

취급설명서

Waterproof Multifunction Meter CX-401



SECHANG INSTRUMENTS

I. Introduction.....2

1.2

2.2

3.3

4.3

5.6

6.6

II. pH 9

7.9

8.10

9.15

10. pH16

11.17

III. 18

12.18

13.18

14.21

15.22

16. α25

17. α27

18.28

19.31

IV. 34

20.34

21.34

22.34

23.38

24.39

V. 41

25.41

VI. ORP 42

26. ORP(voltage)42

27.42

VII. 43

28. & &43

29.44

30.47

31.48

32. Co-operation with PC.....48

33. Technical DATA.....49

I. Introduction

1.

2.

CX-401

;
 ;
 / ;
 1 ~ 5 pH ;
 pH ;
 가 ;
 pH ;
 3 ;
 (autorange);
 (NaCl or KCl) ;
 TDS 가 ;
 (K), 가 ;
 ;
 , ;
 , ;
 & , 200 ;
 가 ;
 RS-232 ;
 가 ;
 ;
 OFF ();

3.

CX-401 (pH) (Oxidation Reduction Potential (mV)) , (μS/cm or mS/cm) (% of saturation or mg/l) , (hPa) , (g/l or %) .
NaCl, KCl or TDS .

CX-401 , , BNC-50 connector 가 pH , connector 가 . Pt-1000 . Chinch 200 RS-232 PC , ,

Caution: , EI-401 .

4.

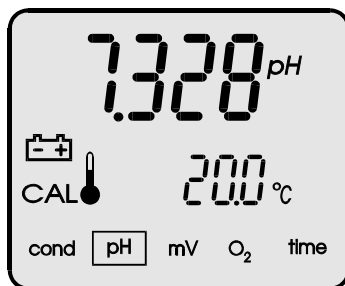
LCD (1) :
* , ; *pH ;
*mV ; * (% , mg/l);
* .



b

: cond , pH, mV, O₂ or time.

(°C)



1.



CAL 가



(. 2)가

ON/OFF,



ON/OFF.



, MODE/P.CAL



(CAL



가




- F(left) -BNC-50 : 가 pH , ORP , Oxygen .
- F1 -BNC-50 : .
- T -Chinch : .
- RS -RS-232 : PC .
- P - (9V)





. 2.

5.


 _____ ON
 , 가


-10000.0 %um
 10000.0 pHuS
 mVrms
 mg/l



 k_α+1000 %·cm⁻¹
 CAL °C

cond pH mV O₂ time


. 3
 가
 HELP 가
 가 ON 1.5

 (Standard Characteristics):
shift = 0 pH, characteristic slope = 100% for pH electrode;
constant K = 1.000 cm⁻¹ for conductivity cell;
shift = 0% O₂, characteristic slope = 100% O₂ for oxygen sensor.

 OFF 가
 OFF 가

6.

- pH , ORP , BNC-50 F

- ;
- BNC-50 F1 ;
- , Chinch t
- ;
- PC , EI-401
- CP-4XX-PC RS .
-  ON .

CAUTION: pH , .

6.1.

가 , .
가 .



가 .

6.2.

(Resolution)

rES(resolution) 가



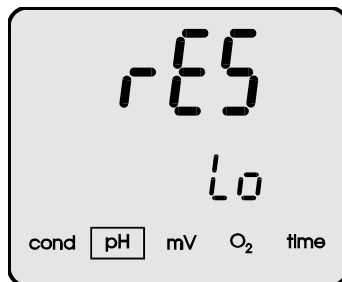
(.4)



:

Lo - (low) ;

Hi - (high) .



. 4

*pH :
Lo - 0.01 pH;
Hi - 0.001 pH.

* :
Lo - 3½ digits;
Hi - 4½ digits.

* :
Lo - 1% or 0,1mg/l;
Hi - 0.1% or 0.01 mg/l.



