



**NIEUWKOOP**

METEN.NL

# USER MANUAL



## ZU1000

OXYGEN/TEMPERATURE METER



TO MEASURE  TO KNOW



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# 1 User-manual

## 1.1 Technical specifications

Brand	: Nieuwkoop Aalsmeer Holland
Measuring range	: 0...19,99ppm, 0...100%, -20...+120°C
Ambient temperature	: 0...50°C
Electrode	: Polarographic electrode with Pt1000 sensor
Zero/slope	: $\pm 15\%$ / $\pm 20\%$
Response time	: 15 sec. for 95%
Liquid speed	: 0,3...0,7m/s
Accuracy	: $\pm 1\%$
Power supply	: 9V battery
Measuring hours	: $\pm 100$ hours
Size/weight	: 320x290x120mm / 2kg
Accessories	: Carrying case, membrane set, screw driver, 1 bottle sodiumbisulfite powder and 1 bottle electrolyte
Warranty instrument/electrode	: 1 year / 3 months

## 1.2 Measurement

The instrument will be delivered ready for use complete with electrode for dissolved oxygen and automatic temperature compensation.

The instrument will be supplied with the electrode connected to the instrument. The instrument is ready for use.

When the electrode will be disconnected, the electrode has to polarise for at least 10 minutes after connection, and the instrument has to be recalibrated.

1. Clean the electrode with distilled water and make it dry.
2. Place the electrode into the sample water and stir carefully ( $\pm 0,5$  mtr/sec).
3. The electrode has to get the same temperature as the sample water. Read the temperature value until this has become stable by keeping the "°C" button pushed.
4. The instrument is calibrated in "%", so it is only possible to measure in "%". by pushing the "%" button. For measurements in mg/l (is equal to ppm) the instrument has to be calibrated in mg/l.  
Wait until the readout is stable before measurement. This could take ca. 5 minutes.
5. In order to get reliable measurements, the instrument has to be calibrated regularly.



## **1.3 Calibration**

For calibration of 0% a solution need to be made of 2% sodiumbisulfite (20gr/l distilled water). This powder is included in the case.

The solution needs to be made 15 minutes before calibration and needs to be used immediately.

**BEFORE USE FIRSTLY READ THE LABEL OF THE SODIUMBISULFITE CAREFULLY!!!**

1. Clean the electrode with distilled water and make it dry.
2. Stir the electrode in the 2% sodiumbisulfite solution.
3. Push the "%" button and wait until the readout is stable.
4. Adjust to 0% of 0mg/l with adjustment screw "Z" at the side of the instrument.
5. Clean the electrode with distilled water and make it dry.

Calibration of 100%:

1. Place the sensor in a well ventilated space, for about 30 minutes. The sensor needs this time to measure the exact environmental temperature.  
(Usually this sensor is used in water/liquid and this makes measurement of temperature is much quicker)
2. Push the "°C" button to see if the temperature is stable.
3. After 30 minutes you can calibrate by turning the small adjustment screw "S" on the side of the instrument.
4. When you adjusted the 100% the instrument is ready for measurement.
5. Dry the electrode.

Note:

1. The 0% is very stable and depending on frequency of measurement, you only have to Adjust this every 4 to 5 months, we advice to check/adjust the 100% every 2 months.
2. When the measurement becomes slow and unstable, it is necessary to replace the membrane (see instructions at 2.4)

**ALWAYS STORE THE INSTRUMENT AT A DRY PLACE!!!**

## **1.4 Replacement of the membrane.**

When the readout is not stable and accurate anymore the membrane in the electrode has to be replaced. See also the drawings on page 9.

1. Remove guard cap from the electrode and let the electrolyte flew out of the electrode.
2. Remove cover cap.
3. Remove the membrane and clean the electrode parts.
4. Place the membrane over the top of the cover cap and press tight the guard cap.
5. Trim excessive membrane.
6. Fill electrolyte into the cover cap. Then twist the cover cap back on to the probe.
7. Calibrate the instrument again.



## 1.5 Notes

- The zero adjustment of the instrument is very stable, the maximum deviation per month or longer is 3mg/l.
- After replacement of the membrane and the electrolyte the instrument always has to be recalibrated.

The advised procedure of calibration with sodiumbisulfite is at the 1st, 2nd and 3rd day, then the 15th day and afterwards once a month.

In this way the instrument and the electrode are always well calibrated.
- For the zero adjustment a deviation of 5ppm is acceptable. It is not necessary to repeat the zero calibration very often.

