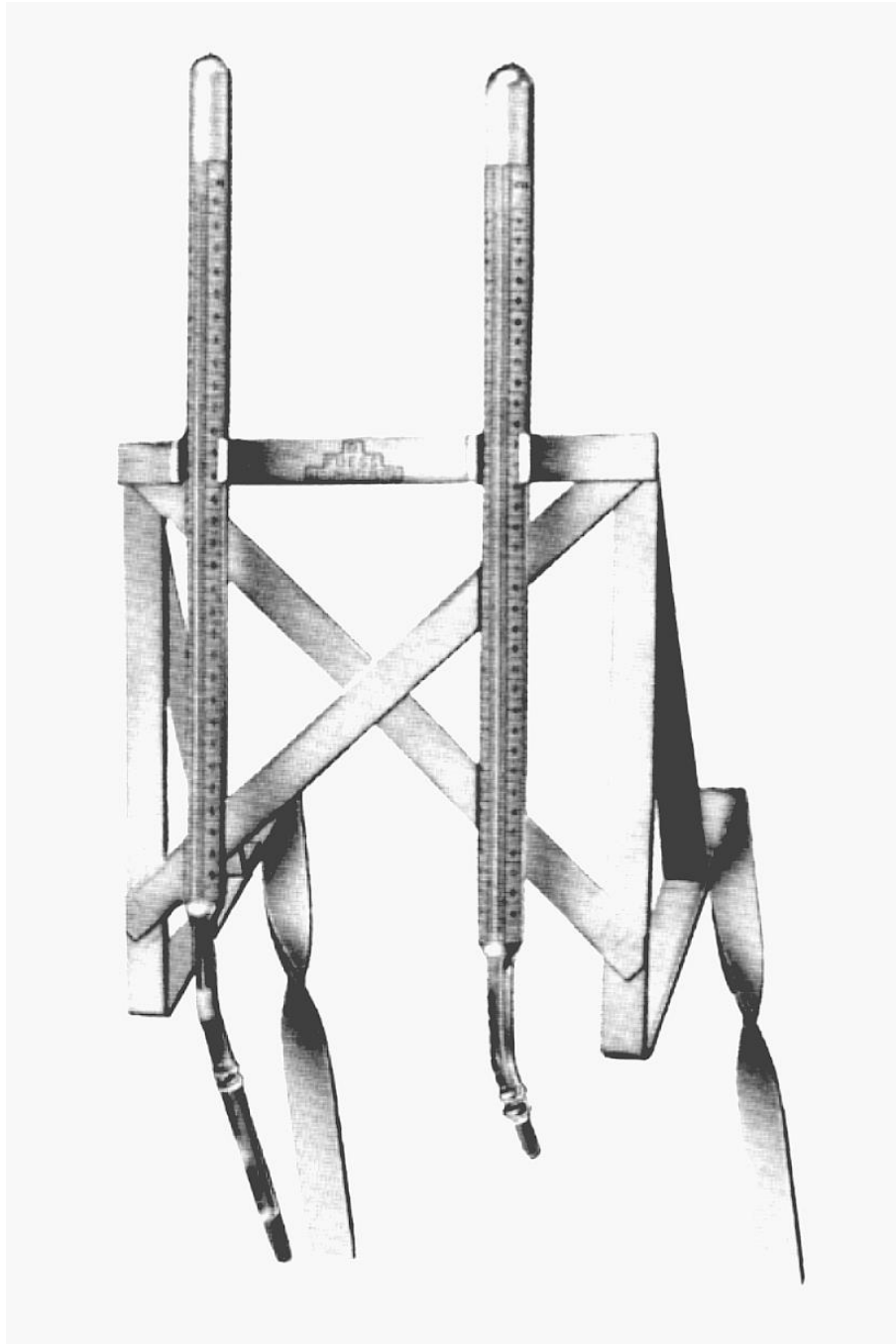


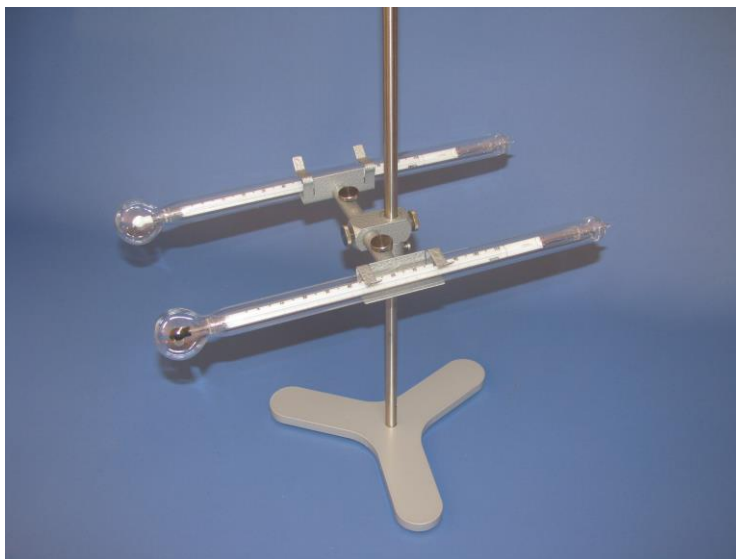
**121,0 E**

## **Meteorological Thermometers**



## 1. Radiation-Intensity Meter, Robitzsch type

This instrument comprises a black and a white bulb thermometer, which are fused inside separate evacuated glass sheaths. On account of the different reflecting and absorption characteristics, the thermometers show a temperature difference dependent upon the radiation intensity; the corresponding amount of the radiated energy can be calculated in  $\text{cal}\cdot\text{cm}^{-2}\cdot\text{min}^{-1}$  from the calibration sheet supplied. The instrument responds to a long-wave and visible, sun, sky and reflected radiations; the short-wave part is largely absorbed by the glass sheath. By screening the direct sunlight, sun and sky radiations can also be separately measured, more conveniently by using two pairs of thermometers. For measurement the thermometers are so arranged that the screening of the thermometer bulb coincides with an etched mark on the sheathing bulb. The stand and bracket enables exact adjustment and setting the thermometers in the correct directions, so that the direct sunlight always falls on the self-same position of the sheathing bulb and always allows the same absorption.



**Fig. 1** Radiation-Intensity Meter 58a on Stand 58b

**58a**      **Radiation-Intensity Meter, Robitzsch type\***  
consisting of a black and a white bulb thermometer,  