가



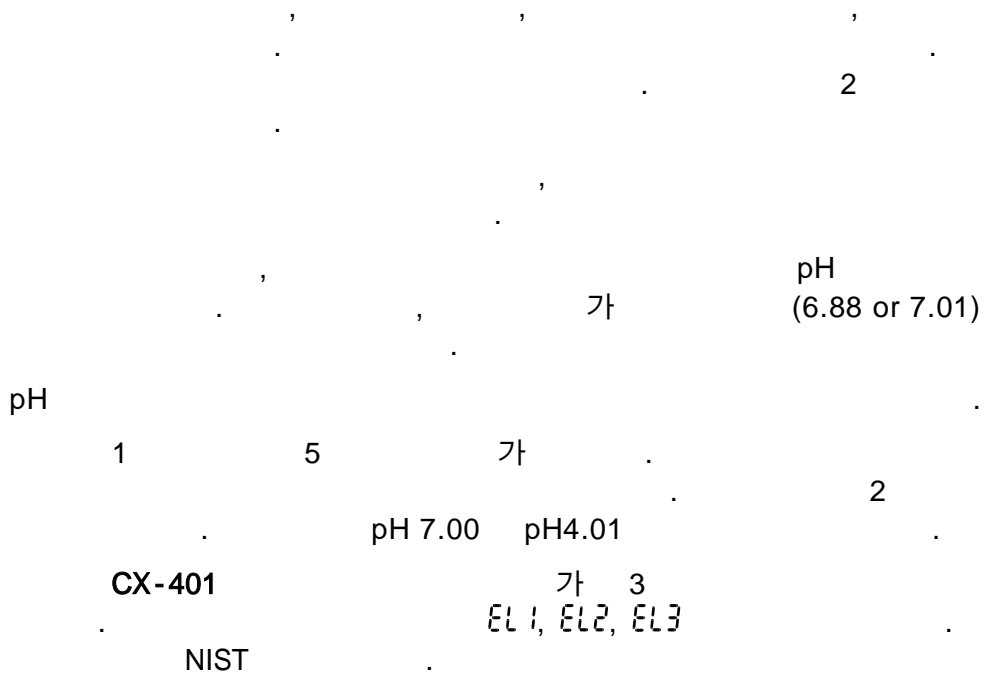
II. pH

7.

- ▶ :
가 : , KCl 5
- ▶ .
- ▶ , Holder .
- ▶ , 2
가 .

CAUTION: , 가 ,

8.



8.1.

(table 1)

Point of Calibration	Resolution 0,001	Resolution 0,01
1	1,675	1,68
2	4,002	4,00
3	6,881	6,88
4	9,225	9,22
5	12,627	12,63

Table 1

가
Table 2

Table 2.

Calibration point	Range
1	0,800 ~ 2,100
2	3,900 ~ 4,100
3	6,800 ~ 7,100
4	8,900 ~ 9,400
5	11,500 ~ 14,000

8.2.

Table3

8.3




Table 3.




Temp. °C	Kind of buffer solution				
	1 oxalate	2 phthalate	3 phosphate	4 di-sodium tetraborate	5 calcium hydroxide
0	1.666	4.003	6.984	9.464	13.423
5	1.668	3.999	6.951	9.395	13.207
10	1.670	3.998	6.923	9.332	13.003
15	1.672	3.999	6.900	9.276	12.810
20	1.675	4.002	6.881	9.225	12.627
25	1.679	4.008	6.865	9.180	12.454
30	1.683	4.015	6.853	9.139	12.289
35	1.688	4.024	6.844	9.102	12.133
40	1.694	4.030	6.838	9.063	11.984
45	1.700	4.047	6.834	9.038	11.841
50	1.707	4.060	6.833	9.011	11.705
55	1.715	4.075	6.834	8.985	11.574
60	1.723	4.091	6.836	8.962	11.449




8.3.

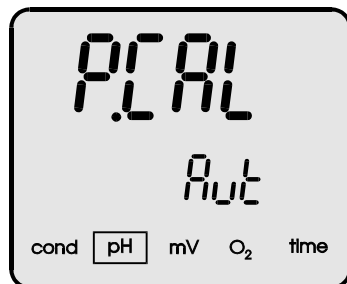
:

가

 pH
 RES (Resolution)가
 or  :
 Lo - (low) 0.01 pH;
 Hi - (high) 0.001 pH.

가
 (EL1, EL2,
 EL3)
 or  :
 가
 CLR -
 SET -
 BAR -

 , PCAL (points of calibration)가
 Mode  or  :
 Aut - [Table 3], pH
 ()
 USt - [Table 2],



.5
 Aut ,  "8.3 8.4 "

USL , "8.3" .




