

温度測定用センサ 取扱説明書

ご使用前に本紙を良くお読みの上、正しくお使いください。

Temperature measurement probe User's Manual

Carefully read entire manual before using the equipment.
Read the English Manual at reverse side.

静止表面温度測定用センサ	Stationary surface temperature measurement probe
移動・回転表面温度測定用センサ	Moving and rotating surface temperature measurement probe
内部温度測定用センサ	Internal temperature measurement probe
空気温度測定用センサ	Air temperature measurement probe

このたびは、安立計器製品をお買い求め
いただきまして、ありがとうございます。
本取扱説明書は、弊社製品を安心して
お使いいただくために書かれています。
本取扱説明書をよくお読みいただき、正しく
ご使用いただきますようお願いいたします。
なお、温度測定器本体に添付されている
取扱説明書も併せてご覧ください。取扱
説明書の中に「安全上の注意」が記して
ありますので、よくお読みの上、正しくご使用
ください。
本取扱説明書は温度測定用センサと一緒
に必ず保管してください。

Thank you for purchasing this
Anritsu Meter's products. This user's
manual was written to ensure safe
and reliable operation of the
products. Carefully read the entire
manual before using the products.
Also, carefully read the Instruction
manual supplied with the
instrument.
Carefully read the sections marked
"Safety Cautions" so as to ensure
correct and safe use of the
instruments. Store this user's
manual with products.

この表示は、誤った取り扱いを
しますと人が死亡、または重傷
を負う危険が想定される内容
を示します。



This mark indicates item
where incorrect operation
could lead to serious bodily
injury death.

この表示は、誤った取り扱い
をしますと人が傷害を負う危険、
及び物的傷害の発生が想定
される内容を示します。



This mark indicates item
where incorrect operation
could lead to bodily injury
or damage the equipment.



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Safety Precaution

	<ul style="list-style-type: none"> ■ This probe is designed for temperature measurement only. It should not be used for any other purpose. ■ This sensor is a thermocouple type temperature measurement probe. Be sure that the probe and measurement unit that are not of the same type will result in measurement error. ■ Most temperature measurement probes are grounded probes. Do not use grounded probes in electricity environment because of electric shock. ■ This probe is not designed for medical use and must not be used to measure body temperature, etc.
	<ul style="list-style-type: none"> ■ The allowable temperature range is displayed on all probes. Do not attempt to measure temperature out of the allowable temperature range. The allowable temperature limit is the contact section temperature limit under normal room temperature. Use of this probe in furnaces or in the other high ambient temperature environments will damaged the probe and can result in fire. In this case, contact the place of purchase or us. ■ If the temperature of the measurement object is 0°C or below, ice or frost may form on the surface. The probe contact plate may then stick to the ice or frost. If this happens, the spring mechanism in the probe may break when the probe is pulled away from the measurement object. To prevent such damage, remove any ice and frost from the surface of the measurement object before making measurements. ■ Do not measure in areas with strong magnetic fields or high frequency electrical fields. Improper use may damage the measurement unit or temperature measurement probe. ■ The probe contact plate may be damaged by impact. Be careful not to drop or exert any other impact on the probe during storage or when moving about with the probe in your hand. ■ Do not use this probe to measure the temperatures of significantly acidic, alkaline, or other corrosive objects. Failure to observe this warning may result in probe corrosion, significantly reducing service life. ■ Make sure that the probe is cool before replacing the probe cap.

In case of trouble

The typical problems of sensor are four shown bellows.

① **Broken junction**

The broken junction occurs when the probes, compensating lead wire, or their connections have become separated.

In case of the broken junction, it cannot be measured. Please repair it.
(Some probes are beyond repair goods.)

The broken junction cannot be judged by external appearance. If the broken junction probe connects to our thermometer, it will be indicated "Burn out" or same means display. (See the instruments manual)

② **Short circuit**

The short circuit occurs when the probe or compensating lead wire comes in with a section other than the hot junction.

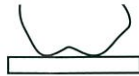
In case of the short circuit, the temperature measurement is that at the point where connection is made rather than the hot junction. Please repair it.

③ **Contact plate Deformation**

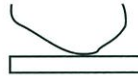
The deformation of the contact plate will cause measurement errors due to poor contact surface. Please repair it.



Normal



Deform 1



Deform 2

④ **Other types of damage**

Damage to functional parts, such as breakage of the guard, deformation of the stainless steel pipe, and damage to the grip section.

- It is difficult to judge the short circuit or the contact probe deformation. Accordingly we recommend that periodic calibrations by our surface temperature calibrator.
- Stop the use as soon as any problems are discovered and contact to the place of purchase or us.

Maintenance

Our products are designed to keep stable quality. However we recommend the periodic calibration and maintenance by the temperature calibration system ACSII series because the life of probes are influenced as various applications. We also supply the calibration service for our users. Please contact to the place of purchase or us.

