

Adjustable contact-thermometers

with rotary magnet MS D.B.P. (German federal patent)
Unexcelled as temperature controller and temperature monitor regarding

- accuracy
- reliability
- simplicity
- economically

for measurement ranges from $-38\dots+400^{\circ}\text{C}$.

Our adjustable glass contact-thermometers have two scales; in the upper part is the setting scale and in the lower part the indication or temperature scale.

The rotary magnet inside the plastic contact cap has the function to move the threaded spindle, thereby the round setting screw nut is moved up or down. A rotary anchor is fitted on the spindle amounting to the magnet, so that an exact transfer of the magnetic power on the spindle is possible.

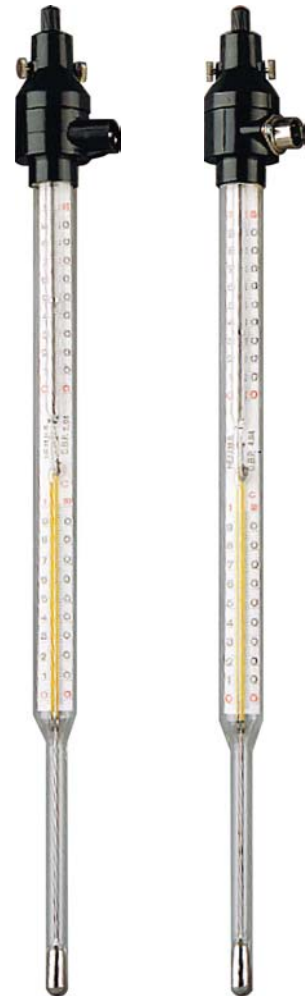
At the setting screw nut a special contact wire is fixed which is at the same temperature degree on the temperature scale like the broad face of the setting screw nut on the setting scale. The contact wire always has to follow unavoidably the movements of the setting screw nut and so it always has the same distance while a sliding contact (the contact wire is lead through a platinum spindle) makes a clean contact sure.

The line contact is fixed below the prismatic yellow reflecting capillary. As soon as the mercury reaches the adjusted temperature the contact is closed and via relay a consumer load (installations for laboratories etc.) is switched on or off (also see our List 200/210/215/220 for contact-protection and laboratory relays).

The threaded spindle is excentrically bedded in the glass (German federal patent D.B.P. 448786). By economy of an iron bearing the contact-thermometer is more durable and assures the cleanness of the mercury.

The threaded spindle is manufactured in stainless steel so any grit of its material is avoided and the setting screw nut is highly smooth running!

- Fast reactions in validity of 1 to 1,2 sec. in standard vessels
- Accuracy max. $2/10000^{\circ}\text{C}$ for an adequate temperature range and division in connection to our contact-protection relays type VR tr and laboratory relays
- Stability of accuracy by artificial aged thermometer glass
- Threaded spindle in stainless steel – so no grit while adjusting and smooth running of the setting screw nut
- Switching operation inside the hermetic closed and with security gas filled thermometer



Spindellagerung
D. B. P.

Adjustable contact-thermometers with rotary magnet MS 121

These contact-thermometers have a round contact cap.

Normally they are attached to with tripod clamps and dived with the rejuvenated bottom part (tube) into a medium. The tube length is serially moving in 50mm steps between 50mm to 300mm, but longer tubes are possible. Immersion depth = calibration depth! In special cases if between medium and tube rejuvenating is a too large distance the needed calibration depth is recommended.

The thermometers are manufactured in high-quality thermometer glass. To avoid aging processes the glass is artifical aged after melting.

