from +160°C: $\pm 1\% \pm 1^\circ\text{C}$ of respective temperature reading

Max. operating temperature corresponds to the respective measuring ranges

Storage of clock indicators: Up to +65°C, max. 9 months; other measuring ranges: up to 2 years; max. storage temperature +25°C. Storage in a refrigerator is recommended.

l x w: 50 x 18 mm or 39 x 18 mm

Ordering data/Quantity discount

1 to 4 booklets (with 10 each)
5 to 9 booklets (with 10 each)
10 to 19 booklets (with 10 each)
20 to 49 booklets (with 10 each)
50 to 99 booklets (with 10 each)
1000 on a roll

Actual size

Clock indicators

testoterm clock indicators are self-adhesive, temperature proof foils with temperature sensitive elements for temperature control and regulation. They are particularly suitable for monitoring temperature in small objects.

+40 to +54 °C	Part no. 0646 0071
+60 to +82 °C	Part no. 0646 0072
+88 to +110 °C	Part no. 0646 0073
+116 to +138 °C	Part no. 0646 0074
+143 to +166 °C	Part no. 0646 0075
+171 to +193 °C	Part no. 0646 0076
+199 to +224 °C	Part no. 0646 0077
+232 to +260 °C	Part no. 0646 0078

Self-adhesive foils



- Irreversible change in colour within 1 second
- Practical booklet with 10 clock indicators
- Clock indicators on sheets of 50

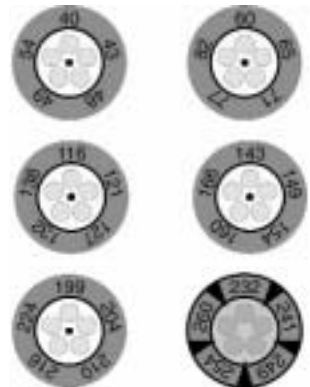
Technical data

Accuracy: From +43°C to +154°C: $\pm 1.5^\circ\text{C}$; from +160°C: $\pm 1\% \pm 1^\circ\text{C}$ of respective temperature reading

Max. operating temperature corresponds to the respective measuring ranges

Storage of clock indicators: Up to +65°C, max. 9 months; other measuring ranges: up to 2 years; max. storage temperature +25°C. Storage in a refrigerator is recommended.

Ø 15 mm



Actual size

Ordering data/Quantity discount

1 to 4 booklets (with 10 each)
5 to 9 booklets (with 10 each)
10 to 19 booklets (with 10 each)
20 to 49 booklets (with 10 each)
50 to 99 booklets (with 10 each)
1000 on sheets of 50

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Single indicators

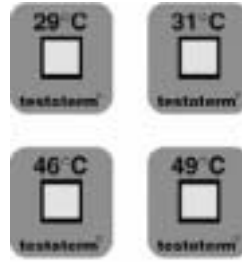
testoterm single indicators are self-adhesive temperature sensitive foils with elements used for control of a given maximum temperature.

Single indicators

Measuring range: +43°C to +260°C
 Part no. 0646 1... (...=reading)
 Ordering examples:
 Single indicator for +43°C: 0646 1043
 Single indicator for +204°C: 0646 1204

Self-adhesive foils

- Irreversible change in colour within 1 second
- Practical single indicator booklet
- Single indicators on sheets of 50



Actual size

Ordering data/Quantity discount

1 to 4 booklets (with 50 each)
5 to 9 booklets (with 50 each)
10 to 19 booklets (with 50 each)
20 to 49 booklets (with 50 each)
50 to 99 booklets (with 50 each)
5000 on sheets of 50

In stock:

71 °C, 77 °C, 82 °C, 110 °C, 143 °C

Delivery time of minimum 4 weeks for orders for more than 10 booklets of other single indicators (See Figure).

