

# Temperature monitoring cable

ZS-7(Silo version )

Product Manual



Producer:Zhe Lee

Modification time2022.11.22

ZS  
TC

Temperature monitoring cable

## ■ Summary

ZS-7 (silo version) is applicable for grain silos with a height of 10-40m, coal silos with a height of 10m, and lime silos with a height of 20m. Compared with monitoring cables of the same level, its tensile capacity is more excellent, and it can withstand a tensile force of more than 7KN (7T). And because the armored sheath is composed of 30 steel wires, its extrusion resistance is also higher than that of the competitors, it allows the temperature core to be changed without barriers when the material level is full. It adopts split structure, divided into armored sheath layer and temperature inner core. In case of damage to the temperature core, the temperature core can be quickly pulled out for replacement without disassembling the armor sheath layer. Effectively reduce the maintenance cost and improve the convenience of repairs.

### Characteristic

- Only two lines are needed for communication
- Temperature accuracy is not affected by wire length
- Single cable can support to 100 temp&hum sensors
- Tensile strength >7KN -30°
- Use range from 30 ° to 90 °
- Programmable temperature sensor
- Change temperature core
- IP67 waterproof and dustproof
- Dust explosion-proof level

### Certificate ( including ZS-11 )

- Intrinsic safety explosion-proof certificate
- Dust explosion-proof certificate
- Tension report
- Food grade test report
- Inner core without plasticizer report
- Temperature accuracy calibration certificate
- Anti fumigation test report
- Product mix patent certificate
- EU CE certification

### Applicable place

- Grain steel plate warehouse
- Grain cement warehouse
- Simple Grain Storage
- Low coal warehouse
- cement warehouse
- Various warehouse with strong tensile force

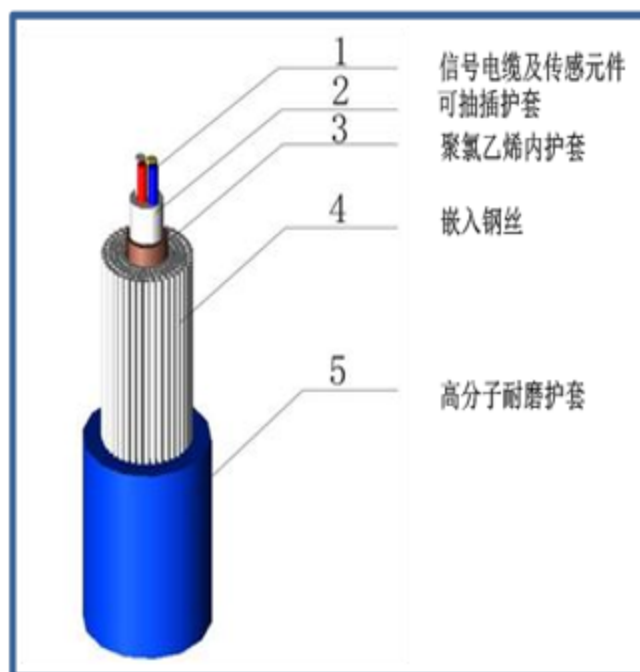


## ■ Summary

### ZS-7 Temperature Monitoring Cable Parameter table

Monitoring Range	-30°C-90°C	Inner core material	Nylon or PE
Supply Voltage	2-5.5VDC(Power supply for collector)	Output core	2-wire (1-wire signal) / 4-wire (485signal)
Temperature accuracy	0.4 °C/0.2 version can be customized	Waterproof performance	Do not immerse in water but prevent condensation
Maximum outer diameter of cable section	14mm	Installation method	U-blot / Flange
Waterproof grade	IP67	Sensor convert time	2S
Output signal	1-wire / or customize 485 version	Service life	Outer sheath>8 years Temperature and humidity sensor>3 years (typical value)
Tensile resistance	>7KN	Customization cycle	20 days
Sheath material	Non-regenerative high molecular weight polyethylene, mixed with wear-resistant additives	Dust explosion-proof grade	Ex iaD 20 T85°C
Maximum length	100meter	Intrinsically safe explosion-proof grade	Ex ib IIB T6 Gb Ex ia IIC T6 Ga
Maximum number of sensor	100	Connected devices (digital signal type only)	Handheld Temperature collecto Temperature measurement unit
Maximum length of extension cable	500meter	Power consumption	0.03MA ( 5VDC ) /sensor

## Internal structure



### Signal cable and sensors

The default temperature measurement component uses a digital chip. If you need to customize thermal resistance and thermocouple temperature measurement, please explain in advance. Signal cables default to 0.3<sup>2</sup> \* 2 inner core double wire system.