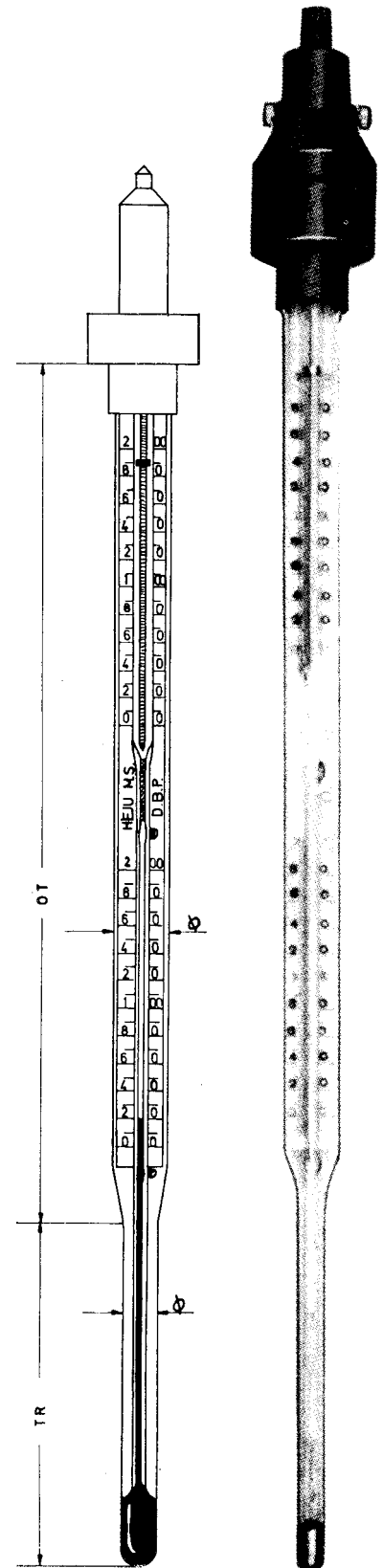
Purest, several times distilled mercury is filled in. The temperature range lies between $-38\dots+400^{\circ}\text{C}$ but because of the boiling point of mercury at $+365^{\circ}\text{C}$ thermometers with that range are blown under overpressure.

The prismatic yellow reflecting capillary allows a excellent reading of the black lettered milk glass scale.

The division is $1/1^{\circ}\text{C}$ for temperature ranges up to 150°C , above is $2/1^{\circ}\text{C}$ and above 360°C $5/1^{\circ}\text{C}$.

Every thermometer is calibrated in several measuring points. The number of points depends on the temperature range or division. The scale is divided from calibration point to calibration point. Because of a minimal different inside diameter of the capillary the degree distances are changing form point to point. So every scale is seperately calibrated for every thermometer.

To reach a higher accuracy not needed temperatures in lower divisions can be disabled by elimination of the zero-point (for example for temperature range $+100\dots+200^{\circ}\text{C}$). This is realized by a extension bubble in the lower capillary.



MS 121

Dimensions	Diameter	*	Lenght
Cap to cap bedstop	22mm		In OT integrated
Upper part (OT)	18mm		245mm
Immersion tube (TR)	8/9mm	8/9mm	On demand
* if needed, please inquire			

Adjustable contact-thermometers with setting scale only (Add-on "esk")

In some cases where a high value is set on accuracy the length of the Upper part (because of the setting scale and temperature scale) is not wanted. Mostly at construction of thermo baths.

Thereby an additional calibratable or calibrated control thermometer is used, so the temperature scale is not needed. Now a thermometer with only half of the original length is favourably.

The manufacturing of thermometers with temperature range of -38...+200°C is possible. The minimum immersion depth is 100mm.

Contact socket caps for contact-thermometers

After dropping the magnet at the standard contact cap the locking cap can be released. Under it electrical contacts of the thermometer are visible (Attention: discontinued model)

To change the thermometer faster and easier we developed the following contact socket caps:

2-pole contact socket cap DBGM (Add-on "st2")