The sodiumbisulfite solution has to be prepared just before calibration with distilled water in a 2% ratio. The storage time of this liquid is maximum one month, on the condition that the storage bottle will be well closed and will be stored dark. However it is better to make a new calibration liquid for every calibration by mixing 20 gr sodiumbisulfite with 1 litre distilled water.
- Mainly during calibration of the zero the instrument has to reach its value within 45 seconds.
- When the electrode will be moved with a speed between 0,3 and 0,7 m/s in a sample, oxygen will flow into the sample water caused by the movement of stirring.

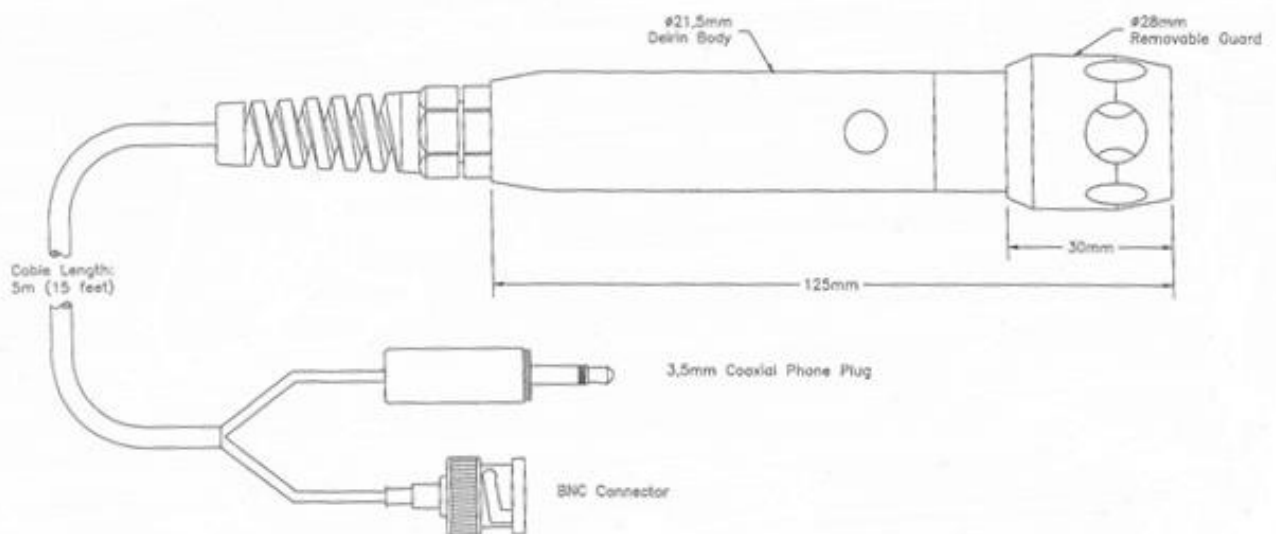
For little sample water ( $\pm 100\text{cc}$ ) this will have a bigger influence as when much water is used (for example 1 litre). For this we advise to use at least 1 litre sample water.

The opening of the sample cup is also important. The bigger the surface the more oxygen will flow into the water compared to a small opening of the sample cup.
- The best way to stir the water is with a magnetic stirrer. Manual is also possible but requires more handling from the user.
- The membrane and the electrolyte have to be replaced when the zero adjustment is slow. The membrane and the electrolyte normally can be used for 5 or 6 months or longer. This can be checked as mentioned above.
- The sodiumbisulfite powder and the magnetic stirrers can be obtained from Nieuwkoop BV or your own supplier.