USL () ,

pH

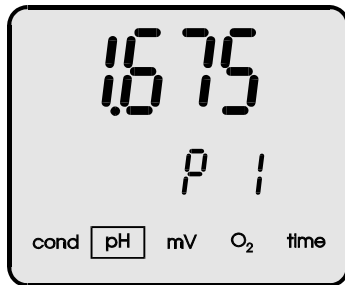
PI (1)

(.6) . 가

가

[Table 2]



. 6.

가

P2가 .

2

pH

(Aut / USL) 가





가

pH

(EL 1, EL 2, EL 3).

(F and t)(. 2).

pH 가

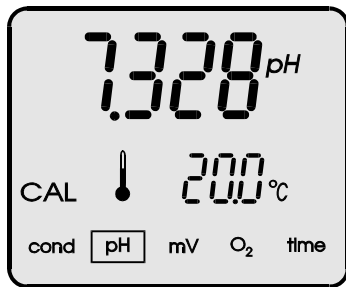





8.4. (with)

pH :

a. **CAL** CAL(. 7) 가
가

b. pH

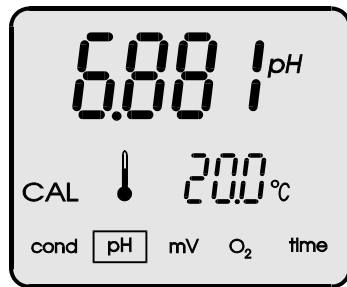


. 7.



. (8).

Err 가



. 8.

c.



b.

8.5. (with)

()가 . 

pH . 8.4

Caution:  20 °C .

9.

가 . (EL 1, EL2, EL3)

9.1.

가 . pH
bAa  가 . 가 .

10. pH


가 6 7
(6.2) (8.3).

10.1. (with)

pH
ON (pH, mV, etc)  ON
가

NOTICE:

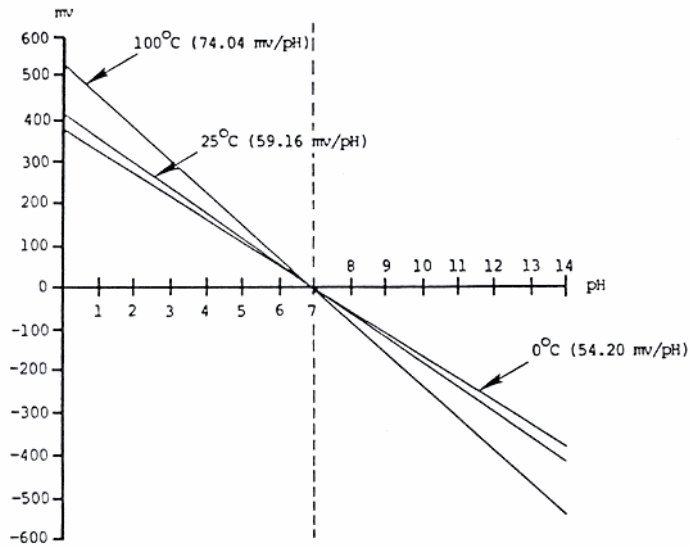
10.2. (with)

 가


10.1

Caution:  20 °C

11.



CX401 K

$k=0.198422 T$

KC

III.

12.


K
 $K = 0,1 \text{ cm}^{-1} \sim K = 10 \text{ cm}^{-1}$ 가
 $\mu\text{S/cm}$ mS/cm
 μS mS
 α coefficient

13.

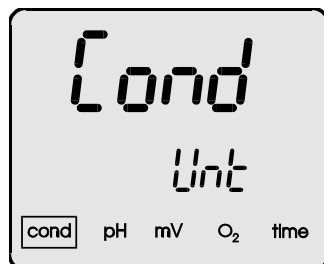
& , 6

13.1.

