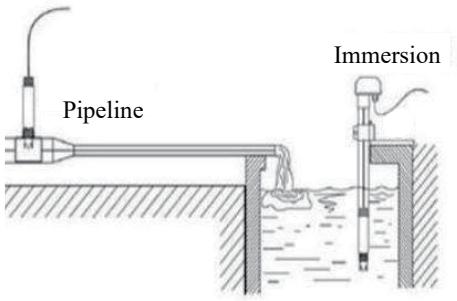
DCRS-LXX DCRS-L Series Ion Sensor MANUAL

INSTALLATION

Immersion Installation: The sensor lead wires pass through the stainless steel tube, and the 3/4" thread at the top of the sensor is connected to the stainless steel 3/4" thread using PTFE tape. Ensure that no water enters the top of the electrode or the electrode wires.



Pipeline Installation: Connect the 3/4" thread of the sensor head to the pipeline.

LETTER of AGREEMENT

Basic communication parameters

Code	8-bit binary
Data bit	8-bit
Parity bit	no
Stop bit	1 person
Error checking	CRC (Redundant Cyclic Code)
Baud rate	1200bit/s、2400bit/s、4800bit/s、9600 bit/s、19200 bit/s、38400 bit/s、57600 bit/s、115200 bit/s，Default: 4800bit/s

Data frame format definition

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

Initial structure ≥ 4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC

Ending structure ≥ 4 bytes of time

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

Function code: The function instruction of the command issued by the host.

Data area: The data area is the specific communication data. Note that the high byte of the 16bits data comes first!

CRC code: two-byte check code.

WIRING CONNECTION

Analog	Color	Description
Power	Brown	Power+(10-30Vdc)
	Black	Power-
Output	Yellow(Green)	Signal+
	Blue	Signal-

Comm.	Color	Description
Power	Brown	Power+(10-30Vdc)
	Black	Power-
Comm.	Yellow(Green)	485-A
	Blue	485-B

PRECAUTIONS and MAINTENANCE

*The equipment itself generally does not need routine maintenance. In case of obvious failure, please do not open it for self repair, and contact us as soon as possible!

*Before the equipment is used, it is necessary to detect whether there are bubbles in the front end of the ion transmitter. If there are no bubbles, it is necessary to use normally. If there are bubbles, it is necessary to shake the sensor downward to remove the bubbles。

*The equipment that is not used for a long time shall be kept dry, and the equipment that is stored for a short time shall be stored in the diluted standard solution of each ion.

*Ion transmitters that have not been used for a long time shall be soaked and activated before measurement. (Start with low concentration activation, soak the sensor in 10mg/L standard solution for at least 12 hours, and soak the sensor in 1000mg/L solution at high concentration for 1-2 hours). The sensor must be fully cleaned before the test after activation. Immerse the front end of the sensor in deionized water for 5 minutes and stir the water solution. For more full cleaning, please replace the clean deionized water for many times and clean again to prevent measurement errors.

*Ion transmitter not used for a short time shall be soaked in deionized water before measurement to prevent measurement error.

*The equipment should be calibrated before each use. For long-term use in water, it is recommended to calibrate once every three months to ensure the accuracy of the sensor. The calibration frequency should be properly adjusted according to different application conditions (the degree of contamination in the application, the deposition of chemical substances, etc.).

*After the sensor is used, please rinse the transmitter head with clean water, cover it with a protective cover and dry it to extend the electrode life.

*The ion transmitter should not be used in a highly corrosive liquid environment to avoid irreversible damage to the sensor.

*Do not touch the membrane head at the front end of the ion transmitter with sharp objects to avoid damage to the sensor.

*Do not apply it in an environment where the temperature exceeds the applicable temperature of the device to avoid damage to the sensor.

*Do not use in water containing organic solvents。

*The service life of electrode film head is about one year, and the electrode should be replaced in time after aging.

