

# Digital Conductivity Sensor

Model: BH-485-EC User Manual



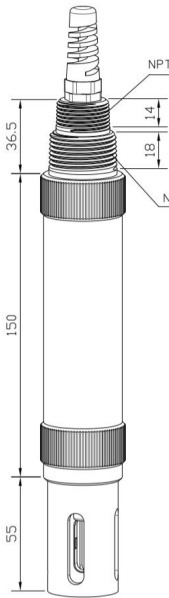
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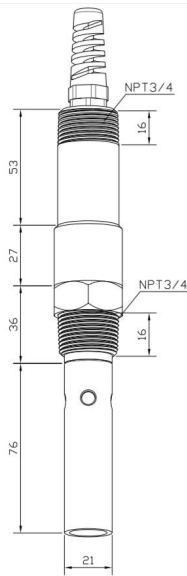
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# Introduction

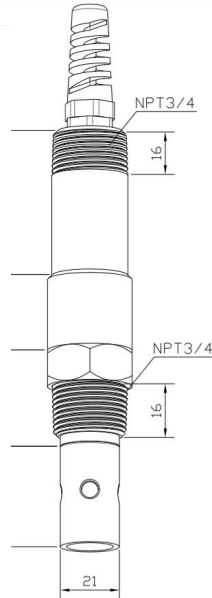
This BH-485-EC is the latest digital conductivity electrode independently researched, developed and produced by BOQU Instruments. The digital conductivity electrode is directly with RS485 Modbus RTU, easy to install, and has high measurement accuracy, responsiveness, and can work stably for a long time. Built-in temperature probe, instant temperature compensation. Strong anti-interference ability, the longest output cable can reach 500 meters. It can be set and calibrated remotely, and the operation is simple. The digital conductivity sensor can be widely used to monitor the electrical conductivity of thermal power, chemical fertilizer, metallurgy, environmental protection, pharmaceutical, biochemical, food and tap water solutions.



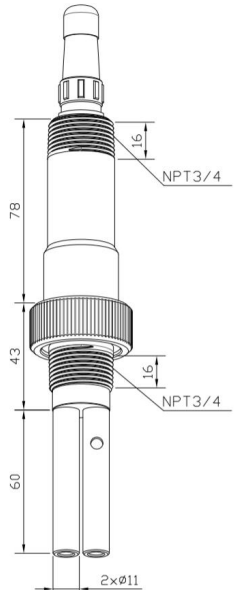
**Type-A**



**Type-B(k=0.01)**



**Type-B(k=0.1)**



**Type-B(k=10.0)**

# Technical Parameters

Type	BH-485-EC			
<b>Conductivity</b>	0.01	0.1	1	10
<b>TDS</b>	×	×	√	×
<b>Salinity</b>	×	×	×	√
<b>Range</b>	0~20us/cm 0~50°C	0~200us/cm 0~50°C	0~2000us/cm 0~2000ppm 0~50°C	0~100ms/cm 0~80.0ppt 0~50°C
<b>Accuracy</b>	±1%FS ±0.5°C	±1%FS ±0.5°C	±1%FS ±0.5°C	±1%FS ±0.5°C
<b>Resolution</b>	0.01us/cm 0.1°C	0.01us/cm 0.1°C	1us/cm 1ppm 0.1°C	0.01ms/cm 0.1ppt 0.1°C
<b>Power</b>	9~36V DC			
<b>Protocol</b>	RS485 Modbus RTU			

## RS485 Modbus RTU Protocol

Addr	Meaning	Range	Default	Magnification	R/W	Cmd	Remarks
0	Temp	0-1270		0.1°C	R		
1	EC	0-20000			R		Determine magnification according to register 20 X:10 <sup>X-2</sup> μS/cm
2	Salt	0-8000		0.01	R		Practical salinity (ppt ‰)
3	Resistivity	5-10000			R		Determine magnification according to register 20 X:10 <sup>-2-X</sup> MΩ·cm
4	TDS	0-2000		1mg/L	R		TDS (mg/L,ppm)
5	Temp state	0-2			R		=0:normal=1:too high/low:=2:no sensor