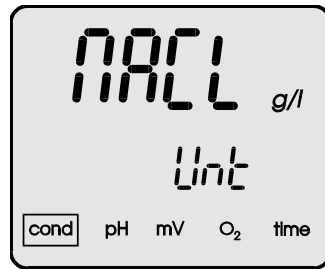
content NaCl, KCl, TDS
 % g/L

Unit(unit) 가  MODE
  (Cond, NaCl, KCl, TDS)

Cond - (. 9);

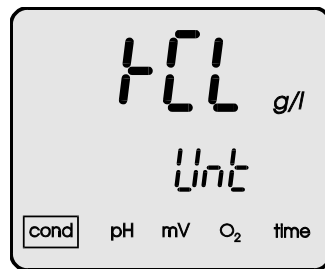


. 9.
 NaCl - NaCl(g/l) (. 10);



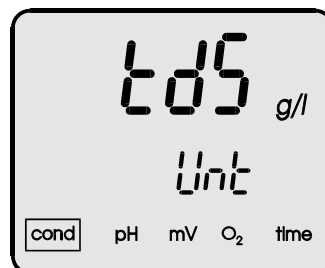
. 10.

NaCl - KCl (g/l) (. 11);



. 11.

HCL - TDS(g/l) (. 12).



. 12.

(NaCl, HCL or tds), CAL % g/l



가

% Weight Concentration

가

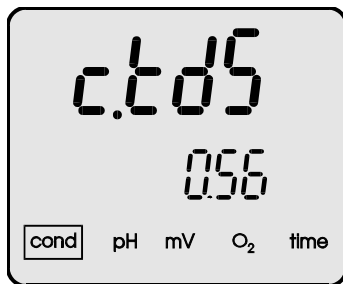
1% of Weight Concentration (C) = 10 000 ppm = 10 ppt% (Weight Concentration)
 0.001% or 10 ppm

13.2. W_{TDS}

, TDS

, W_{TDS} coefficient

- MODE (MODE) $ctd5$ 가
- MODE (← →) (. 13);
- (← →) TDS
- 가 (FUNCTION)



. 13.

W_{TDS} coefficient

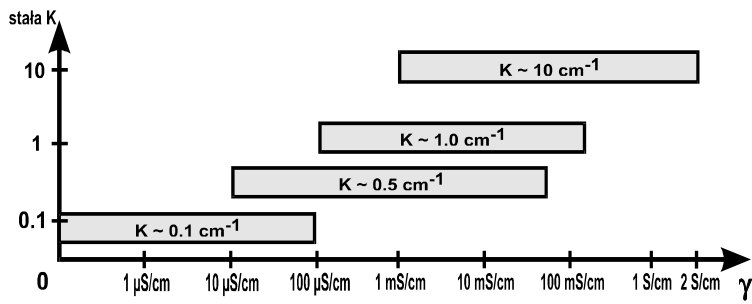
18.2

14.

14.1.

CX-401
가

0 ~ 1999 mS/cm
(BNC-50 connector)
3가 가



14.

$K \sim 0.1 \text{ cm}^{-1}$

가

14.2.

가

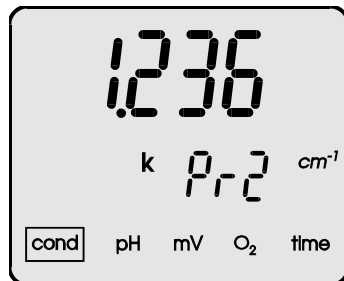
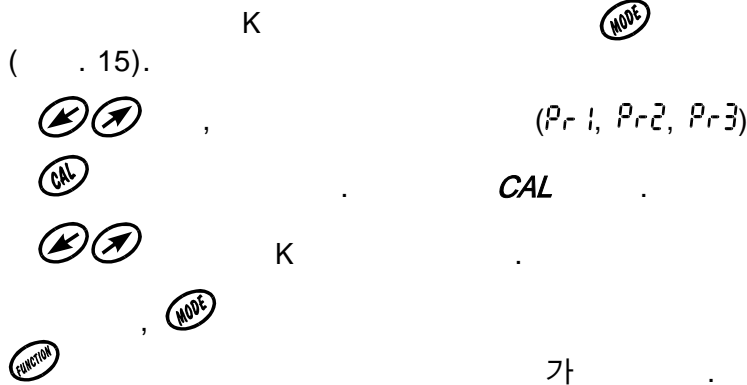
1:1

15.

3가 (Pr1, Pr2, Pr3) 3가

15.1. (without)

CX 401 가 K



. 15.