Technical data

Accuracy: From +43°C to +154°C: ±1.5°C; from +160°C: ±1% ±1°C of respective temperature reading

Max. operating temperature corresponds to the respective measuring ranges

Storage of clock indicators: Up to +65°C, max. 9 months; other measuring ranges: up to 2 years; max. storage temperature +25°C. Storage in a refrigerator is recommended.

Larger quantities – Ask your Testo sales partner for more details.

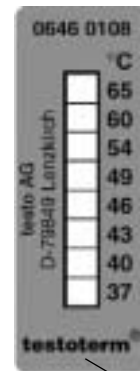


testoterm thermometer strips

Orders for more than 5000 thermometer strips are supplied on rolls (1000 on each roll, see photo).

testoterm clock indicators and testoterm single indicators

Orders for more than 1000 clock indicators or 5000 single indicators are supplied on sheets of 50.



Actual size

Company name

You can have your company name or logo printed on the testoterm thermometer strips and testoterm single indicators if you order more than 10 000 (per temp. value).



Your company name/logo can be printed here

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Mini thermometer

The quick-action immersion/penetration thermometer is ideal for measuring the temperature in air, soft or powdery substances and liquids.

1 Mini thermometer, 120 mm long, up to +150°C

Protective sleeve for probe shaft

Part no.

0900 0525

2 Mini thermometer, 200mm long, up to +250°C

Part no.

0900 0526

3 Water-proof mini thermometer

With protection sleeve for probe shaft

Part no.

0900 0528

Quantity discounts available

Mini penetration thermometers

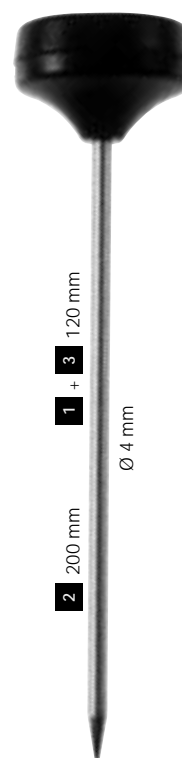
- Easy to read thanks to large display
- Quick and easy battery replacement
- Can be used anywhere



3



1 + 2



1

3

1

2

1

2

2

2

2

2

2

2

2

Ø 4 mm

Technical data

	1	2	3
Meas. range	-50 to +150 °C	-50 to +250 °C	-40 to +230 °C
Accuracy ±1 digit	±1 °C (-10 to +99.9 °C) ±2 °C (-50 to -10.1 °C) ±2% of mv (+100 to +150 °C)	±1 °C (-10 to +99.9 °C) ±2% of mv (+100 to +199.9 °C) ±3% of mv (+200 to +250 °C)	±0.3 °C (+54 to +90 °C) ±1 °C (-20 to +53.9 °C / 90.1 to +180 °C) ±1.5% of mv (remaining range)
Resolution	0.1 °C (-19.9 to +150 °C) 1 °C (remaining range)	0.1 °C (-19.9 to +150 °C) 1 °C (remaining range)	0.1 °C
Oper. temp.	0 to +40 °C	0 to +40 °C	-10 to +50 °C
Storage temp.	-20 to +70 °C	-20 to +70 °C	-40 to +70 °C
Battery type	Button cell LR44	Button cell LR44	Button cell LR44
Battery life	150 h	150 h	150 h
Display	LCD, 1 line	LCD, 1 line	LCD, 1 line
Warranty	2 years	2 years	1 year

Accessories

Button cell batteries, Type LR 44, 1.5 Volt (4 off)

Part no.

0515 0032

Mini thermometer

Affordable. The surface thermometer has a widened measuring tip making it particularly suitable for surface measurements.

Mini surface thermometer with battery

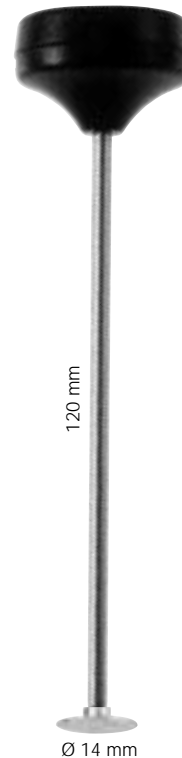
Part no.