### Detachable sheath

The detachable sheath is filled with silicone, which can prevent moisture from entering the inner core, prevent corrosion, and prevent condensation. It can be dismantled and replaced for easy maintenance.

### Inner sheath

The inner sheath uses high-temperature and wear-resistant materials by default. If other materials are required, please customize them in advance.

### Embedded steel wire

Steel wire default use 32 single high-carbon steel composition, if 7-40T version can be customized in advance.

### Outer sheath

Outer sheath default use of "non-regenerative high molecular weight polyethylene, mixed with self-developed modified additives", wear resistance, high temperature resistance.

## ZS-7 Temperature monitoring cable Comparison with domestic competitors

ZS-7



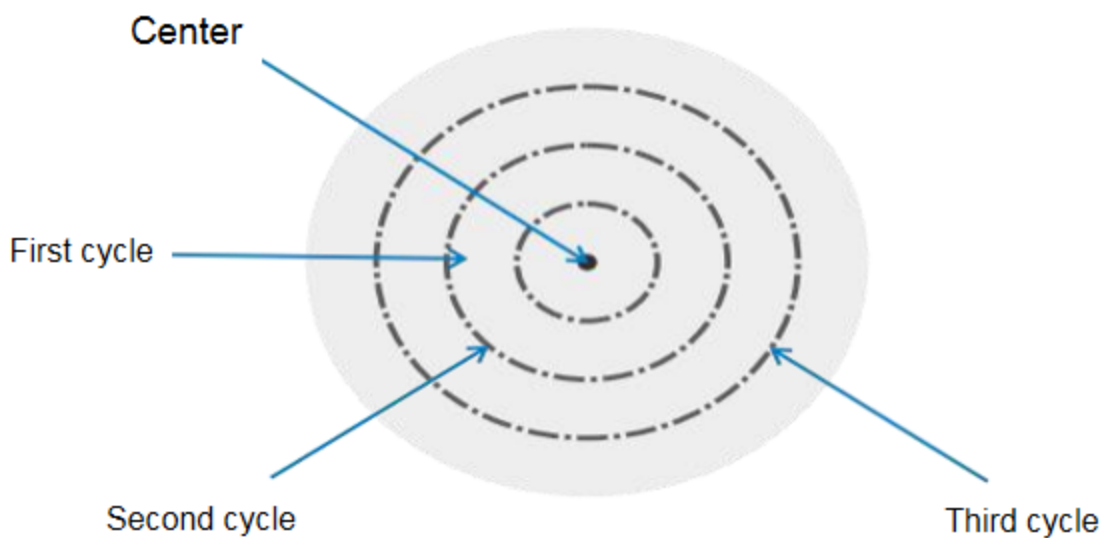
domestic competitors



Tensile properties:	default 7T	default 2.5T
Anti extrusion ability:	Strong (almost unchanged)	Generally (prolonged exposure can cause cable deformation)
Core replacement:	The inner core can be replaced when there is material available (due to its strong anti extrusion ability)	The inner core cannot be pulled out when there is material, and the inner core needs to be replaced when the material is emptied.
Tensile structure:	Because the armored sheath is composed of 30 steel wires, the uneven force on one side will also turn into the whole force.	Tensile strength relies on two steel wire ropes. When subjected to uneven force, it is possible to cause excessive tension on one side and tear off the steel wire on the side.
Outer sheath lifespan:	The outer armor sheath can have a lifespan of over 8 years	At most about 1 year, there will be severe deformation, and the lifespan is unknown

