The selection is detailed on page 6

DB10

Surface Thermal Resistance Thermometer

Working principle

Thermal resistance is a temperature measuring element commonly used in low and medium temperature areas, using the resistance of the substance itself to measure the temperature when the temperature changes. The heated part of the thermal resistance (temperature sensing element) is evenly wound on the skeleton made of insulating material with a thin metal wire. When there is a temperature gradient in the measured medium, the measured temperature is the average temperature in the medium layer within the range of the temperature sensing element。

Product description

probe
This type of surface temperature measuring thermal resistance thermometer. The DB10 series resistance thermometer can be installed in a borehole without a thermometer casing.
For example. Into machine parts, cables have a variety of insulation materials to match different environmental conditions.
Note: To install a temperature timer with a flight lead, the installer must ensure that the installation works properly and complies with the appropriate regulations. If the cable end of the thermometer is in the hazardous area, the PTER/ connector must be used for ADA. Flight leads must be attached to certified attachments when operating outside hazardous areas or in dust explosion atmospheres.
Connection of resistance thermometers (e.g. The Pt100 to the transmitter must be made of shielded cable. The shield must be electrically connected to the housing of the grounded thermometer. It will ensure that there are equal potentials bonded during installation, so that the balanced current cannot flow.

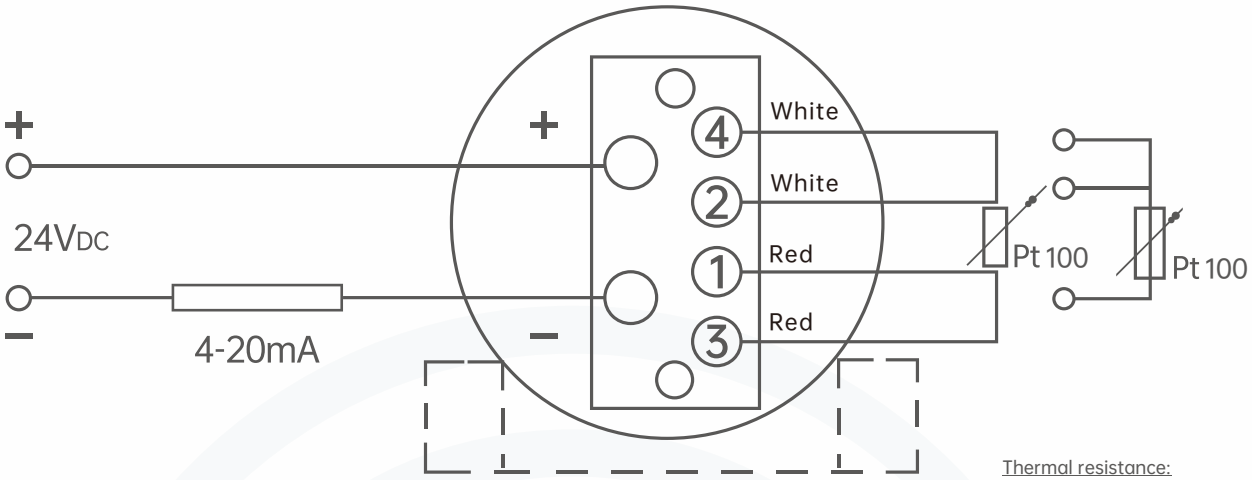
Product application

Plastic processing machinery
Injection molding machinery
Engine cylinder head and oil pool
bearing
Pipelines and vessels

Functional characteristics

Sensor range up to 400 ° C (752 ° F)
Single and double resistance thermometers
Good heat transfer by adjustable spring loading
Easy to install and remove, no tools required
Explosion-proof version

Working principle
Analytic table



Thermal resistance:
three or four wire system

Sensor

The sensor is located at the tip of the probe.

Sensor design

The DB10 is designed as a bend pad to fit every pipe and sensor size.
The DB10 is designed for applications where changes are small and accuracy is not required, providing measurement readings for trend analysis, remote measurement and tracking of changes.

