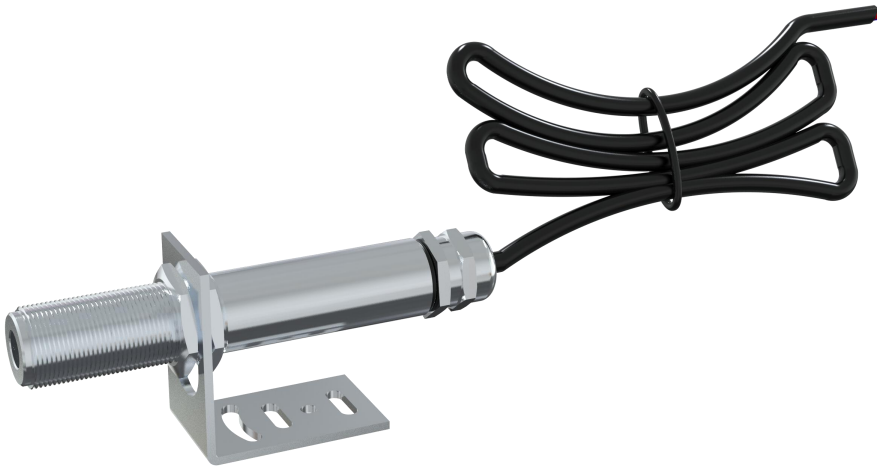
RS-WD-HW-N01-2-EX Non contact Infrared Temperature Transmitter User Manual(485 type)

Document version:V1.1



Catalog

1. Product introduction

1.1 Product overview

RS-WD-HW-N01-2-EX is a non-contact infrared temperature transmitter, which can calculate the surface temperature of an object by measuring the infrared radiation energy that emitted by the object within the range of 8μm-14μm without touching the target. Suitable for industrial equipment, steel industry, food temperature detection and other applications.

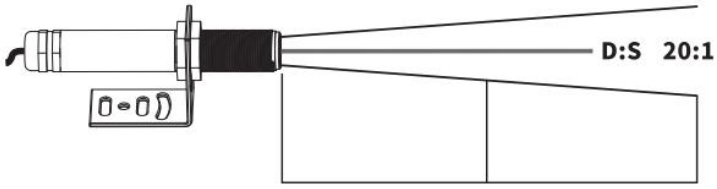
The temperature sensor is an integrated infrared temperature sensor. The sensor, optical system and electronic circuit are integrated in the stainless steel housing. Easy to install, the standard thread on the stainless steel housing can be quickly connected to the installation site. At the same time, there are various options (various meters, large screens, paperless recorder purge protective covers, laser sights, adjustable mounting brackets, etc.) to meet the requirements of various working conditions. It has the characteristics of wide measuring range, high precision, good linearity, good versatility, easy to use, easy to install, and long transmission distance.

1.2 Main technical parameters

DC power supply(default)	10V-30V DC
Maximum power consumption	0.12w
Temperature measurement range	0-100℃, 0-150℃, 0-200℃, 0-300℃, 0-400℃, 0-500℃, 0-600℃
Temperature value resolution	0.1℃
Spectral range	8~14um
Precision(default)	±1% or ±1℃ of measured value, choose the big one(@300℃)
Transmitter circuit working environment	Temperature:-20 ~60℃ Relatively humidity:10–95%(no condensing)
Preheating time	≥40min
Response time	300 ms (95%)
Optical resolution (D:S)	20:1
Emissivity	0.95 (ex-factory preset)
Output signal	RS485(ModBus protocol)
Protection grade	IP54
Outer shell	304 stainless steel
Cable length	2m(default)

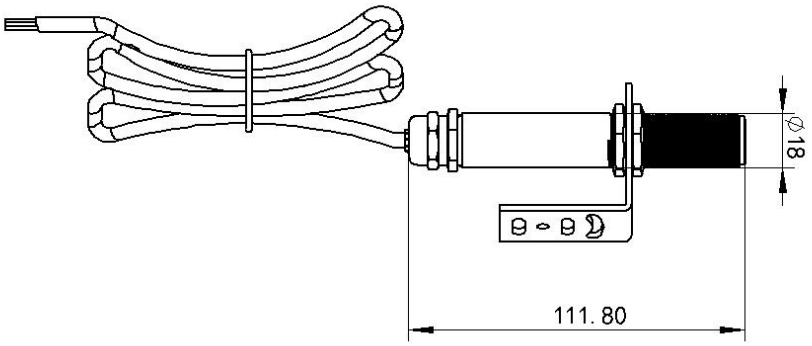
1.3 Optical path figure

Object distance ratio (D: S) 20:1 refers to the ratio of the measured distance to the diameter of the measured object. When the distance between the infrared temperature sensor and the measured object increases, the surface area of the measured object is required to be large.