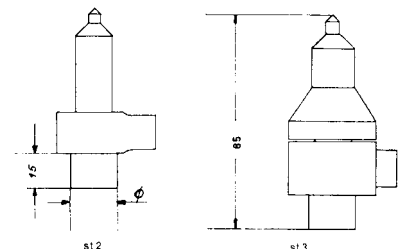
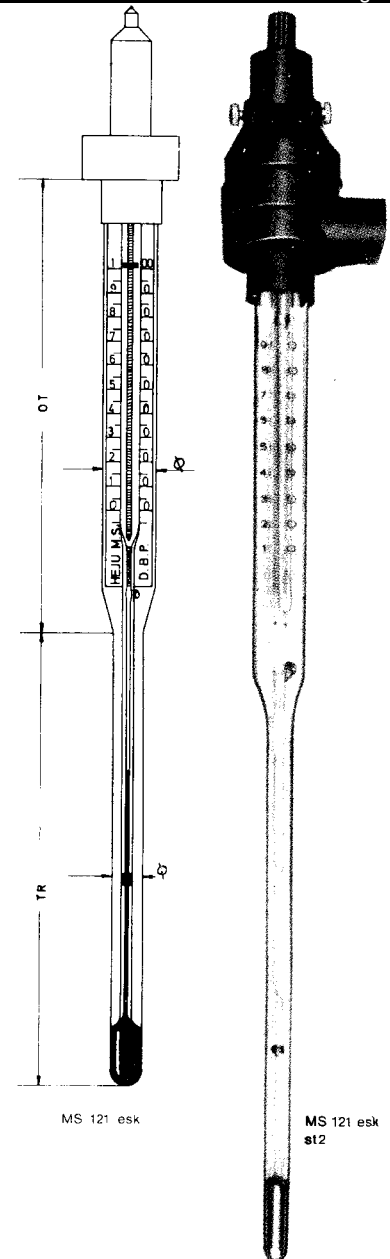
Two pins with a pole distance of 13 mm are lying protected into the overlap of the contact cap. That pins are the thermometer connection.

An additional delivered coupling is mounted to the cable and afterwards slipped on the pins. A secure connection is established. If you are working with our laboratory relay TST II-A an semiconductor is configured inside the cap. The installation switches off as soon as the connection between relay and thermometer is interrupted. Also for cable breach on both sides. Thereby a maximum in security is assured. The same configuration is also possible for contact-thermometers with round contact cap.

3-pole spezial contact socket cap DBGM (Add-on "st3") according to DIN 41524

For these contact-thermometers the thermometer connection to the connection cables is 3-pole executed. In connection to our laboratory relays (except type TST II-A) the current circuit is only closed if all connection between thermometer and relay are orderly done. By our bridge circuit DBGM inside all contacts the signal simulates "relay off" if any contact is interrupted. Of course the connection is useable in standard contacts. Couplings for this add-on are deliverable on inquiry. They are required for executions according to DIN 12878!

For all connection types connection cables in any length completely mounted with socket and coupling are deliverable on demand.



Dimensions in mm		*	Length
OT	18	22	135
TR	8/9	8/9	On demand (min. 100mm)

* if needed, please inquire

Adjustable Contact-thermometers with standard joint "NS" (Add-on "s")

For monitoring and controlling of temperature in glass installations (for example distilling installations etc.) contact-thermometers with standard joints are primarily used if adequate standard joint cores are available.

Adjustable Contact-thermometers with relocateable NS (Add-on "sv")

In contrast to the above mentioned contact-thermometers with fixed standard joint all stock versions of contact-thermometers are useable.

Additionally a standard joint with melted glass thread is delivered. With help of a plastic screw cap and an inside lying teflon and silicone sealing the immersion tube is sealed in a vacuum and pressure-resistant on principle of squeeze screwing.

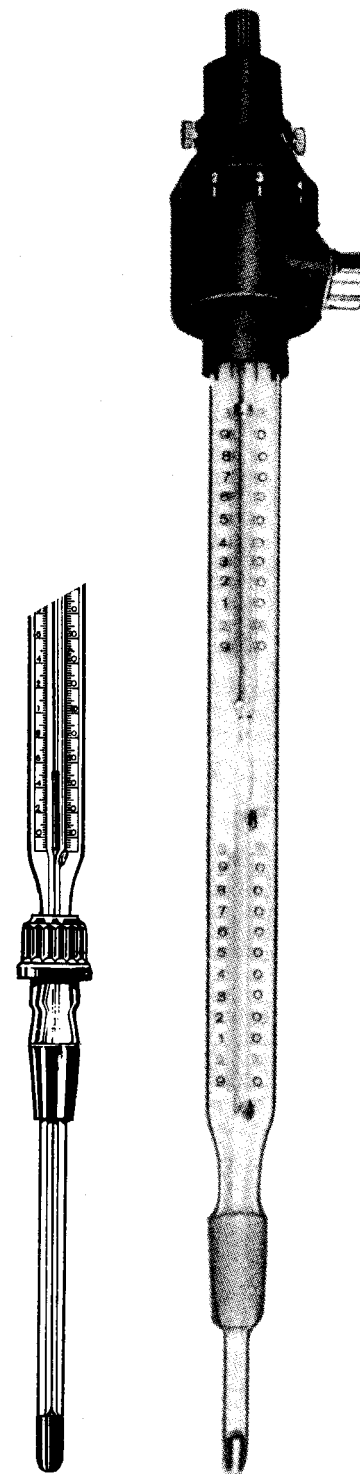
The special advantage is in the stockkeeping – relocateable joints can separately be ordered to available contact-thermometers!