Tolerance value

For the tolerance value of the thermal resistance, the cold end temperature of 0 ° C has been taken as the basis.
When using compensation cables or thermal resistance cables, additional measurement errors must be considered.

Sensor - Measuring element

Pt100, Pt1000[1] (Measuring current: 0.1 ... 1.0 mA)

Connection mode	
Unitware	1 x 2 Wire system
	1 x 3 Wire system
	1 x 4 Wire system
Two-element	2 x 2 Wire system
	2 x 3 Wire system
	2 x 4 Wire system[2]

Measuring rod tolerance values, according to EN 60751		
Category	Sensor structure	
	Winding form	Film type
B level	-196 ... +600°C	-50 ... +500°C
	-196 ... +450°C	-50 ... +250°C
A level[3]	-100 ... +450°C	-30 ... +300°C
AA level[3]	-50 ... +250°C	0 ... 150°C

1) Pt1000 Can only be used as a thin-film measuring resistor;
2) non-diameter 3mm;
3) Not applicable to 2-wire connection

Sensor connection

The DB10 is provided as an insulated (ungrounded) or uninsulated (grounded) measuring point.

Mechanical design

Sensor

The DB10's disc design provides strong welded connections on all three sides.

Armoured cable

Armored cables are very soft. The minimum bending radius is five times the diameter of the sheath.

Casing bore

6.0 mm
6.4 mm (1/4")
7.9 mm (5/16")
9.5 mm (3/8")

Other casing diameters are available on request

Surface measuring type thermistor temperatureThe way the meter is constructed:

Armor design

In armored type thermal resistance thermometers, the flexible part of the sensor is a mineral insulated cable (MI cable).
It consists of high density ceramic compound, coupling wire and stainless steel outer sheath.
The measuring resistance element is connected directly to the lead inside the armored cable, so this design is particularly suitable for high temperature conditions. Because armored resistance thermometers are flexible and can be made small in diameter, they can be used in less accessible locations. Armored cables can be bent to a maximum radius of three times the diameter of the wire, except where the probe and the tube seal connecting the cable are located.

Connect cables and single cables

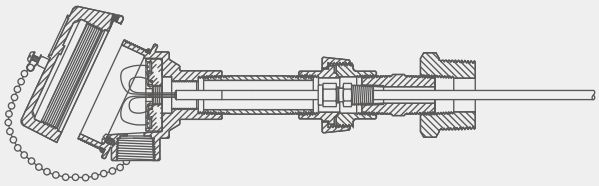
At any position on the connection cable, the maximum temperature requirements of the connection cable must be complied with. The sensor itself may withstand higher temperatures. For common connection wires, the maximum operating temperature is as follows:
PVC -20 ... +100 ℃
Silicone-50... +200 ℃
PTFE -50 ... +250 ℃
Fiberglass -50... +400 ℃
Therefore, for tubular designs, if an insulated cable is installed inside the metal probe, the upper operating temperature limit for the connecting cable still applies.

Glue filling catheter

According to the corresponding electrical connection characteristics, the DB10 thermal resistance can be divided into the following types:

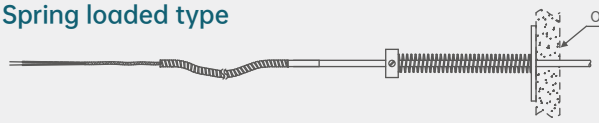
Fixed connection (movable sleeve) to hot stove

The cable length is 150 mm, other lengths are also available on request
The type of compensation cable depends on the sensor model, and the PTFE insulation is process sealed by movable ferrules. Available in a variety of common thread sizes.
The connector can be mounted directly to the neck tube or connected remotely.