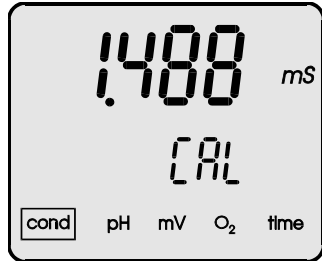
15.2. (with) ()

1 가 K

15.2.1.

12.1

(16) , **MODE** CAL ()
 가 **FUNCTION**



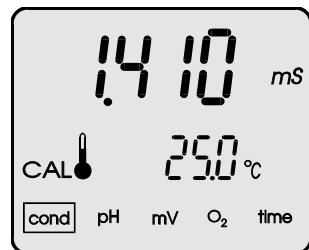
. 16.

15.2.2. (with)

15.2.1

1 cm




CAL 가
 (. 17).
 * 가
 가
CAL Err 가
 가 **FUNCTION**






. 17.

가

15.2.3. (with)

 ON
 . (subchapter 13.1);
 
 . (15.2.1)

1 cm

25 °C
 CAL 가 (. 17).
 가 ,  Err

 가
 * 가
 가

16. α

α

Table 4.

substance	Weight Concentr.	α coefficient
HCl	10 %	1.56
KCl	10 %	1.88
H ₂ SO ₄	50 %	1.93
NaCl	10%	2.14
HF	1.5 %	7.20
HNO ₃	31 %	1.39

5

α

Table 5.

temp.	α coefficient			
	KCl solution			Saturated NaCl
	0,01M	0,1M	1,0M	
5	2,68	2,68	2,39	2,77
10	2,45	2,36	2,20	2,53
15	2,27	2,19	2,04	2,38
20	2,11	2,06	1,89	2,21
25	1,91	1,86	1,75	2,03
30	1,80	1,77	-	1,91

- 가 α .
1. 25 °C
2. 가 25 °C
(G₂₅)
3. 20 °C
- 4.
5. 25 °C
6. (G_{Tx}) 25 °C(G₂₅) (20 °C)
7. α

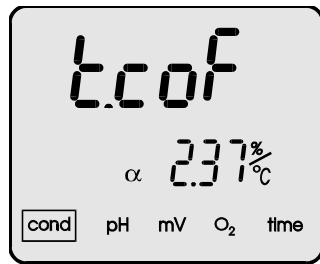
$$\alpha = [(G_{25} - G_{Tx}) / \{G_{25} (25 - T_x)\}] \times 100(\% /)$$

- T_x - ()
- G₂₅ - 25
- G_{Tx} - (25) (T_x)
- (T_x)가

17. α

(α) 0.01 ~ 10.00% 가
 $\alpha = 2 \% / ^\circ\text{C}$

- : α coefficient (. 18) 가
- MODE t.cof (temperature coefficient α) 가
- ← →
- 가 FUNCTION



. 18.

18.

18.1. (without)

25 °C



-
2)



ON

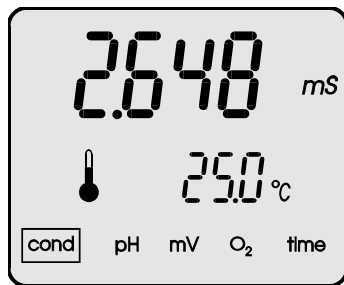
. (F1 and t) (

. (13.1)

15

25 °C

. (. 19).



. 19.

18.2. (with)

. F1 and t (. 2);



ON

. (13.1)

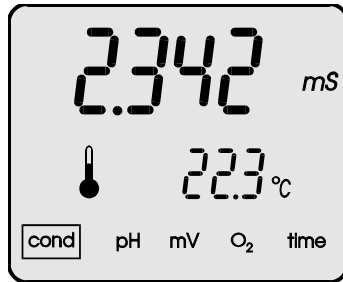
15

2.00%

-

-

(. 20).



. 20.

Notice:

가

가



가

가

18.3.

(with

)

-

F1

(. 2)

-



ON

-

(13.1)

-

. 15

-

()

-



-

(. 21).

Notice: ⚡ ⚡

25



. 21.

19.

Dissolved Solids) (g/l or %). TDS (Total
 가 가 가 , 가
 0.5 가
 가 , 가

Table 6

Table 6.