Adjustable contact-thermometers with long-distance lines

To increase the switching and indication accuracy all contact-thermometers are manufactureable with long-distance lines (also for thermometers with zero-point elimination). Therefore the mercury lies in a larger mercury vessel and per ° it has to put back a longer distance. In consequence the upper part is longer. The numbers in the following table show the upper part length in mm. Is no number shown, manufacturing is not possible.

°C	2/1	1/1	1/2	1/5	1/10	1/20	1/50	1/100
5	185	185	185	185	185	245	295	485
10	185	185	185	185	248	295	485	
25	185	185	185	245	295	485		
50	185	185	245	335	485			
100	245	245	245	485				
150	245	245	295					
200	245	245	435					
250	245	245	485					
300	245	335						
360	245	385						

Other divisions on inquiry



MS 121 s

MS 121s st3 g

Dimensions		
UT	14,5	19
TR	12	5

Adjustable contact-thermometers with security contact (Add-on "usk")

The additional security contact monitors the mercury pillar between the mercury ball and the lower contact. Only possible in conjunction of add-on "st3".

Thermometers according to the security classes 1 or 2 of DIN 12878.

Dimensions in mm	Length	
Cap to cap bedstop	22	In OT
OT	18	235
TR	8/9	On demand
* if needed, please inquire		

Adjustable contact-thermometers with cullet monitoring (Add-on "usk-s")

Like "usk", but with an additional contact stripe touching all glass parts inside and outside the thermometer, that means **HIGHEST SECURITY!** Only possible in conjunction of add-on "st3".

In case of breakage of glass at any location the consumer load is switched off!

Thermometer according to the security class 2 of DIN 12878!

Please notice:
 For operating with the above mentioned security thermometers adequate relays are recommended, for example laboratory relays of type TST (see datasheet HEJU T 210/215/220).