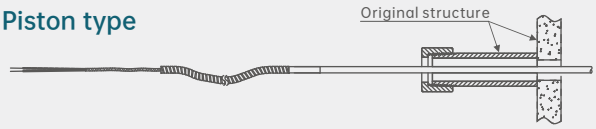


Slide the connection (piston/spring) to Hot stove

Spring loaded type

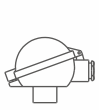


Piston type

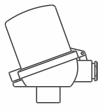


Cable length is subject to customer specifications
The number of leads depends on the number of sensors, and the lead uses the bare wire end
Insulation (Material/maximum ambient temperature) :
- PVC 105 ℃ (221 ℉)
- PTFE 250 ℃ (482 ℉)
- Fiberglass 400 ° C (752 ° F)
Connection headers can be installed remotely.

Connector



DSM-A
DSM-K



DSM-B

DSM-C

DSM-D

DSM-E

DSM-F

Materials	Cable inlet thread specification[1]	Class of protection	Block shot	surface
Aluminum	M20×1.5	IP65	Hinge cover with cylinder head screws	Blue finish
Plastic	M20×1.5	IP65	Hinge cover with cylinder head screws	Plastic
Aluminum	M20×1.5	IP65	Hinge cover with cylinder head screws	Blue finish
Aluminum	M20×1.5	IP65[3]	Hinged cover with clamps	Blue finish
Aluminum	1/2NPT	IP65[3]	Tighten the cap	Blue finish
Stainless steel	1/2NPT	IP65[3]	Tighten the cap	Blank
Aluminum	M20×1.5	IP65[3]	Tighten the cap	Blue finish
Stainless steel	1/2NPT	IP65[3]	Tighten the cap	Blank
Aluminum	3×M20×1.5	IP65	Tighten the cap	Blue finish

1) Standard, other can be provided according to customer requirements;
2) Need to be equipped with a suitable seal/granulated head

Transmitter (optional)

The transmitter can be mounted directly into the connector。

Connection mode	Transmitter model number		
	S10	S20	S30
DSM-A/DSM-K	○	○	○
DSM-B	●	●	●
DSM-C	○	○	○
DSM-D	○	○	○
DSM-E	○	○	○
DSM-F	○	○	–

○ Install directly instead of the terminal board; ● Installed in the cap of the connecting head; – Cannot install

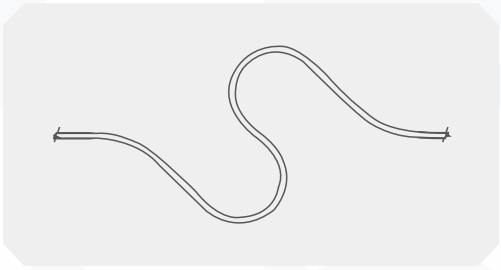
Model number	Instructions	Explosion protection
S10	Digital transmitter, configurable PC	Assorting
S20	Digital transmitter, HART protocol	Assorting
S30	Digital transmitter, FOUNDATIONTM fieldbus and PROFIBUSR PA	Assorting

Expansion ring

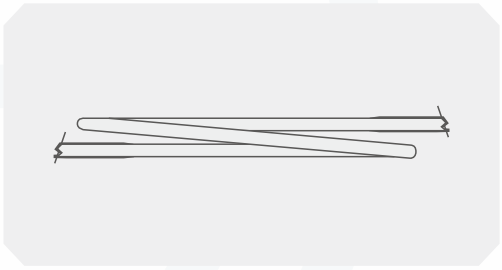
The maximum line displacement from the starting position to the operating temperature should be considered when designing the expansion ring. The expansion ring should be designed according to the available space.