Conductivity (mS/cm)	Real salinity (g/l)	Salinity (g/l) Counted for coefficient = 0.5	Error (%) by using the coefficient = 0.5
1.00	0.495	0.500	0.01
2.00	1.006	1.000	0.60
4.00	1.976	2.000	1.21
10.00	5.400	5.000	7.40
30.00	18.174	15.000	17.46

(NaCl, KCl). 가 (NaCl, NaCl
 가 , TDS
 W_{TDS} coefficient
 Total Dissolved Solids
 水

103 ~ 105

19.1 (with conversion to NaCl or KCl content)

(NaCl or KCl): .

- 13.1 .
- (g/l or %).
- (18).
- .

19.2. W_{TDS}

TDS , 水 .

1. → g/l

$$W_{TDS} = TDS /$$

W_{TDS} - TDS coefficient

TDS - Total Dissolved Solids in g/l;

γ - conductivity of the sample in mS/cm;

Caution: TDS 1L .

2. → % of weight concentration:

$$W_{TDS} = TDS /$$

W_{TDS} - TDS coefficient

TDS - Total Dissolved Solids in g/kg;

γ - conductivity of the sample in mS/cm;

Caution: TDS 1kg .

19.3. (with conversion to TDS)

- 13.1 TDS (t.TdS)
- 13.1 TDS
.(g/l or %);
- (18).
- . (g/l or %)

IV.

20.

permeable membrane Teflon semi-

가 가 가 가

1 가

2 . 0 100%

21.

CX401

20

22.

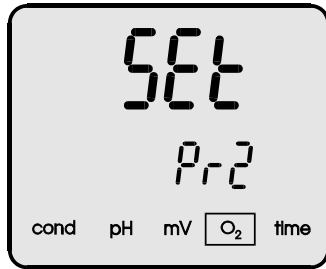
22.1.

3 DO

MODE Pr 1, Pr2 or Pr3 가

(. 22). ↙ ↘

가



. 22.

Clr -

SEt -

22.2.

(% & mg/l)

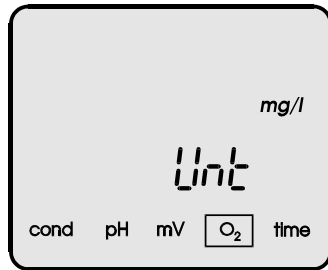


Unit(unit) 가



% - % of oxygen saturation

mg/l - mg/l (. 23).



. 23.

가








22.3.

가 1g/L

5%

22.3.1.

- 가 
- (NaCl) .(19.1)
- , 가 
-  SAL(salinity) 가
-  Err(error) , 가 (g/l) g/l (NaCl)
- 가 

22.3.2.

Table 7

Table 7

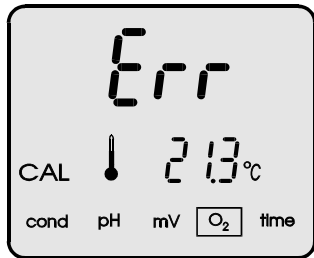
-  SAL(salinity) 가
-   Table 7
- 가 

%

mS/cm	g/l	mS/cm	g/l	mS/cm	g/l
1	0.49	28	16.87	55	34.34
2	1.00	29	17.52	56	34.99
3	1.52	30	18.17	57	35.64
4	2.08	31	18.82	58	36.28
5	2.63	32	19.46	59	36.93
6	3.19	33	20.11	60	37.58
7	3.74	34	20.76	61	38.23
8	4.29	35	21.41	62	38.87
9	4.85	36	22.05	63	39.52
10	5.40	37	22.70	64	40.17
11	6.00	38	23.35	65	40.81
12	6.61	39	23.99	66	41.46
13	7.21	40	24.64	67	42.11
14	7.83	41	25.29	68	42.75
15	8.45	42	25.93	69	43.40
16	9.07	43	26.58	70	44.05
17	9.70	44	27.23	71	44.70
18	10.35	45	27.87	72	45.34
19	11.01	46	28.52	73	45.99
20	11.66	47	29.17	74	46.64
21	12.31	48	29.82	75	47.28
22	12.96	49	30.46	76	47.93
23	13.61	50	31.11	77	48.58
24	14.26	51	31.76	78	49.22
25	14.91	52	32.40	79	49.87
26	15.56	53	33.05	80	50.63
27	16.22	54	33.70		

Table 7. (g/l NaCl) & (mS/cm) (in temperature 25°C).