0900 0519

Quantity discounts available

Mini surface thermometer

- Easy to read thanks to large display
- Quick and easy battery replacement
- Ideal for surface measurements



120 mm

Ø 14 mm

Technical data

Meas. range	-50 to +250 °C
Accuracy ±1 digit	±1 °C (-10 to +99.9 °C) ±2 °C (-50 to -10.1 °C) ±2% of mv (+100 to +199.9 °C) ±3% of mv (+200 to +250 °C)
Resolution	0.1 °C (-19.9 to +150 °C) 1 °C (remaining range)
Oper. temp.	0 to +40 °C
Storage temp.	-20 to +70 °C
Battery type	Button cell LR44
Battery life	150 h
Display	LCD, 1 line
Warranty	2 years

Accessories

Button cell batteries, Type LR 44, 1.5 Volt (4 off)

Part no.

0515 0032

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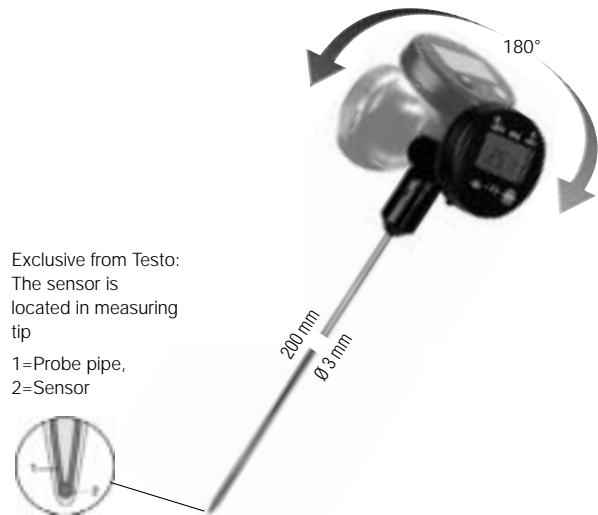
testo 905-T1
Mini penetration stick

testo 905-T1 is one of the fastest mini thermometers available with a wide measuring range from -50 to +350°C, short-term (1-2 minutes) up to +500°C. Particularly in the top measuring range, testo 905-T1 is much more accurate than most thermometers in this price range.

- Professional industrial sensor (type K thermocouple)
- Quick and large display
- High temperature measurement, short-term to 500°C

testo 905-T1 temperature measurement stick incl. multi-function clip, battery

Part no.
0560 9051



Exclusive from Testo:
The sensor is located in measuring tip

1=Probe pipe,
2=Sensor

Technical data

Meas. range	-50 to +350 °C Short-term to +500 °C
Accuracy ±1 digit	±1 °C (-50 to +99.9 °C) ±1% of mv (remaining range)
Resolution	0.1 °C
Oper. temp.	0 to +40 °C
Storage temp.	-20 to +70 °C

Battery type	3V button cell (CR 2032)
Battery life	150 h
Reaction time	10 s
Reaction type	t_{99} (in water)
Display	LCD, 1 line
Weight	110 g
Warranty	2 years

Accessories
Part no.

ISO calibration certificate/Temperature ; For air/immersion probes, calibration point 0°C	0520 0062
ISO calibration certificate/Temperature ; For air/immersion probes, calibration point -18°C	0520 0061
ISO calibration certificate/Temperature ; For air/immersion probes, calibration point +60°C	0520 0063
ISO calibration certificate/Temperature ; For air/immersion probes, calibration points -18°C; 0°C; +60°C	0520 0001

testo 905-T2
Mini surface stick

testo 905-T2, our latest innovation. A surface thermometer of professional quality at a low price. The sprung, wide thermocouple measuring head guarantees a very quick reaction time and a high accuracy level since it always lies flat on the uneven surface of the object being measured.