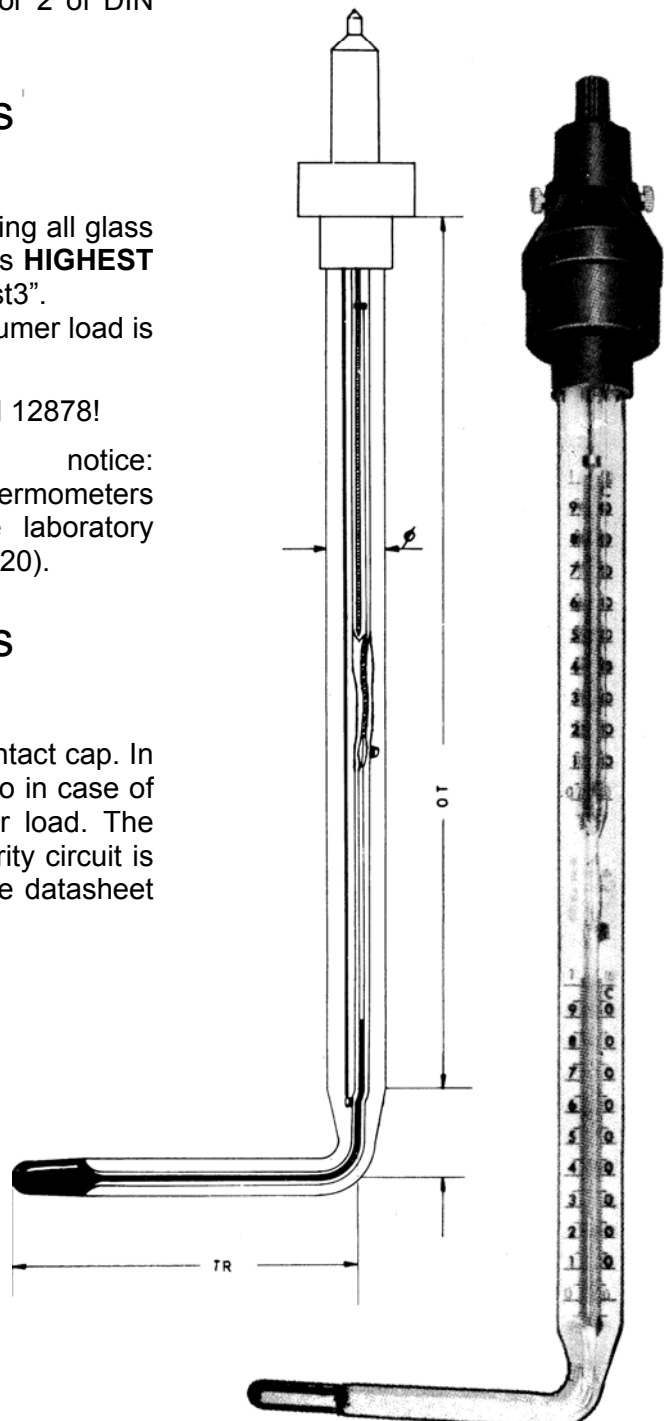
Adjustable contact-thermometers with wire break (Add-on "D")

In these thermometers a diode is fitted bellow the contact cap. In case of non-orderly connection the thermometer (also in case of wire break on one side) shuts down the consumer load. The contact cap "st" has to be used primarily. The security circuit is working with all laboratory relays of type TST A (see datasheet HEJU T 210/215/220).

Adjustable contact-thermometers with rotary magnet MS 123

The immersion tubes are normally bent backwards with an angle of 90°, but it is possible to bent it right or left or with an other angle (for example 135°).

For the choice of a contact cap please note that there have to be enough space behind the cap. Especially for 2- or 3-pole contact caps is more useful to turn the socket to the right or left. Installation becomes easier.



Adjustable contact-thermometers with rotary magnet MS in protection mount

If the possibility of mechanical damages is high, the use of contact-thermometers in protection mounts is recommended. That is also the case if the more or less valuable medium is unuseable after contamination of mercury.

These thermometers are primarily used in installations and machines, electroplating bathes or heating bathes.

In thermometers with closed immersion tubes upside the mercury ball is an asbestos isolation fitted and looped up to the thread to isolate the air cushion and increase the validity. To reach a higher accuracy and a faster reaction it should be used (if damages are only possible in the upper part) either

- choose the glass immersion tube ex attaching part (thread or flange) free outstanding or
- use a punched protection tube (the stability is not impacted in case of mechanical stress)

Please mind the aggressiveness of mercury to the medium in both cases.

The protection mount for contact-thermometers is serially manufactured in brass for temperature ranges up to +360°C. Above +360°C the thread and protection tube is made of steel.

On demand and without any extra charge protection tubes are deliverable in steel for all temperature ranges. For operations in electroplating bathes it is mostly recommended to use a PVC protection tube (Operating temperature max. +75°C). For an extra charge protection tubes are manufactured in stainless steel or titanium etc.

Immersion tube and thread should be made of the same material anyway, but not the upper part (for example thread and tube in V4A and upper part in PVC)