with calibration sheet  
range: -5 ... +100 °C  
division: 1/2 °C  
weight: 0.6 kg

**58b**      **Stand with bracket for No. 58a**

---

\* Literatur:

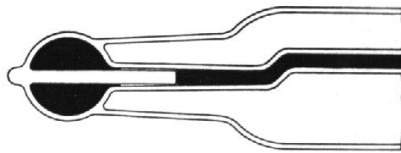
M. Robitzsch: "Meteorologische Zeitschrift", No. 6/1928, p. 234 - 235

M. Robitzsch: "Gerlands Beiträge zur Geophysik", No. 27-2/1930, p. 244 - 252

## 2. Extreme Thermometers

These are designed for measuring the highest and lowest temperatures over a particular time, generally a day.

The **maximum thermometers** (fig. 2, 3) are mercury thermometers with cut-off threads. In the bulb a glass rod is fused. Its free end projects into the capillary leaving a small free space, which allows the mercury to expand through, but with contraction causes a breaking of the thread, which thus remains in the maximum position. After reading the value the mercury can be easily shaken down once more into the bulb.



**Fig. 2**  
Maximum Thermometer  
(cut-off arrangement)

The **minimum thermometer** (fig. 3) is filled with alcohol. In the capillary there is a glass rod in the alcohol, which with a falling column is drawn down through the surface tension, but with rising column remains where it was. The glass rod indicates with its end nearest to the thermometer bulb the lowest temperature obtained during a particular time interval. It can be reset by tilting the thermometer.