- Super-quick measurement
- User-friendly operation
- Auto OFF function

testo 905-T2, surface temperature measurement stick with spring loaded probe, incl. multi-function clip, battery

Part no.
0560 9052



Spring loaded thermocouple adapts itself to every surface

Technical data

Meas. range	-50 to +350 °C Short-term to +500 °C
Accuracy ±1 digit	±(1 °C ±1% of mv) (-50 to +500 °C)
Resolution	0.1 °C (-50 to +500 °C)
Oper. temp.	0 to +40 °C
Storage temp.	-20 to +70 °C

Battery type	3V button cell (CR 2032)
Battery life	150 h
Reaction time	5 s
Reaction type	t_{99}
Display	LCD, 1 line
Weight	120 g
Warranty	2 years

Accessories
Part no.

ISO calibration certificate/Temperature ; Single point calibration for surface thermometer; calibration point +120°C	0520 0073
ISO calibration certificate/Temperature ; Single point calibration for surface thermometer; calibration point +60°C	0520 0072
ISO calibration certificate/Temperature ; Thermometers with surface probe; calibration points +60°C; +120°C; +180°C	0520 0071
ISO calibration certificate/Temperature ; Meas. instruments with surface probe; calibration points selectable from -15 to +480°C	0520 0121

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Mini alarm thermometer

The affordable mini thermometer with Min/Max alarm. Small in size but big on quality! The penetration probe is attached to the instrument (80 cm cable) and is suitable for measuring the temperature in air, in soft, powdery substances and in liquids.

Mini thermometer, battery included

Part no.
0900 0530

Mini thermometer with penetration probe and alarm

- Permanently attached probe
- Adjustable Min/Max alarm
- With clip for positioning, for mounting on the wall and for attachment



Technical data

Meas. range	-50 to +150 °C
Accuracy	±1 °C (-10 to +100 °C) ±1 digit ±2 °C (remaining range)
Resolution	0.1 °C (-19.9 to +150 °C) 1 °C (-50 to -20 °C)
Oper. temp.	0 to +50 °C
Storage temp.	-20 to +70 °C

Battery type	2 AAA micro batteries
Battery life	100 h
Display	LCD, 1 line
Material/Housing	ABS
Warranty	2 years

Accessories

ISO calibration certificate/Temperature ; For air/immersion probes, calibration point -18°C

ISO calibration certificate/Temperature ; For air/immersion probes, calibration point 0°C

Part no.

0520 0061

0520 0062

testo 915-1

The compact testo 915-1 thermometer has many advantages including a large display, hold button and high accuracy. The probe is particularly suitable for immersion and penetration measurements in the trade sector, industry or in the food industry.

testo 915-1, thermometer with penetration probe and battery

Part no.
0560 9151

Thermometer with robust penetration probe

- Compact instrument with permanently attached probe
- TopSafe protects the instrument from dirt, dust and water
- With calibration protocol



Technical data

Meas. range	-50 to +400 °C
Accuracy	±1% of mv (+100.1 to +400 °C) ±1 digit ±1 °C (-50 to +100 °C)
Resolution	0.1 °C
Oper. temp.	0 to +50 °C
Storage temp.	-20 to +70 °C

Battery type	Alkali manganese
Battery life	500 h
Display	LCD, 1 line
Material/Housing	ABS
Conn.	Fixed cable
Weight	300 g
Protection class	IP67
Warranty	2 years

Accessories

TopSafe (indestructible protection case) with bench stand

Case for instrument and probes; For safe and orderly storage

ISO calibration certificate/Temperature; For air/immersion probes, calibration points -18°C; 0°C

ISO calibration certificate/Temperature; For air/immersion probes, calibration points 0 °C; +100 °C

Part no.