ϕ Traget diameter S	15	20	30(mm)
Measuring distance D	300	400	600(mm)

1.4 Equipment dimension



1.5 Product model

RS-					Company code	
	WD-				Single temperature transmitter	
		HW-			Infrared temperature measurement	
			N01-		RS485(ModBus protocol)	
				2-	Shell	
					EX	Fixed code

2. Working principle and precautions

2.1 Maximum distance and dimension of the measured point

The size of the target to be measured and the optical characteristics of the infrared thermometer determine the maximum distance between the target to be measured and the measuring head. In order to avoid measurement errors, the measured target should be as full as possible of the detection head's field of view. Therefore, the measured point should always be smaller than the measured object or at least the same size as the measured target.

2.2 Lens cleaning

The lens of the instrument must be kept clean to avoid measurement errors or even damage to the lens due to dust, smoke and other pollutants. If the lens is stuck with dust, wipe it with mirror paper dipped in anhydrous alcohol.

2.3 Electromagnetic interference

To prevent electromagnetic interference, keep the infrared temperature sensor away from electromagnetic sources (such as electromotors, motors, and high-power cables etc.), and add metal tubes if necessary.

3. Equipment installation

3.1 Inspection before installation

Equipment list:

■ Infrared temperature transmitter(include 2 meters cable) equipment 1pc

■ Fixed nuts

3.2 Installation method

The infrared temperature sensor has M18×1 threads and can be mounted either directly or by using a mounting bracket, an adjustable mounting bracket that allows easy adjustment of the measuring head. When adjusting the measured target and the measuring head, the optical path must do not have any shelter.

3.3 Wiring instruction

Cable color	Description	Remark
brown	V+	10~30V DC
black	Power GND	GND
yellow	485-A	485-A
blue	485-B	485-B

3.4 Configuration software installation and usage

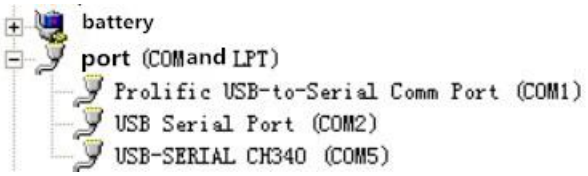
Software selection

Open the document pack, select"Debug software"--"485 parameter configuration software", find 

and just open it.

Parameters setting

①Select the right COM port (View the COM port in "my computer-properties-deceive manager-Port") , below figure lists some different kinds 485 converter driver name.