- CAL
 - 0%
 - CAL
 - 0
 - , 100%
 - CAL
 - 100%
 - 가
 - FUNCTION
 : CAL (0% or 100%) , Err 가



. 25.

24.

23 6
 mg/l %

24.1. (with)

- DO
 - DO
 - FUNCTION ON
 - FUNCTION
 - 22.2
 - (mg/l) (22.3)

- . 30cm/sec

- , .

24.2. (with)

- .
-  ON .

- 

- 22.2

- (mg/l) . (22.3)

- .

- .

-  




- 30cm/sec

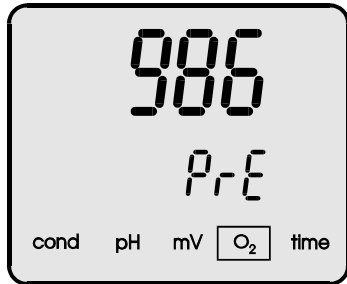
- .

Caution: Table 7 0.00 g/l

V.

25.

-  ON
-  (O₂)
-  PrE (pressure) 가
- (hPa) (. 26);




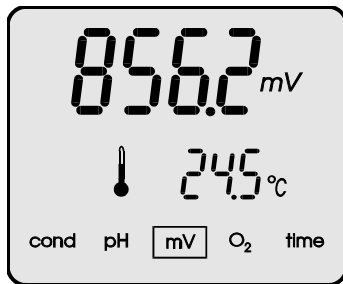
. 26.

- 가 

VI. ORP


26. ORP(vol tage)

CX-401 mV meter (Oxidation Reduction Potential)
 Redox . (. 27).  mV





. 27.

27.

-
 -  ON
 -
 -
 PT-1000
 :
 :

VII.

28. & &


 (Time) , OFF ,






28.1.

가 / . , .

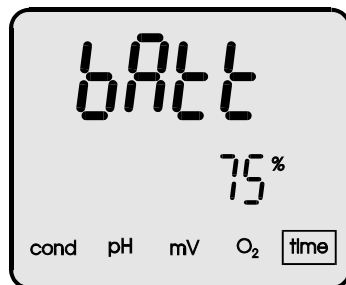
28.2.

月 日, 年 (Month - Day - Year).

28.3.

OFF   Auto-OFF (Auto-OFF) Minute .
 OFF  "1" " Off " .
 OFF  가  .

28.4.



. 29.

가 , , Function

가 . MODE
 (. 29).
 bAtt , SUPP %
 100% .
 가 FUNCTION

28.5. &
 ,
 . CAL CAL
 CAL CAL
 가

29.

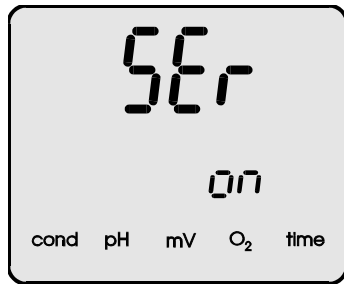
29.1. Or
 . 200 (Readout),
 EEPROM ,

EI-401 가 . ,

29.2. &
 (Readout mode)

가
 가
 "n00X" 가

A SEr - (Series) , Single results



.30



on or off (. 30)

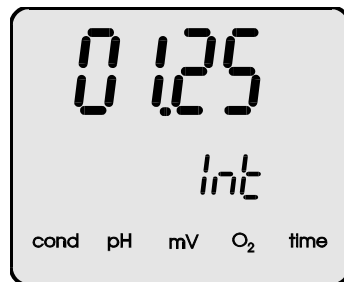
on , (Series)

off , 

.(Single results)

B Int -

.(.31).



.31.



1 60

가 .

SEr

off

C Prt -

- yes or no.



, on ,

, off ,

D ALL -

on - , , ,

off - ,



가



29.3.

single results



29.6
가



, End가

가

29.4.

200

- 29.2.A

- 29.2.B

(29.6)



가

가



(series)

.

가

: Prt -

- no)

가

가



200

29.5.

, 가

가
가



. ALL






. (29.2.B

).



가





29.6.

- :
-  .
-   .
-  가 , 가 ---
- 가  .


30.