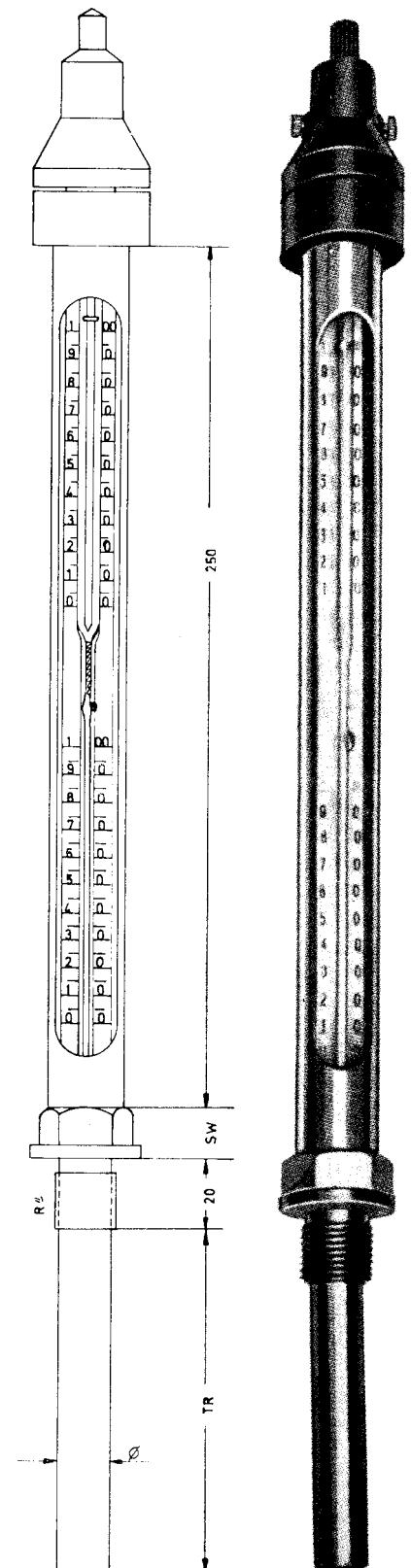
The protection mounts according to DIN:

MS 122 = adjustable contact-thermometers with rotary magnet, dimensions analog to DIN 16174

MS 124 = adjustable contact-thermometers with rotary magnet, immersion tube with angle of 90° bented, dimensions analog to DIN 16175

MS 124a = ditto, but immersion tube with angle of 135° bented, dimensions analog to DIN 16176

Dimensions (if not seen in illustration)		Length
OT	22 mm	In OT
TR	18 mm	235 mm
Thermometer with precise division: OT dimensions page 4 plus 15 mm		
SW for R 1/2" or R 3/4" = 27 mm		



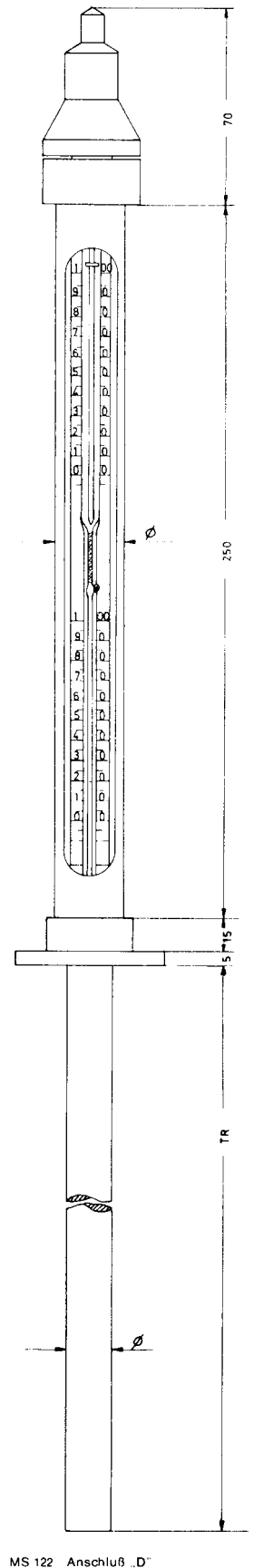
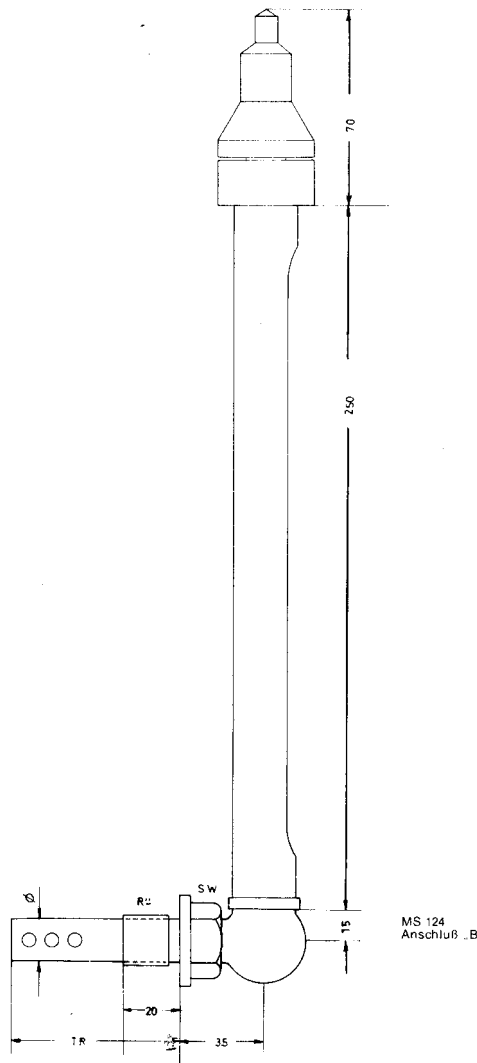
MS 122 Anschluß „B“