## 2 Picture

### 2.1 ZZ5000-probe



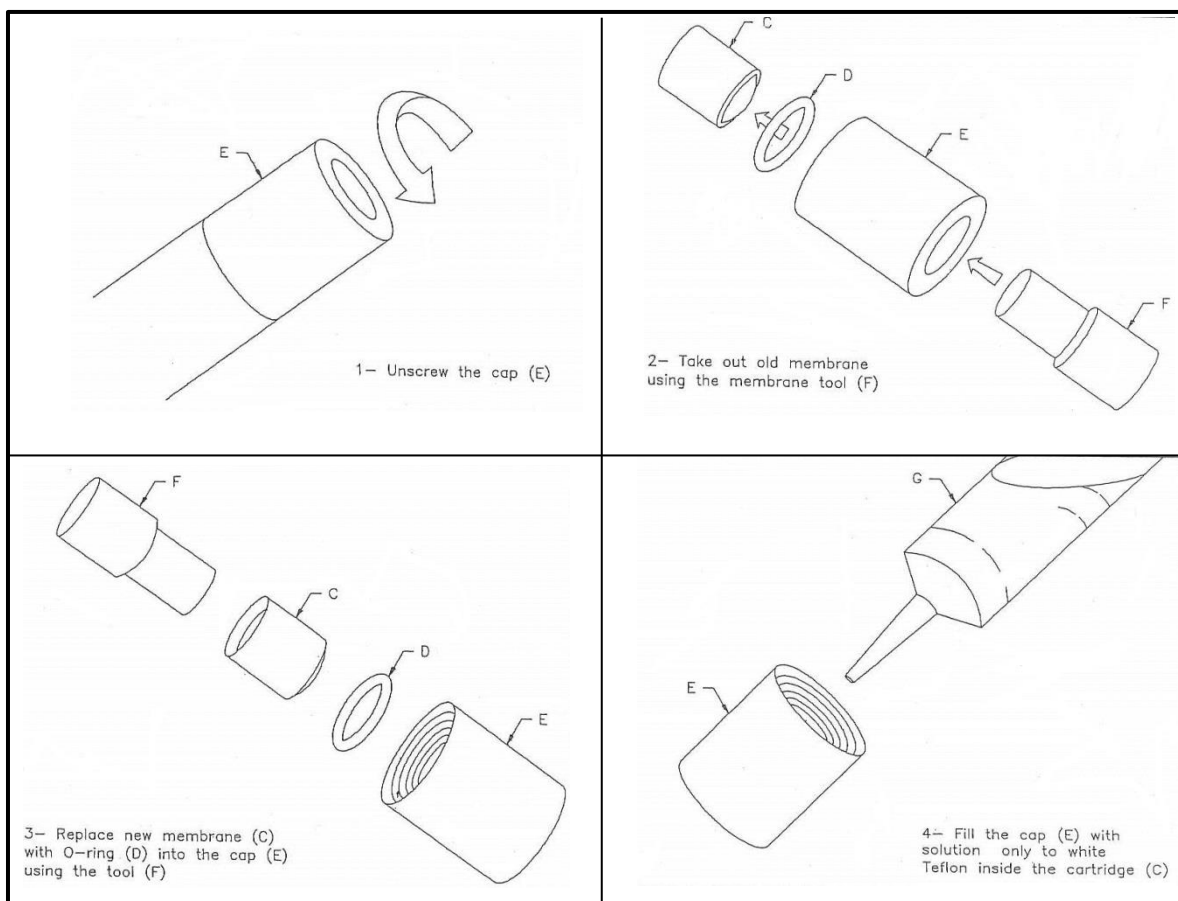
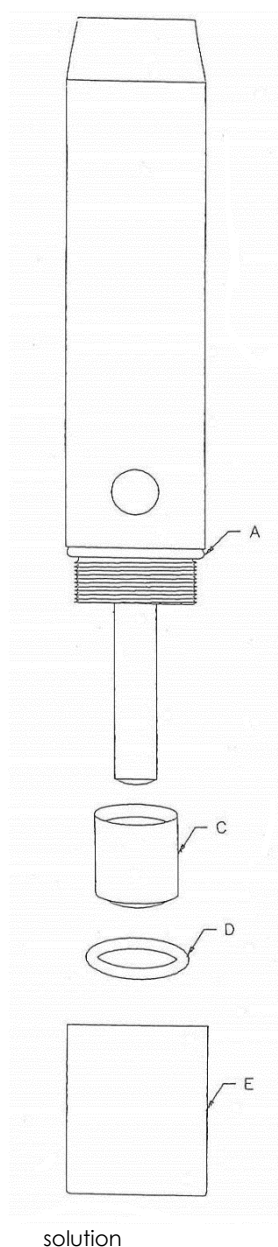
#### SPECIFICATIONS for 023IP25S

Type	Polarographic
Cathode:	Pt
Anode:	Ag/AgCl
Response:	95%/60 seconds
Stability: 1	Better than 2%
Temperature Compensation:	Pt1000
Temperature Range:	0-60°C
Residual Signal:	Less than 5nA
Output: 2	240-320nA

1= Constant Temperature  
2= Medium saturated with air



## 2.2 Replacement membrane



A: O-Ring, 15.5mm x 1.5mm  
 B: Ag Anode  
 C: Replaceable teflon/silicone and stainless steel mesh membrane (M050OP1-M1)  
 D: O-ring, 2-014 (M0082014)  
 E: Membrane cover  
 F: Membrane tool  
 G: Syringe