가 RS-232 가 Centronics
 EI - RS232 .

30.1

- :
- ON .
- (Prt) on (29.2.c)
- (29.2.d), single or serial (29.2.a)
- ON .
- Single (Ser - off) ,  .
- Series (Ser - on) ,  .
- , ALL on , , ,
- Series ,  OR  .

30.2.

-
- ON
- (29.2.d), serial or single (29.2.a)
- 가 (29.5), 

SEr on ,
 SEr off ,
 ALL on , 가

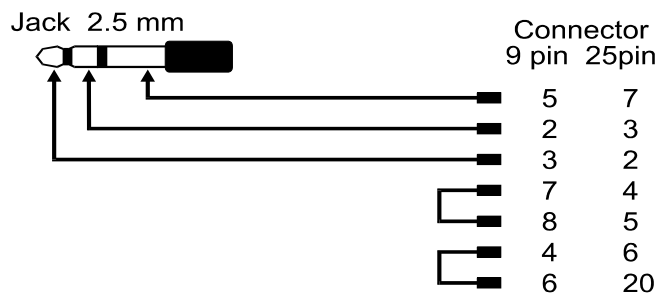
31.

9V  가 P (.2)

32. Co-operation with PC

CX-401

RS-232 connector
 Typically COM2
 9600 b/s
 8 bit
 1 even bit
 1 stop bit



32.

(Prb) on 

Caution:

RS232

33. Technical DATA**pH MEASUREMENT:**

Range	Resolution	Accuracy (± 1 digit)
-2.000 ~ 16.000 pH	0.001 / 0.01 pH	± 0.002 pH

: $10^{12} \Omega$
 : manual/automatic
 : -5.0 ~ 110.0
 pH : automatic, in 1 ~ 5 points

pH

Calibration point	Range
1	0,800 ~ 2,100
2	3,900 ~ 4,100
3	6,800 ~ 7,100
4	8,900 ~ 9,400
5	11,500 ~ 14,000

mV MEASUREMENT:

Ranges	Resolution	Accuracy (± 1 digit)
-1000 ~ 1000 mV	0.1 mV	± 0.1 mV

: $10^{12} \Omega$

OXYGEN MEASUREMENT:

Range	Resolution	Accuracy
0 ~ 400.0 %	0.1 %	Of probe* ± 1 digit
0 ~ 60.00 mg/l	0.01 mg/l	Of probe* ± 1 digit

: 0.0 ~ 40.0
 : 0.0 ~ 50.0 g/l
 : 800 ~ 1100 hPa

:

Two point 0% and 100% O₂
 One point in 100%O₂
 Oxygen probe: membrane, galvanic

* Accuracy given in the "oxygen Probe" section (page 52).

ATMOSPHERIC PRESSURE MEASUREMENT:

Range	Resolution	Accuracy* (± 1 digit)
800 ~ 1100 hPa	1 hPa	± 2 hPa

NPP-301

TEMPERATURE MEASUREMENT:

Range	Resolution	Accuracy* (±1 digit)
- 50.0 ~ 199.9	0.1	±0.1

* accuracy of the meter. Final accuracy of the measurement depends on the accuracy of the used PT-1000 probe

: platinum resistor Pt-1000

: 0 ÷ 100

FOR PT1000B RESISTOR: ±0.8

FOR PT1000¹/₃B RESISTOR: ±0.27

OTHER:

: -5 ~ 45

: 1. 9V battery type 6F22

2. stabilised power adapter 9V

: 60 mW

: Custom LCD 55 x 45 mm

: 149 x 82 x 22 mm

: 222 g (with battery)

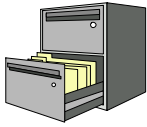
Standard:

1. Pt-1000B (standard);
- 2.
- 3.
- 4.

Options:

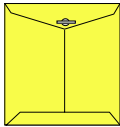
1. pH (glass membrane)
2. ()
3. 9V
4. ORP
- 5.

WaterProof Multifunction Meter CX - 401



3 : 2004 2 2

:



() 152-766

3 212-1

1

1007

TEL : 02-6675-6000 (), FAX : 02-2109-0123 ()

ID :



e-mail : sechang@sechang.com

Internet Website : <http://www.sechang.com>



SECHANG INSTRUMENTS