Datasheet

Membrane-Coated Amperometric Sensor

AI-ADC11

Arka Instruments LLP

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Digital Membrane Sensor for Disinfectant Measurement

AI-ADC11

The digital membrane-coated amperometric sensor is a three-electrode, constant-potentiostatic, current-measuring device designed for measuring the disinfectant concentrations such as residual chlorine, chlorine dioxide, ozone, and total chlorine. It is primarily used in applications such as tap water outlets, pipe networks, secondary water supply systems, water supply terminals, and swimming pools. Featuring a built-in ARM processor and advanced filtering algorithms, the electrode effectively minimizes noise interference. It also provides an RS485 interface for seamless access to computers and network monitoring systems.

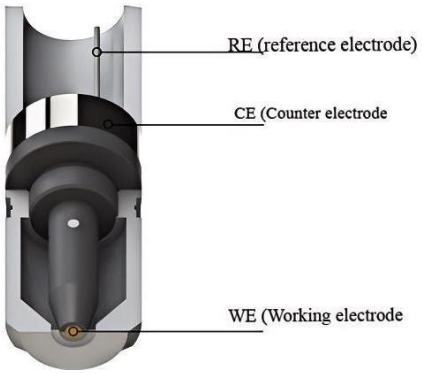
Features

- No reagents consumption and polutant on the Electrochemical sensors do not consume reagents or emit pollutants .
- The membrane-coated design helps prevent contaimination and degradation of the working electrode.
- The three-electrode design ensures high zero-point stability and high sensitivity .
- The built-in high-precision sampling circuit provides excellent sensor linearity.
- The sensor delivers measurement results consistent with the DPD (N, N-diethyl-p-phenylenediamine) method.

Amperometric Sensor

Principle

The membrane-coated digital disinfectant electrode is a three-electrode measurement system with a high-purity gold electrode as the working electrode. The build-in high-precision constant potentiostat keeps the potential of the working electrode stable. Disinfectant components such as hypochlorous acid undergo redox reactions at the working electrode, and the current generated follows Faraday's law, thereby measuring the disinfectant concentration.



Free chlorine (Formula 1):

$$ClO^- + 2H^+ + 2e^- \rightarrow Cl^- + H_2O$$

Total chlorine: Total chlorine includes free chlorine and combined chlorine (such as ammonia , NH_2Cl, $NHCl_2$, etc.). Combined chlorine also undergoes redox reaction on the working electrode :

Formula 2

$$NH_2Cl + 2H^+ + 2e^- \rightarrow 2Cl^- + NH_4^+ + H_2O$$

Formula 3

$$NHCl_2 + 4H^+ + 6e^- \rightarrow 2Cl^- + NH_4^+ + H_2O$$

Parameters		
Categories	Parameters	Description
System	Power supply	(9 ~ 28) V DC
	Power consumption	≤0.5W
	Measurement parameters	Residual chlorine, chlorine dioxide, ozone, total chlorine, temperature
	Communication interface	RS485 interface + (4 ~ 20) mA output
	Water sample flow rate	>400mL/min, and the flow rate needs to be kept stable
	Operating temperature	(-5~45) ℃ (no freezing)
	Pressure resistance	< 0.1MPa
	Protection level	IP68
Disinfectants (residual chlorine/chlorine dioxide/ozone/total chlorine)	Measurement method	Reagent-free, electrochemical, three-electrode amperometry system
	Range	(0~5) mg/L; (0~20) mg/L
	Resolution	0.001mg/L
Categories	Parameters	Description

	Detection limit	0.030 mg/L or lower
	Accuracy	±3% (DPD comparison error ±10% or ±0.05mg/L, whichever is greater)
	Repeatability	±3%
	Response time	T_{90} ≤90 seconds
	Calibration method	One-point or two-point calibration
	Sample pH range	4~9
Temperature	Measurement method	Thermistor method
	Range	(-5~60)℃
	Resolution	0.1℃
	Accuracy	±0.4℃
	Repeatability	0.2℃
	Response time	T_{90} ≤ 25 seconds
	Calibration method	Single-point calibration

Wiring

Note: Please carefully follow the instructions to connect the electrodes, otherwise the electrodes may be damaged.

Models with the (4-20)mA (if selected) output are supplied with a 6-core cable, while those without (4-20)mA option adopt 4-core ccable. The electrode wiring definitions are shown in the figure below:

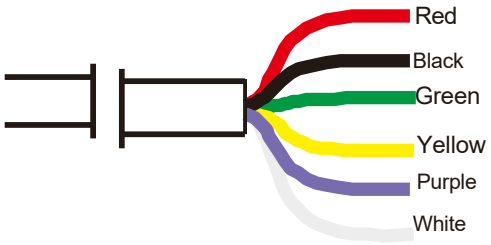
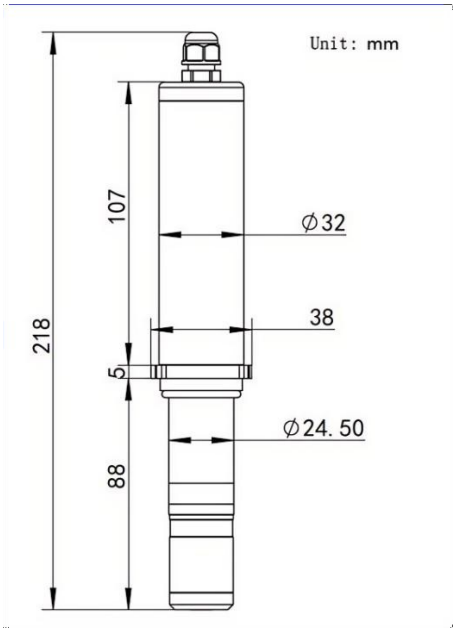


Fig 1 Cable diagram

Table 1 Cable Definition

No.	Color	Definition
1	Red	24VDC power supply
2	Black	GND
3	Green	RS485 output A
4	Yellow	RS485 output B
5	Purple [only for (4~20) mA output]	(4~20) mA output+
6	White [only for (4~20) mA output]	(4~20) mA output-

Dimensions



Ordering Code

AI-ADC11															Description
ADC1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Measuring range	WB														0-5mg/L
	WC														0-20mg/L
Temperature compensation		1													NTC 10K
Process connection			AJ												Quick-connect fitting
Output				B											4-20mA+RS485
Power supply					B										12VDC
					X										Others
Cable length						02									2m
						XX									Others
Housing material							ND								ABS plastic
Accessories							P3								Flow cell

Arka Instruments LLP

Add: Hyderabad Office: H.no: 08-041/1, Plot no 132, N C L Enclave, Kompally, Hyderabad, Telangana, India - 500067
Land Line: +91 40359 00418
Mobile: +91 81438 12346
Email: admin@arkainstruments.com
Website: www.arkainstruments.com