Warranty and Responsibility

All probes are consumable and not warranted. However if the probes is damaged due to manufacturing errors or damaged during shipment, please contact to the place of purchase or us. If the suitable application probe is not used, the measurement error is occurred. Please ask our dealer or us.

Anritsu Meter is not responsible for any problems or damages that might result from use of the temperature measurement.

- Anritsu Meter is not responsible for infringements of third party rights occurring from the use of data appearing in this manual.
- This manual may not be copied in any form without the written consent of Anritsu Meter.

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Operation



Moving and Rotating Surface Temperature Measurement Probe

Moving and rotating surface temperature measurement probes are designed to measure the temperature of moving surface and rotating surfaces.

The suitable probes are chosen depend on the size, roughness of the surface and target condition.
Use suitable probes to your application.

- **Position error**
The probe must be held in the correct position to insure the reliability of measurement result.
The guards are attached to the head of probes for stable measurement and reduction of friction.
Do not press the only part of guards to target otherwise measurement error occurs.
- **Dirty surface of measurement**
Dirty surface or sensor occurs measurement errors. Dirty of target surface makes friction increasing.
Clean the surface of target as possible.
Be careful cleaning that temperature may be burns or frost bite.
- **Shape of measurement surface**
The measurement needs the target area larger than the head of probe.
It also needs the surface must be flat.
If the measurement condition is not satisfied above, measurement error occurs.
Especially the target that is low thermal conduction should be flat surface.
Use the suitable probe for measuring the curved surface.
If the curved surface is measured with the stationary surface temperature probe, measurement error occurs.
- **Application pressure to the measurement object**
Guards are attached to the head of probes.
Press the probes to the measurement object so that Guards or Stoppers is vertical to the surface.
It does not need the strong pressure to press the probes otherwise the target or probes would be damaged.

Safety precautions to observe during operation



	<ul style="list-style-type: none">■ Do not touch the probe or stainless steel pipe after measurement. The temperature may cause burns or frost bite.■ The guards are designed so that the set surface area will come into contact surface. Do not change the shape of the contact surface. The shape changing will occur degrade the measurement accuracy.■ Carefully confirm that the objects to be measured will not catch your body and that will not wind the cable of the probe.
	<ul style="list-style-type: none">■ If the curved surface (Rotating) is measured, choose the suitable probe, otherwise measurement error occurs.■ The surface of object must be flat otherwise the measurement error occurs because the rough surface makes friction.

Internal Temperature Measurement Probe

(Internal of liquid or semi-solid objects / needle type)

Internal temperature probes are designed to measure the temperature of liquid or semi-solids.
The suitable probes are chosen depend on the hardness, thermal characteristics and temperature range.
Use suitable probes to your application.

Safety precautions to observe during operation

	<ul style="list-style-type: none">■ The Hot junction is located at the end of the stainless steel pipe. Insert the probe into the substance to be measured 15 times of the stainless steel pipe diameter. (For example, in case of $\phi 3$ mm diameter stainless steel pipe, it needs to insert more than 45 mm) If the insert length is not satisfied above, measurement error occurs.■ Do not touch the probe or stainless steel pipe after measurement. The temperature may cause burns or frost bite.■ Some internal temperature measurement probes have sharp ends. Handle with special care to prevent bodily injury.■ Air temperature measurement probes can not be used to measure surface temperature.
	<ul style="list-style-type: none">■ Model 518 and Model 524, the hot junction is formed when the end is soaked molten metal.■ When measuring corrosive liquids, do not use the non-coated internal probe otherwise it will be damaged.■ Check the no pressure leaks when the sheath probe is attached into section with internal pressure. In case of high pressure, contact to the place of purchase or us.

Operation

● Temperature measurement probe

The various surface temperature measurement probes are designed to each application. The type of probes are classified roughly into the four types, the Stationary Surface Temperature Probes, the Moving and Rotating Surface Temperature Measurement Probes, the Air Temperature Measurement Probe and the Internal Temperature Measurement Probe.

Stationary Surface Temperature Measurement Probe

The stationary surface temperature measurement probes are designed to measure surface temperature

The suitable probes are chosen depend on the size, roughness of the surface and target condition.

Use suitable probes to your application.

● Position error

The probe must be held in the correct position to insure the reliability of measurement result.

Be sure that the position 90° to the surface, not deviate by more than 5° in any direction.

● Dirty surface of measurement

Dirty surface or sensor occurs measurement errors. Clean the surface of target as possible.

Be careful cleaning that temperature may be burns or frost bite.

● Shape of measurement surface

The measurement needs the target area larger than the head of probe.

It also needs the surface must be flat.

If the measurement condition is not satisfied above, measurement error occurs.

Especially the target that is low thermal conduction should be flat surface.

Use the suitable probe for measuring the curved surface.