Register address

Register address	Support function code	Data type	Explain
0000H	0x03/0x04	16 bit unsigned integer	Ion concentration value (100 times of actual value)
0001H	0x03/0x04	16 bit signed integer	Temperature (10 times the actual value)
0050H	0x03/0x04/0x06	16 bit signed integer	Temperature deviation value (10 times of actual value)
0051H,0052H	0x03/0x04/0x10	Floating point number	Ion concentration deviation value (actual value)
07D0H	0x03/0x04/0x06/ 0x10	16 bit unsigned integer	1~254 (factory default 1)
07D1H	0x03/0x04/0x06/ 0x10	16 bit unsigned integer	0 stands for 2400 1 stands for 4800 2 for 9600 3 for 19200 4 stands for 38,400 5 stands for 57600 6 represents 115200 7 for 1200

Example and explanation of communication protocol

Example 1: Read the current ion concentration of the device with address 01

Issuing frame:

Address code	Function code	Register address	Register contents	Check code low bit	Check code high
0x01	0x03	0x0000	0x0001	0x84	0x0a

Response frame: (for example, the read ion concentration value is 7.90)

Address code	Function code	Number of valid bytes	Register contents	Check code low bit	Check code high
0x01	0x03	0x02	0x0316	0x39	0x7a

Ion concentration calculation: 316H (hex)=790=>The current ion concentration is 7.90

Example 2: Numerical correction of current ion value setting deviation value of equipment with address 01

Issuing frame: (If the current device output ion value is 7.90, the value should be corrected to 8.00, the difference is 8.00-7.90=0.10, which is 0.1=>3DCCCCD (floating point number), and 3DCCCCD should be written for the contents of the two registers)

Address code	Function code	Register address	Number of registers	Number of bytes	Register contents	Check code low bit	Check code high
0x01	0x10	0x00 0x51	0x00 0x02	0x04	0x3dc 0xcc 0xcc 0xcd	0x6e	0x59

Answer frame:

Address code	Function code	Register address	Number of registers	Check code low bit	Check code high
0x01	0x10	0x00 0x51	0x00 0x02	0x10	0x19

Register calibration electrode

If the electrode needs to be calibrated, write parameters to the 0x1100 and 0x1101 registers through the 0x10 function code to calibrate.

This equipment adopts two-point calibration, and two known ion standard solutions need to be prepared. When calibrating the first point, write 0x0003 to the 0x1100 register and 100 times the standard ion concentration value of the first point to the 0x1101 register; When calibrating the second point, write 0x0004 to the 0x1100 register and 100 times the standard ion concentration value of the second point to the 0x1101 register. Calibration is complete. (It is recommended to use the standard solution with the concentration of 10mg/L for the first point and 100mg/L for the second point)

For example: select 10mg/L ion standard solution to calibrate the first point.

Issued frame: 10 * 100=1000 converted to hexadecimal 0x3e8

(For equipment with chloride ion and 1000 measuring range, the amplification is 10 times 10 * 10=100, and the conversion to hexadecimal is 0x64)

Address code	Function code	Register address	Register length	Byte length	Register contents	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x04	0x00 0x03 0x03 0xe8	0xc3	0x41

Answer frame:

Address code	Function code	Register address	Register length	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x44	0xf4

Then select 100mg/L ion standard solution to calibrate the second point.

Issued frame: 100 * 100=10000 converted to hexadecimal 0x2710

(For equipment with chloride ion and 1000 measuring range, the amplification is 10 times, 100 * 10=1000, and the conversion to hexadecimal is 0x3e8)

Address code	Function code	Register address	Register length	Byte length	Register contents	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x04	0x00 0x04 0x27 0x10	0x68	0x02

Answer frame:

Address code	Function code	Register address	Register length	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x44	0xf4

Then select 100mg/L ion standard solution to calibrate the second point.

Issued frame: 100 * 100=10000 converted to hexadecimal 0x2710

(For equipment with chloride ion and 1000 measuring range, the amplification is 10 times,

100 *10=1000, and the conversion to hexadecimal is 0x3e8)

Address code	Function code	Register address	Register length	Byte length	Register contents	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x04	0x00 0x04 0x27 0x10	0x68	0x02

Answer frame:

Address code	Function code	Register address	Register length	Check code low bit	Check code high
0x01	0x10	0x11 0x00	0x00 0x02	0x44	0xf4