### SHIP WITE ELECTRODE:

1- RO01068-60  
 1- 10ml Syringe  
 1- Membrane cartridge  
 1- Expansion foam

### ACCESSORIES:

MO030p1-K1:  
 3 Membrane Cartridge  
 1 10 ml Syringe  
 1 RO01058-125  
 1 Complete O-Ring set  
 3 Expansion foam  
 1 Membrane tool  
 RO01058-125  
 125ml bottle of Polarographic

M0330P1-M1  
 1 Expansion foam





## 2.3 Solubility of air saturated distilled water (mg/l)

TEMP (C)	PRESSURE (TORR)								
	715	730	745	750	755	760	765	770	775
0	13.70	13.99	14.28	14.37	14.47	14.57	14.66	14.76	14.86
1	13.33	13.61	13.89	13.98	14.08	14.17	14.27	14.36	14.45
2	12.97	13.24	13.52	13.61	13.70	13.79	13.88	13.97	14.07
3	12.63	12.89	13.16	13.25	13.34	13.43	13.52	13.61	13.69
4	12.30	12.56	12.82	12.90	12.99	13.08	13.16	13.25	13.34
5	11.98	12.23	12.49	12.57	12.66	12.74	12.83	12.91	13.00
6	11.68	11.93	12.17	12.25	12.34	12.42	12.50	12.58	12.67
7	11.39	11.63	11.87	11.95	12.03	12.11	12.19	12.27	12.35
8	11.11	11.34	11.58	11.66	11.74	11.81	11.89	11.97	12.05
9	10.84	11.07	11.30	11.38	11.45	11.53	11.61	11.68	11.76
10	10.58	10.81	11.03	11.11	11.18	11.26	11.33	11.41	11.48
11	10.33	10.55	10.77	10.85	10.92	10.99	11.07	11.14	11.21
12	10.10	10.31	10.53	10.60	10.67	10.74	10.81	10.89	10.96
13	9.87	10.08	10.29	10.36	10.43	10.50	10.57	10.64	10.71
14	9.65	9.86	10.06	10.13	10.20	10.27	10.34	10.41	10.48
15	9.44	9.64	9.84	9.91	9.98	10.05	10.11	10.18	10.25
16	9.24	9.44	9.64	9.70	9.77	9.83	9.90	9.96	10.03
17	9.05	9.24	9.43	9.50	9.56	9.63	9.69	9.76	9.82
18	8.86	9.05	9.24	9.30	9.37	9.43	9.49	9.56	9.62
19	8.68	8.87	9.05	9.12	9.18	9.24	9.30	9.36	9.43
20	8.51	8.69	8.87	8.93	9.00	9.06	9.12	9.18	9.24
21	8.34	8.52	8.70	8.76	8.82	8.88	8.94	9.00	9.06
22	8.18	8.36	8.53	8.59	8.65	8.71	8.77	8.83	8.89
23	8.03	8.20	8.37	8.43	8.49	8.55	8.61	8.66	8.72
24	7.88	8.05	8.22	8.28	8.33	8.39	8.45	8.50	8.56
25	7.73	7.90	8.07	8.13	8.18	8.24	8.29	8.35	8.41
26	7.60	7.76	7.93	7.98	8.04	8.09	8.15	8.20	8.26
27	7.46	7.62	7.79	7.84	7.89	7.95	8.00	8.06	8.11
28	7.33	7.49	7.65	7.70	7.76	7.81	7.86	7.92	7.97
29	7.20	7.36	7.52	7.57	7.63	7.68	7.73	7.78	7.84
30	7.08	7.24	7.39	7.44	7.50	7.55	7.60	7.65	7.70
31	6.96	7.12	7.27	7.32	7.37	7.42	7.47	7.52	7.58
32	6.85	7.00	7.15	7.20	7.25	7.30	7.35	7.40	7.45
33	6.73	6.88	7.03	7.08	7.13	7.18	7.23	7.28	7.33
34	6.62	6.77	6.92	6.97	7.02	7.07	7.11	7.16	7.21
35	6.52	6.66	6.81	6.86	6.90	6.95	7.00	7.05	7.10
36	6.41	6.55	6.70	6.75	6.79	6.84	6.89	6.94	6.98
37	6.31	6.45	6.59	6.64	6.69	6.73	6.78	6.83	6.88
38	6.21	6.35	6.49	6.53	6.58	6.63	6.67	6.72	6.77
39	6.11	6.25	6.39	6.43	6.48	6.52	6.57	6.62	6.66
40	6.01	6.15	6.29	6.33	6.38	6.42	6.47	6.51	6.56





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