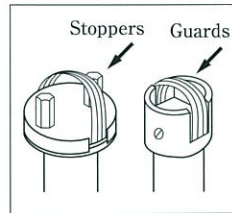
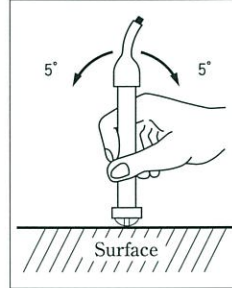
If the curved surface is measured with the stationary surface temperature probe, measurement error occurs.

● Application pressure to the measurement object

Guards or Stoppers are attached to the head of probes.

Press the probes to the measurement object so that Guards or Stoppers is vertical to the surface.

It does not need the strong pressure to press the probes otherwise the target or probes would be damaged.



Safety precautions to observe during operation

	<ul style="list-style-type: none"> ■ Do not touch the probe or stainless steel pipe after measurement. The temperature may cause burns or frost bite. ■ The stopper is designed so that the set surface area will come into contact surface. Do not change the shape of the contact surface. The shape changing will occur degrade the measurement accuracy.
	<ul style="list-style-type: none"> ■ The stationary surface temperature measurement probes are designed only stationary flat surfaces temperature measurement. If it use to the moving or rotating surfaces, it would be damaged.

Air Temperature Measurement Probe

The air temperature measurement probe is designed to measure the air temperature.

Use suitable probes to your application.

Safety precautions to observe during operation

	<ul style="list-style-type: none"> ■ Do not touch the probe or stainless steel pipe after measurement. The temperature may cause burns or frost bite. ■ Some air temperature measurement probes have sharp ends. Handle with special care to prevent bodily injury. ■ Air temperature measurement probes can not be used to measure surface temperature.
	<ul style="list-style-type: none"> ■ Air temperature measurement probes can not be used to measure corrosive air otherwise it would be damaged.

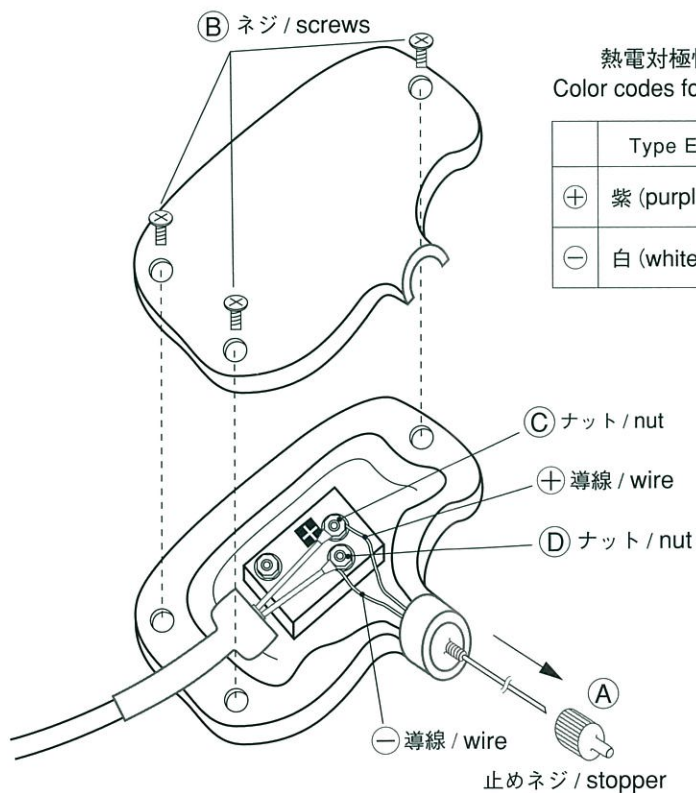
BTシリーズの交換針 (BTNシリーズ) 交換方法

- ① 止めネジ (A) を外す。
- ② ネジ (B) を3箇所外し、握り部フタを外す。
- ③ ナット (C) (D) をゆるめ、交換針を抜く。
- ④ 新しい交換針を挿入し、
 - ・ ⊕ 導線の被覆がない部分をナット (C) のワッシャの間に挟み、ナット (C) を締める。
 - ・ ⊖ 導線の被覆がない部分をナット (D) のワッシャの間に挟み、ナット (D) を締める。
- ⑤ 握り部フタを閉め、ネジ (B) を3箇所締める。
- ⑥ 止めネジ (A) を締める。

How to replace the sensor needle for BT series

- ① Remove the stopper (A).
- ② Remove the screws (B) and open the cover of grip.
- ③ Loosen nut (C), (D) and remove the needle.
- ④ Set the spare needle and connect the wires as follows.
 - Fasten nut (C) with putting the bared wire of plus in the nut (C).
 - Fasten nut (D) with putting the bared wire of minus in the nut (D).
- ⑤ Close the cover of grip and fasten 3 of screws (B).
- ⑥ Fasten the stopper (A).

組立図 / Assembly drawing



熱電対極性の色識別
Color codes for thermocouple

	Type E	Type K
⊕	紫 (purple)	緑 (green)
⊖	白 (white)	白 (white)