8	Device Addr.	1-254	4		R/W		Change device ID
9	Baud Rate	4800-19200	9600		R/W		Only 4800,9600,19200。
10	Recovery				W	1996	Reset to default
11	Device Rst				W	1524	Device reset
12	Factory CC			0.001	R		
13	Cal		0		W	2	Cal:Put the electrode into standard(1413us/cm default , determined by register 14).Cal after stable
14	Standard solution	0-2	1		R/W		0:84us/cm 1: 1413us/cm 2: 12.88ms/cm
15	CC	1-60000	1000	0.001	R/W		Update auto after cal
16	Temp compensation coefficient	0-100	20	0.1%	R/W		Linear temp compensation coefficient
17	TDS modulus	400-1000	500	0.001	R/W		
18	Ref Temp		25		R/W		20/25°C
20	Measure modulus X	0-5			R/W		Auto-modify according to constant or manually
21	Temp adjust		0		R/W		
22	Measure adujust		0		R/W		
24	MTCT	0-1270	250	0.1°C	R/W		

Example of communication format(take the default setting ):

Temp data reading instruction:

Addr. + Func. + Register start Addr. + Number of registers read + CRC check code(Hex)

e.g. Tx:01 03 00 00 01 84 0A

Addr.	Func.	Register start Addr.	Number of registers read	CRC check code
01	03	0000	0001	840A

Temp data return instruction:

Addr. + Func. + data length + data + CRC check code(Hex)

e.g. Rx:01 03 02 00 DF F9 DC

Addr.	Func.	Data length	Temp value	CRC check code
01	03	02	00DF	F9DC

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual temperature value contains 1 decimal place, then the actual value is  $223 \times 0.1 = 22.3$ .

EC data reading instruction:

Addr. + Func. + Register start Addr. + Number of registers read + CRC check code(Hex)

e.g. Tx:03 03 00 01 00 01 D4 28

Addr.	Func.	Register start Addr.	Number of registers read	CRC check code
03	03	0001	0001	D428

EC data return instruction:

Addr. + Func. + data length + data + CRC check code(Hex)

e.g. Rx:03 03 02 00 DF 80 1C

Addr.	Func.	Data length	EC value	CRC check code
03	03	02	00DF	801C

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual value contains 2 decimal places, then the actual value is  $223 \times 0.01 = 2.23$ .

Salt data reading instruction:

Addr. + Func. + Register start Addr. + Number of registers read + CRC check code(Hex)

e.g. Tx:03 03 00 02 00 01 24 28

Addr.	Func.	Register start Addr.	Number of registers read	CRC check code
03	03	0002	0001	2428

Salt data return instruction:

Addr. + Func. + data length + data + CRC check code(Hex)

e.g. Rx:03 03 02 00 DF 80 1C

Addr.	Func.	Data length	Salt value	CRC check code
03	03	02	00DF	801C

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual value contains 2 decimal places, then the actual value is  $223 \times 0.01 = 2.23$ .

TDS data reading instruction:

Addr. + Func. + Register start Addr. + Number of registers read + CRC check code(Hex)

e.g. Tx:03 03 00 04 00 01 C4 29

Addr.	Func.	Register start Addr.	Number of registers read	CRC check code
03	03	0004	0001	C429

TDS data return instruction:

Addr. + Func. + data length + data + CRC check code(Hex)

e.g. Rx:03 03 02 00 DF 80 1C

Addr.	Func.	Data length	TDS value	CRC check code
03	03	02	00DF	801C

The hexadecimal number DF is converted to decimal by a calculator (programmer mode) to obtain the value 223.

The actual value does not contain decimals, the actual value is 223.

## Appendix

Wiring: The supporting Meter is DDG-2080S Digital Conductivity Meter.

V+	M_A	M_B
9~36V anode	RS485_A	RS485_B