■ Suggestions on the design of num of cables in the silo

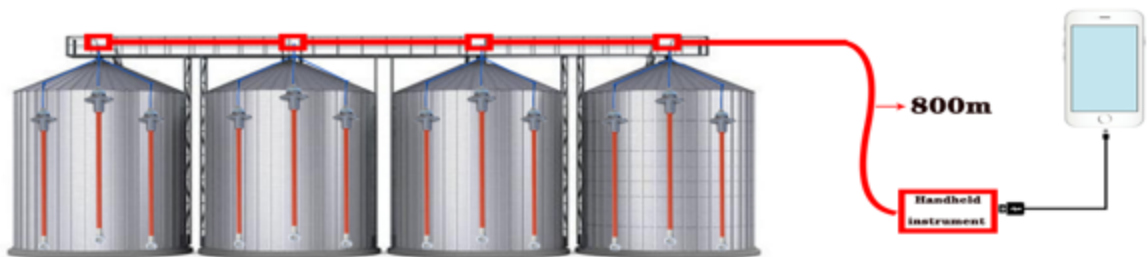
Silo diameter (m)	Cable Quantity	Center Quantity	First cycle		Second cycle		Third cycle	
			Quantity	Interval angle(m)	Quantity	Interval angle(m)	Quantity	Interval angle(m)
4	1	1	-	-	-	-	-	-
6	1	1	-	-	-	-	-	-
8	3	-	3	2.3	-	-	-	-
10	3	-	3	2.5	-	-	-	-
12	4	1	3	3.3	-	-	-	-
14	6	1	5	4.7	-	-	-	-
16	7	1	6	5.6	-	-	-	-
18	8	1	7	6	-	-	-	-
20	11	-	3	2.5	8	7.5	-	-
22	12	-	3	2.8	9	8.2	-	-
24	13	-	3	3	10	9	-	-
26	17	1	6	5.3	10	10.5	-	-
28	19	1	6	6.6	12	10.6	-	-
30	22	-	3	2.6	7	7.5	12	12.8
36	29	-	3	2.5	10	8.5	16	14.5
40	34	1	5	5.6	10	11.3	18	17



## Application scenario

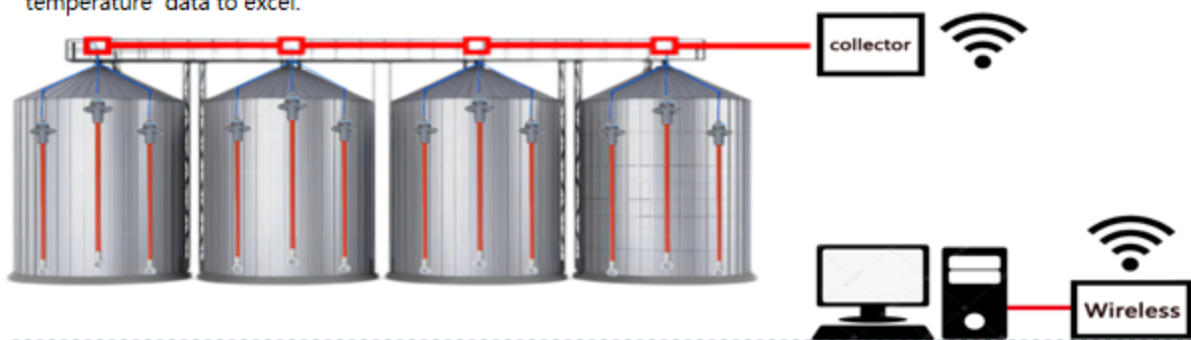
### 1、Handheld

Handheld version is an economical grain bin temperature monitoring solution. It only needs an Android phone to connect with the handheld to read the connected grain bin temperature cable connected of the silo. Hand held can support more than 800 meter extension cables and 200 grain bin temperature sensors readings. You can extend the grain bin temperature cable anywhere in the factory and read it with an Android phone. The android application can record the temperature value and display the number of each sensor of the cable in the silo. The android application can also connect to PC wirelessly to display real-time temperature data or historical temperature data on PC or export temperature records in Excel format through the software.



### 2、PC OR CLOUD MONITORING

PC monitoring version is to collect the temperature in the silo by wireless. The temperature of silos is displayed graphically on the PC. It can store temperature data for more than 3 years / monitored regularly / can show high and low temperature / graphically display the historical temperature / draw temperature-time curve / export historical temperature data to excel.