Expansion ring example:

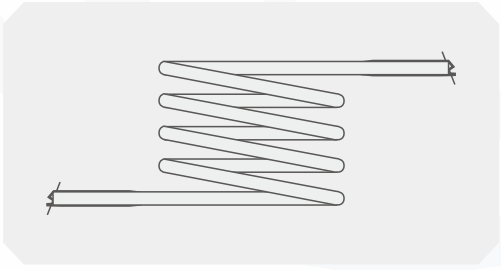
S-ring



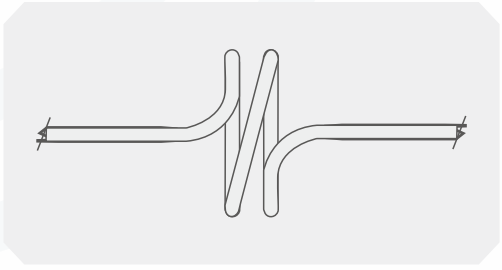
Single coil



Multicoil



Spiral ring



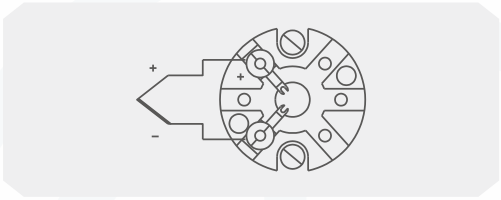
Bare wire design

Rodeweig's trained professionals tailor the temperature measuring points to the specific application. These professionals use scientific knowledge and practical experience to optimize the life and accuracy of thermal resistors. They can advise on system optimization in terms of temperature, movement and boiler ignition.
To select the right product, the following design factors can help determine the measurement point for the specific application:

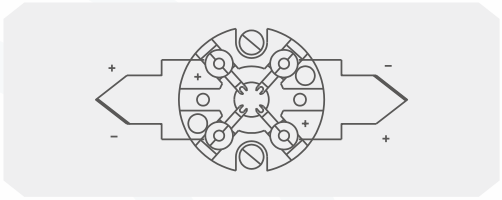
- Material compatibility with furnace tubes
- Heat transfer (radiation, convection, and conduction)
- Joint (grounded and ungrounded)
- Thickness of mineral insulated cables (flexibility vs. durability)
- Expansion ring (location and design)
- Flame impact
- Design Options for Hot Furnace Outlet
- Boiler fuel (flue gas composition)
- Welding procedures (TIG, manual arc welding, and temperature monitoring)
- Installation (location and orientation)
- Working vs. Design Temperature
- Bending radius
- Furnace wall channel
- Pipe clamp (location and arrangement)
- Connector (material, location, certification)
- Hot furnace design (boiler location)

Electrical connection
-Ceramic terminal board

Single thermal resistance

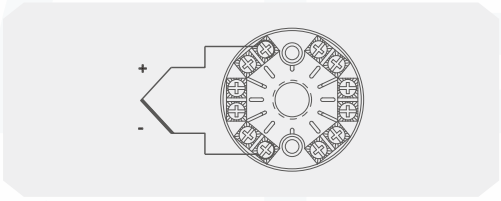


Dual thermal resistance

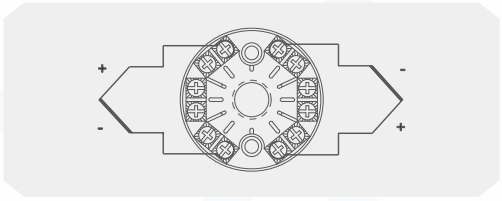


Electrical connection
-Crastin Terminal plate

Single thermal resistance



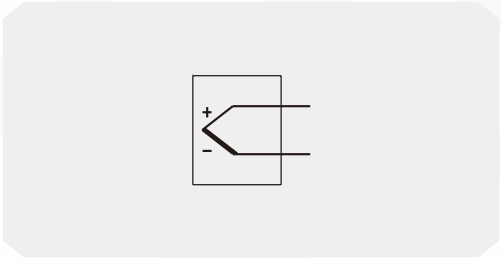
Dual thermal resistance



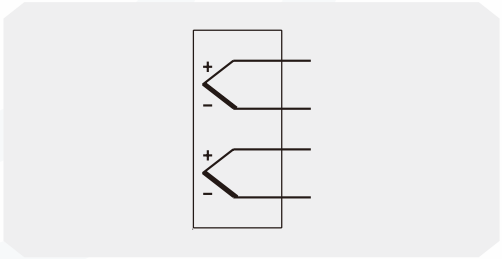
Cable connection
-Cable

See the table for the color coding of the wire end

Single thermal resistance



Dual thermal resistance



Cable color coding

IEC 60584-3

Thermal resistance type	Positive electrode	Negative electrode
K	green	white
J	black	white
E	purple	white
N	pink	white