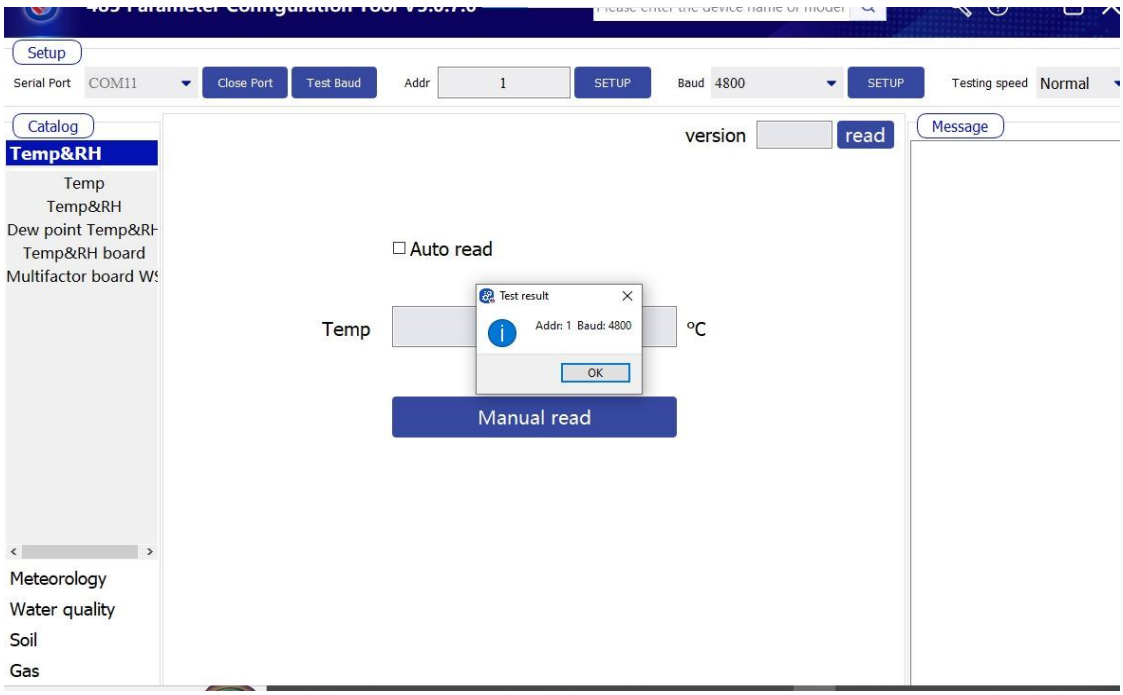


②Connect only one device and power on, click test baud rate of software, the software will test our the baud rate and address of current device, default baud rate is 4800bit/s, default address is 0x01.

③Modify the address and baud rate per the needs of use, you can query the current

function state of device at the same time.

④If the test is not success, please recheck the device wiring and 485 driver installation status.



4. Communication protocol

4.1 Communication basic parameter

Encode	8-bit binary
Data bit	8-bit
Parity check bit	null
Stop bit	1-bit
Error check	CRC(Cyclic Redundancy Check)
Baud rate	1200bit/s, 2400bit/s, 4800bit/s, 9600bit/s, 19200bit/s, 38400bit/s, 57600bit/s, 115200bit/s can be set, factory default is 4800bit/s

4.2 Data frame format definition

Adopting Modbus-RTU communication protocol, the format is as follows:

Time of initial structure ≥ 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure time ≥ 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default is 0x01).

Function code: instruction function instruction issued by the host.

Data area: The data area is specific communication data, pay attention that the 16bits data high bit comes first!

CRC code: two-byte check code.

Host inquiry frame structure:

Address code	Function code	Register start address	Register length	Check code low byte	Check code high byte
1byte	1byte	2bytes	2bytes	1byte	1byte

Slave response frame structure:

Address code	Function code	Effective bytes number	Data area one	Data area two	Data area N	Check code low byte	Check code high byte
1byte	1byte	1byte	2bytes	2bytes	2bytes	1byte	1byte

4.3 Register address

*XXXXXX is the new added function, some previous devices do not support this function.

Register address	Content	Data type	Operating	Definition instruction
0000H or 0001H	Measure temperature	Integer	Read only	Actual value enlarge 10 times
0002H, 0003 H	Emissivity	Floating point	Read/write	Default 0.95
07D0H	Device address	Integer	Read/write	Default 1
07D1H	Device baud rate	Integer	Read/write	0 represent 2400 1 represent 4800 2 represent 9600 3 represent 19200*202505 4 represent 38400*202505 5 represent 57600*202505 6 represent 115200*202505 7 represent 1200*202505

4.4 Communication protocol examples and explanations

Example: Read device(address 0x01) temperature value

Inquiry frame:

Address code	Function code	Start address	Data length	Check code low byte	Check code high byte
0x01	0x03	0x00 0x00	0x00 0x01	0x84	0x0A

Response frame:

Address code	Function code	Return the valid byte number	Temperature value	Check code low byte	Check code high byte
0x01	0x03	0x02	0x00 0xC8	0xB9	0xD2

Temperature calculation:

Temperature: 00C8 (hexadecimal)=> temperature =20℃

5. Common problems and solutions

No output or output error

Possible reason:

1)The range corresponding error caused the PLC calculation error, and for range you can refer to technical indicators in first parts.

2)Wiring method is incorrect or the wiring sequence is error.

3)Power supply voltage is incorrect.

4)The distance between transmitter and collector is too long, that lead to the signal disturbance.

5) PLC collecting port is damaged.

6)Device is damaged.

6. Contact information

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7. Document history

V1.0 Document establishment

V1.1 Add baud rate modification description