Type	Divisions	1/2 °C	1/5 °C
	Length	29 cm	37 cm
	Weight	0.075 kg	0.080 kg
	Range	No.	No.
<b>Maximum Thermometer</b>	- 30 ... + 50 °C	<b>42/50</b>	<b>43c/50</b>
	- 10 ... + 60 °C	<b>42/60</b>	<b>43c/60</b>
<b>Minimum Thermometer</b>	- 40 ... + 40 °C	<b>43/40</b>	<b>43d/40</b>
	- 10 ... + 60 °C	<b>43/60</b>	<b>43d/60</b>
	- 30 ... + 50 °C	<b>43/50</b>	<b>43d/50</b>

(other ranges possible on request)

**T23 UG14**      **Combined holder (support) for Maximum and Minimum Thermometer**  
(= No. 44e)

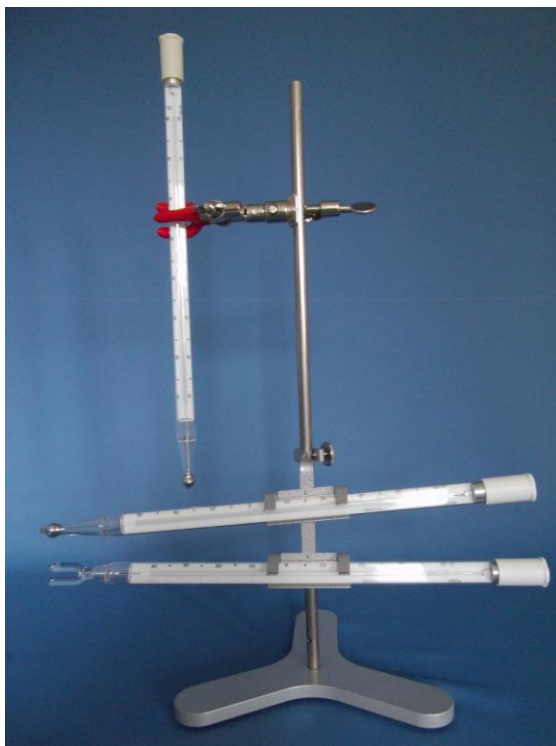


**Fig. 3** Maximum and Minimum Thermometers  
with Support T23 UG14

**T23 UG01**      **Tripod with rod**  
(= No. 44f)      for carrying Psychro- and Extreme Thermometers  
Weight: 1.25 kg

**TH48 UG03**      **Holder for one maximum- or minimum-thermometer**  
(= No. 52h)

- T23 UG35**      **Thermometer Support consisting of:**
- tripod with rod (T23 UG01)
  - Combined holder for Maximum and Minimum Thermometer (T23 UG14)
  - Holder for 1 Thermometer for measuring air temperature (RM34 T118)  
(without thermometers)

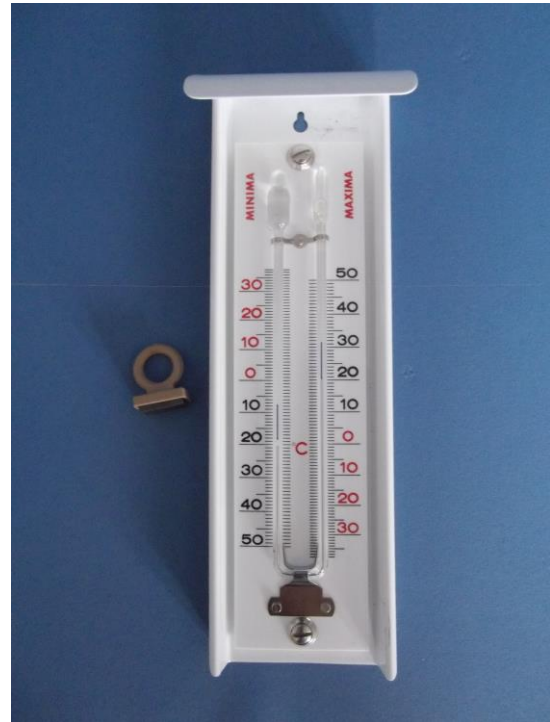


**Fig. 4**  
No. T23 UG35

### 3. Six-Thermometers

#### T23 UG36

range:  $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$   
division:  $1^{\circ}$   
incl. magnet  
for wall attachment  
with mercury filling