0516 0188

0516 0182

0520 0041

0520 0042

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testo 106-T1/-T2
Quick-action penetration thermometer

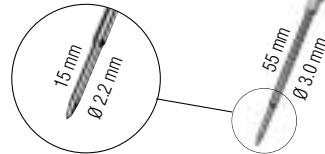
The testo 106 penetration thermometer is ideal for quick, uncomplicated core temperature checks in all industries i.e. caterers, hotels, canteens, supermarkets etc.

testo 106-T2 with audible alarm if limits are exceeded.

- Compact, practical and always ready to hand
- Wide range with high measuring accuracy
- Fast measurements and hardly visible penetration holes using special food probes
- Also available: Practical drill for deep-frozen food
- Quick check using a thin, robust measuring tip

testo 106-T1, penetration thermometer with probe protection cap and battery

Part no.
0560 1061



Technical data	
Meas. range	-50 to +230 °C
Accuracy	±1% of mv (+100 to +230 °C)
±1 digit	±0.5 °C (-30 to +99.9 °C) ±1 °C (-50 to -30.1 °C)
Resolution	0.1 °C
Oper. temp.	-20 to +50 °C
Storage temp.	-40 to +70 °C
Battery type	Lithium battery (2032)
Battery life	250 h
Dimensions	215 x 34 x 19 mm
Display	LCD, 1 line
Material/Housing	ABS
Weight	80 g
Protection class	IP67 with TopSafe
Warranty	2 years

Set	Part no.
testo 106-T1 set, penetration thermometer w. TopSafe (waterproof case, IP67), holding clip, probe cap and battery	0563 1061
testo 106-T2 set, penetration thermometer w. alarm, incl. TopSafe (waterproof protection case, IP67), holding clip, probe cap and battery	0563 1062
Accessories	Part no.
Frozen food drill ; Can be attached to holder clip	0554 0826
TopSafe (indestructible protection case); Waterproof and dishwasher-safe protection case (IP67)	0516 8265
Holder clip with probe protection cap	0554 0825

Accessories	Part no.
ISO calibration certificate/Temperature ; For air/immersion probes, calibration point +60°C	0520 0063
ISO calibration certificate/Temperature ; For air/immersion probes, calibration point -18°C	0520 0061
ISO calibration certificate/Temperature ; For air/immersion probes, calibration point 0°C	0520 0062
ISO calibration certificate/Temperature ; For air/immersion probes, calibration points -18°C; 0°C	0520 0041
ISO calibration certificate/Temperature ; For air/immersion probes, calibration points -8°C; 0°C; +40°C	0520 0181

testo 105
Robust one-hand thermometer

The robust food thermometer with interchangeable measurement tips for control measurements in abattoirs, refrigerated storerooms, lorries etc.

- 2 user-defined limit values, alarm visual or audible
- Built-in backlit display
- Audible key feedback
- 2 line display
- Waterproof (IP 65) and robust



testo 105, One-hand thermometer with standard measurement tip, incl. battery

Part no.
0563 1051



Easy-to-change measurement tips

Technical data	
Meas. range	-50 to +275 °C
Accuracy	±0.5 °C (-20 to +100 °C)
±1 digit	±1 °C (-50 to -20.1 °C) ±1 % (+100.1 to +275 °C)
Resolution	0.1 °C
Oper. temp.	-20 to +50 °C
Storage temp.	-40 to +70 °C
Dimensions	145 x 38 x 195 mm
Display	LCD, 1 line
Weight	139 g
Protection class	IP65
Warranty	2 years

Set	Part no.
One-hand thermometer with standard measurement tip, frozen food tip, long measurement tip and belt/wall holder in aluminium case	0563 1052

Accessories	Part no.
Standard measurement tip, 100 mm long	0613 1051
Frozen food tip, 90 mm long	0613 1052
Long measurement tip, 200 mm long	0613 1053
Aluminium case for the testo 105 one-hand thermometer and accessories	0554 1051
ISO calibration certificate/Temperature ; For air/immersion probes, calibration points -18°C; 0°C	0520 0041
Button cell batteries, Type LR 44, 1.5 Volt (4 off)	0515 0032

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