Protection tube connections are serially manufactured according to figure B with thread R 1/2" or R 3/4".

The following tube connections are possible:

- A = Einsteckform without thread
- B = fixed hexagonal bolt with thread
- C = non-fixed coupling nut
- D = fixed flange d = 50mm
- E = coupling nut with fused screw-in cover
- E/1 = coupling nut with fused screw-in cover
- F = coupling nut with screwable coupling nut DIN ND16, NW20, d = 150mm
- F/1 = ditto, but with fused-in flange

On demand other protection tube connections are deliverable. The manufacturing of contact-thermometers with protection mount with precise division is possible for straight thermometers also with setting scale only! Upper edge length see list "divisions" +15mm. Please mind, especially for angled contact-thermometers, that there is enough space behind the upper part. If necessary please inquire right or left rotated!



Adjustable contact-thermometers with rotary magnet MS 129

In glasshouses, colling rooms, computer rooms and storage rooms (for example breweries) highly exact temperature controlling appliances are needed.

In these cases our adjustable contact-thermometer MS 129 is perfectly adequate.

These appliances also have a mount in nickel-plated brass. The length of the mount is 250 mm with a diameter of 24 mm. Two feet for installing at a wall are existent. An integrated scale protector on the mount protects the glass thermometer against mechanical damages. The thermometers have two scales like described before, on the one hand the setting scale and on the other hand the indication or temperature scale.

The rotary magnet inside the plastic contact cap has the function to move the threaded spindle, thereby the round setting screw nut is moved up or down. A rotary anchor is fitted on the spindle amounting to the magnet, so that an exact transfer of the magnetic power on the spindle is possible.

At the setting screw nut a special contact wire is fixed which is at the same temperature degree on the temperature scale like the broad face of the setting screw nut on the setting scale. The contact wire always has to follow unavoidably the movements of the setting screw nut and so it always has the same distance while a sliding contact (the contact wire is lead through a platinum spindle) makes a clean contact sure.

The line contact is fixed below the prismatic yellow reflecting capillary. As soon as the mercury reaches the adjusted temperature the contact is closed and via relay a consumer load (installations for laboratories etc.) is switched on or off (also see our List 200/210/215/220 for contact-protection and laboratory relays).

The temperature range is serially $-10 + 70^{\circ}\text{C}$, but every range between $-38...+70^{\circ}\text{C}$ is possible. The adjustment happens steplessly, accuracy is $1/20^{\circ}\text{C}$.

A higher adjustment is possible in choice of more precisely divisions (for example 10°C in $1/10^{\circ}\text{C}$ divided). Please inquire!

Precision contact-thermometer with fixed fused contact figure 33a

Another solution offers the fixed contact-thermometer illustrated on the right side if only temperature is needed

This contact-thermometer consists of a massive glass tube without division, only the according contact temperature is marked on the appliance. At the thermometer a 2-pole flat socket is fitted.