**Fig. 5**  
No. T23 UG36

#### T23 UG37

range:  $-30^{\circ}\text{C} \dots +50^{\circ}\text{C}$   
division:  $1^{\circ}$   
accuracy:  $\pm 1^{\circ}\text{C}$   
aluminium, silver  
for wall attachment  
with push button  
mercury-free  
dimensions: 50 x 24 x 220 mm, 104g



**Fig. 6**  
No. T23 UG37

## 4. Thermometers for Measuring Air Temperature

For measuring air temperature, in addition to the following types for special cases, the **Aspiration Psychrometer** may be preferred, which, on account of its radiation screen and the effective artificial ventilation of the thermometer, gives a representative cross-sectional value with the best accuracy. These instruments are described in Leaflet 131,0 E.

**Thermometer** (for Psychrometer type August)

<b>28/45</b>	range -35 °C to +45 °C, division in 1/5 °C, length 370 mm
<b>28/60</b>	range -10 °C to +60 °C, division in 1/5 °C, length 370 mm
<b>29/45</b>	range -35 °C to +45 °C, division in 1/2 °C, length 340 mm
<b>29/60</b>	range -10 °C to +60 °C, division in 1/2 °C, length 340 mm

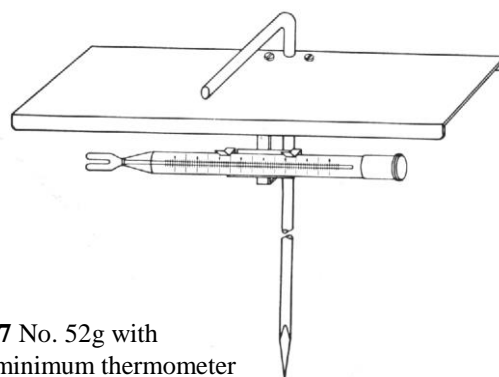
other ranges possible on request, but total measuring range 80 K

### further typical ranges

<b>28/50</b>	range -30 °C to +50 °C, division in 1/5 °C, length 370 mm
<b>29/50</b>	range -30 °C to +50 °C, division in 1/2 °C, length 340 mm

**52gk Holder for Maximum and Minimum Thermometer for measuring the maximum and minimum air temperature close to the earths surface (e.g. as grass minimum Thermometer)**  
with support rod, thermometer holder  
T23 UG14 and radiation screen  
measuring height adjustable from 2 to 12 cm  
Weight: 1.1 kg

**52g** as No. 52gk but with holder for only one thermometer (TH48 UG03)



**Fig. 7** No. 52g with one minimum thermometer

## 5. Water Thermometer

**53c Water Thermometer**  
in nickel holder with scoop  
Range: -5 °C ... +40 °C, Divisions 1/5°C  
Length: 30 cm, Weight: 0.3 kg

**53f Spare Thermometer**  
for No. 53c  
Length: 27 cm



**Fig. 8** No. 53c  
Water Thermometer

## 6. Soil Thermometer

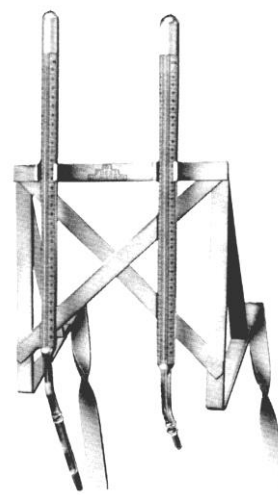
These instruments are intended for shallow depths. To the mercury bulb is fused a vertical shaft, of a length corresponding to the measuring depth. For easy reading the tube bearing the scale above the surface of the soil is angled at 60° from the horizontal. This improved form minimises breakage movement of the soil. The insertion depth is calculated from the middle of the bulb.