IEC 60584-3

Thermal resistance type	Positive electrode	Negative electrode
K	yellow	red
J	white	red
E	purple	red
N	orange	red

DB10-Selection composition

Selection example Threaded type DB10

B	S	G	J	S	V	S	B	E	S	N	A	P	N
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1.Selection description	A	All-in-one transmitter
	B	Threaded casing
	C	Intrinsically safe explosion-proof type
	D	Flameproof type
	T( )	Other types
2.Threaded connection	S	Sliding thread
	F	Fixed thread
3.Insert probe design	G	Fixed installation
	H	Spring fixed terminal block (replaceable insert)
4.Junction box	I	Aluminum
	J	Stainless steel
	K	With digital temperature display
	T( )	Other types of junction boxes
5.Electrical interface	R	1/2NPT
	S	M20×1.5
6.Wiring block/sensor	U	Crastin Terminal block
	V	Ceramic connection block
	W	S10 (4-20mA Transmitter)
	X	S20 (HART transmitter)
	Y	S30 (Fieldbus transmitter)
7.Wire system	S	Single 3-wire system
	T	Double branch 6-wire system
	T( )	Other wire system
8.Dimension of thread connection	A	1/2NPT
	B	G1/2
	C	M20×1.5
9.Thermistor	E	Pt100, B level
	F	Pt100, A level
	G	Pt1000, B level
	H	Pt1000, A level
10.Probe rod material	S	304SS
	L	316/316L (1.4401/1.4435)
	T( )	Other materials
11.Temperature range (℃)	N	-50...+250
	O	-50...+450
	P	-200...+250
	Q	-200...+450
	R	-200...+600
	S	0...+400
	T	0...+500
	T( )	Other measured temperatures

DB10-Selection composition

Selection example Threaded type DB10

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	S	G	J	S	V	S	B	E	S	N	A	P	N

12.Rod length (mm)	A	50			
	B	100			
	C	150			
	D	200			
	E	250			
	F	300			
	G	350			
	H	400			
	I	450			
	J	500			
	T( )	Other lengths			
13.Rod diameter (mm)	P	3mm			
	Q	4mm			
	R	5mm			
	S	6mm			
	T	8mm			
	U	10mm			
14.Safety certification	E	Intrinsic safety			
	D	Flameproof			
	N	There is no			
15.Additional order information	X	Additional information			
	N	There is no			

Instructions:

It means that the DB10 thermal resistance is a thermometer with threaded sleeve, the thread connection mode is sliding thread, the probe rod design is fixed installation, the connection box is stainless steel, the electrical interface is M20*1.5, the sensor is ceramic connection block, the single three-wire system, the thread specification is G1/2, the thermal resistance element is Pt100, the grade B, the probe rod material is 304SS, and the thermal resistance component is PT100. Temperature range -20... +250℃, rod length 50mm, rod diameter 3mm, no explosion-proof, 15 parts are not required.

Product certification

Compliance and approval; Rodwig thermometers meet key standards and certifications for process measurement technology; Thus guaranteeing the highest reliability in such Settings;

Ludwig China Representative Office
Ludwig Automation Instrument (Guangzhou) Co., Ltd | Ludwig International Trade (Shanghai) Co., Ltd
LUDWIG More product information is available www.ludwig-schneider.com.cn
✆ 400-860-9760 ✉ lw@ludwig-schneider.com.cn
LUDWIG INSTRUMENT