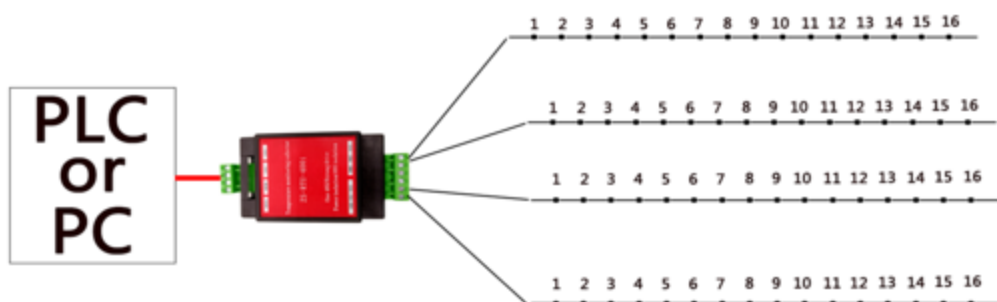
CLOUD monitoring VERSION is an upgraded version of PC monitoring version. It can view the temperature of silo anywhere in the world. It has two ways: mobile app viewing and website viewing. It has branch office structure. If user have a head office account, you can view the real-time temperature and historical temperature data of each branch.



## ■ Application scenario

### 3、 Provide communication Protocol

If you do not need to use our software, we can provide standard protocols. The temperature collector (ZS-RTU series) uses the MODBUS-RTU communication protocol and has two 485 ports. While monitoring by PC, can access the temperature data to PLC, configuration screen or configuration software. Our wireless can send temperature data over 5KM to the office by wireless way. In addition, we have directly output MODBUS-TCP protocol version. ( RJ45 )



## ■ Installation method (reference)

U-blot



Flange



## ■ Video materials

Installation tutorial video (construction site) : [http://www.zhaosuicewen.com/?list\\_13/76.html](http://www.zhaosuicewen.com/?list_13/76.html)

ZS-7整体结构讲解视频 : <https://haokan.baidu.com/v?vid=9503320437708685176>

ZS-7内芯结构讲解视频 : <https://haokan.baidu.com/v?vid=10840450082190278423>

ZS-7 and other models installation method tutorial video (model silo) :  
<https://haokan.baidu.com/v?vid=10588996311404761101>

## ■ Certificate ( Partial )

Explosion proof certificate  
(intrinsic safety)



Explosion proof certificate  
(intrinsic safety&dust)



Food grade test report



Accuracy calibration certificate



Fumigation prevention report

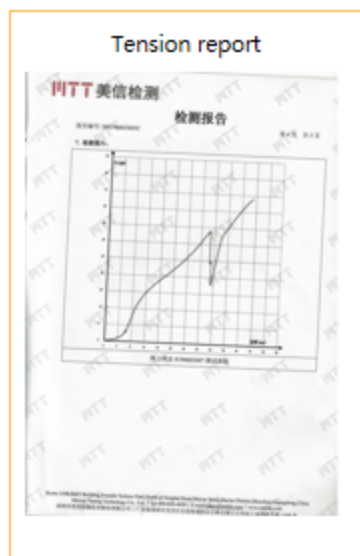


Inner core without plasticizer report





## ■ Certificate ( Partial )



Product mix patent certificate

## Producer: Zhe Lee

Providing some pictures and sorting out data:

General Manager - Li Zhaojun  
 Business Department-Sun Haiyang  
 -Sun Zhengjie  
 Factory director-Sun Hening  
 R&D Department-Wang Daochuan  
 A&D Department -Sun Tianning  
 Installation Team-Sun Bowei

### Important notes and disclaimers

Due to the continuous improvement of the product, this specification may be changed, and the latest version shall prevail. Users of this product need to pay attention to the product dynamics on the official website, so that users can get the latest information of this product in a timely manner. The pictures and diagrams used in this specification are for illustration of the functions of this product and are only for reference.

The measurement data in this specification are all measured by our company at room temperature and are only for reference. Please refer to the actual measurement for details. Langfang Zhaosui

Thermometric Cable Co., Ltd. reserves the right of final interpretation and modification of all contents in this specification