### Soil Thermometer,

Divisions: 1/5°C

Weight: 0.1 kg

No.	Depth cm	Range °C
<b>49a/0</b>	0	-30 ... +55
<b>49a/2</b>	2	-30 ... +55
<b>49a/5</b>	5	-25 ... +55
<b>49a/10</b>	10	-25 ... +55
<b>49a/20</b>	20	-20 ... +55
<b>49a/30</b>	30	-15 ... +55
<b>49a/50</b>	50	-10 ... +40



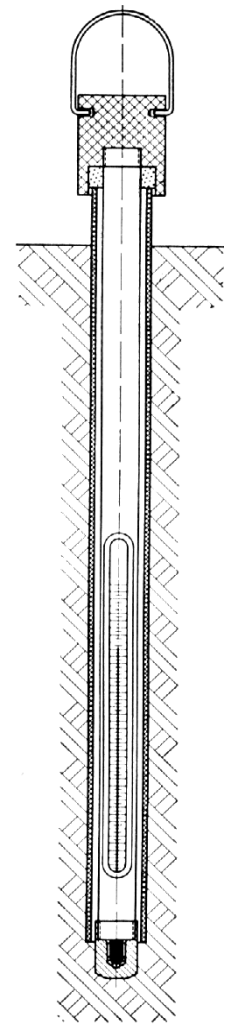
**Fig. 9** No.51a with two soil thermometers

### Iron Stand for Soil Thermometer

- 51a** for 2 Thermometers Weight: 0.72 kg  
**51b** for 3 Thermometers Weight: 0.76 kg  
**51c** for 5 resp. 6 (on request) Thermometers

### Deep-Soil Thermometer

For larger depths soil thermometer 61 shown in fig. 10 is suitable. Equipped with a large mercury bulb, the thermometer is fitted in the lower end of a plastic sheath, and the whole unit is withdrawn from the soil for reading. The protruding thermometer bulb is protected by a cap of corrosion-resisting material. For protection and for inserting the thermometer into the soil a plastic tube is used. The upper protective cap with its gasket prevents the ingress of water and foreign bodies, as well as the formation of air currents inside the thermometer. Furthermore the low thermal conductivity of the plastic parts will prevent a variation of measurement values when withdrawing and reading the thermometer. By the use of corrosion and humidity resisting materials, a long life is guaranteed. To accommodate the natural structure and heat conductivity of the soil, a soil borer of the same size is used for inserting the thermometer tube.



### Deep-Soil Thermometer in Plastic Sheath

with protective cap and insertion tube  
 Range: -10 °C ... +30 °C  
 Divisions 1/10 °C

<b>61/30k</b>	for 10 / 20 / 30 cm depth	Weight: 0.8 kg
<b>61/50k</b>	for 50 cm depth	Weight: 0.9 kg
<b>61/100k</b>	for 100 cm depth	Weight: 1.4 kg
<b>61/200k</b>	for 200 cm depth	
<b>61/300k</b>	for 300 cm depth	

**48**            Spare Thermometer    Weight: 0.12 kg

**Fig. 10**  
 Deep-Soil Thermometer  
 No. 61.. in plastic sheath



## 7. Reference Standard Thermometers

With blue reflecting capillary for a better contrast with the thermometer scale in order to assure better readings. Different ranges deliverable, e.g.:

<b>range</b>	<b>division</b>	<b>Total length</b>	<b>diameter</b>
-3 ... +102°C	0,1	600 mm	10-11 mm
-3 ... +50°C	0,1	450 mm	9-10 mm
-5 ... +50°C	0,1	450 mm	9-10 mm
-3 ... +38°C	0,1	360 mm	9-10 mm
-38 ... +10°C	0,1	475 mm	9-10 mm
-38 ... +50°C	0,1	560 mm	10-11 mm
-5 ... +105°C	0,2	450 mm	9-10 mm
-38 ... +52°C	0,2	400 mm	9-10 mm

**DR. ALFRED MÜLLER**  
**METEOROLOGISCHE INSTRUMENTE KG**  
Chausseestraße 39 / 42c  
D-15712 Königs Wusterhausen

**Tel.:** +49 3375 9025-32  
**Fax:** +49 3375 9025-36  
**e-mail:** info@meteomueller.de  
**www.rfuess-mueller.de**