

INSTRUCTION MANUAL

for

SK 101 Salinity Indicator

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Table of contents

| | | |
|----|----------------------------------|---|
| 1. | Notes for safety operation ----- | 2 |
| 2. | Outline ----- | 2 |
| 3. | Specifications ----- | 3 |
| 4. | Names of components ----- | 4 |
| 5. | Operations and functions ----- | 5 |
| 6. | Wiring and connection ----- | 6 |
| 7. | Maintenance ----- | 8 |
| 8. | Errors and remedies ----- | 9 |

Notes on safety indications

The user is requested to read these instructions and the attached documents carefully before the installation, operation and inspections or maintenance of the Salinity Indicator so that it will be used properly.

Please be sure to get accustomed thoroughly to the knowledge of, and the safety information and notes about, the indicator prior to use it.

[Safety notes in this Instruction Manual will be indicated by any one of the following three levels:]




indicates a case where an erroneous operation of the machine would produce a dangerous situation which could result in death or serious injury and the level of emergency is high when such a situation occurs. This note will appear limitedly for very dangerous cases.



denotes a case where an erroneous operation of the machine would produce a dangerous situation which could result in death or serious injury.



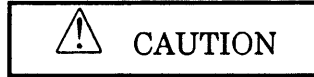
represents a case where an erroneous operation of the machine would produce a dangerous situation which could result in slight injury or material damage.

Please note, however, that a  case could result in more serious consequences than assumed above by the synergy of different conditions. So, it is important to live up to the instructions herein to forestall any factor which would inhibit safety operation.

1. Notes for safety operation

These Operating Instructions must be read through carefully for the proper and safe use of this product.

Any erroneous operation could cause a breakdown and/or a disaster resulting in injury and/or material damage.



- 1.1 Turn off the power source prior to wiring or inspecting the inside of the indicator; otherwise the worker could suffer an electric shock.
The main source must be turned off at both ends.
- 1.2 Prior consultation with the manufacturer is necessary if the indicator is intended for uses where its breakdown or erroneous operation could endanger a human life or lives or cause hazards to people.
- 1.3 No excessive load, vibration or impact must be given to the body or the cell.
- 1.4 The indicator must be used within the specified temperature range.
- 1.5 In case of detaching the cell, stop the pump and lower residual pressure by closing the pipeline valve(s) beforehand.
- 1.6 Do not adapt the indicator to add a new function to it or for any other purposes.
For repairs, call the manufacturer.
- 1.7 To wire the indicator, strictly follow instructions in the "Wiring and connection" part of this brochure.
- 1.8 Prior to use, make sure that the correct voltage has been chosen on the voltage selector.

2. Outline

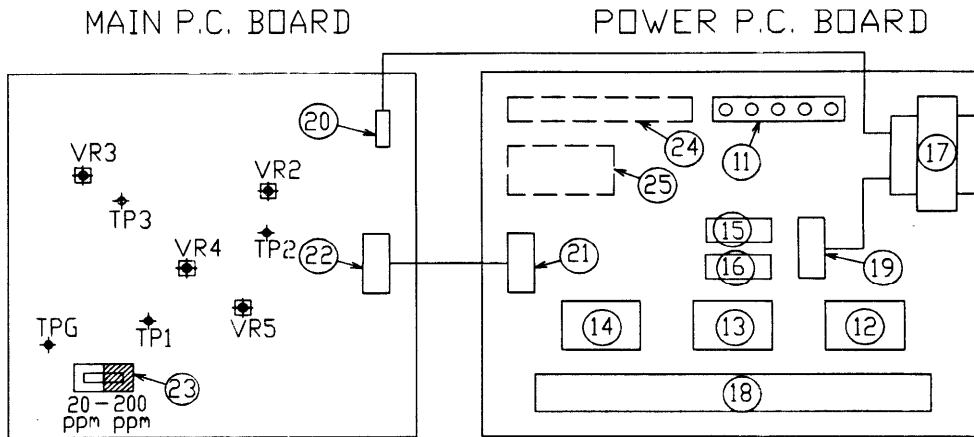
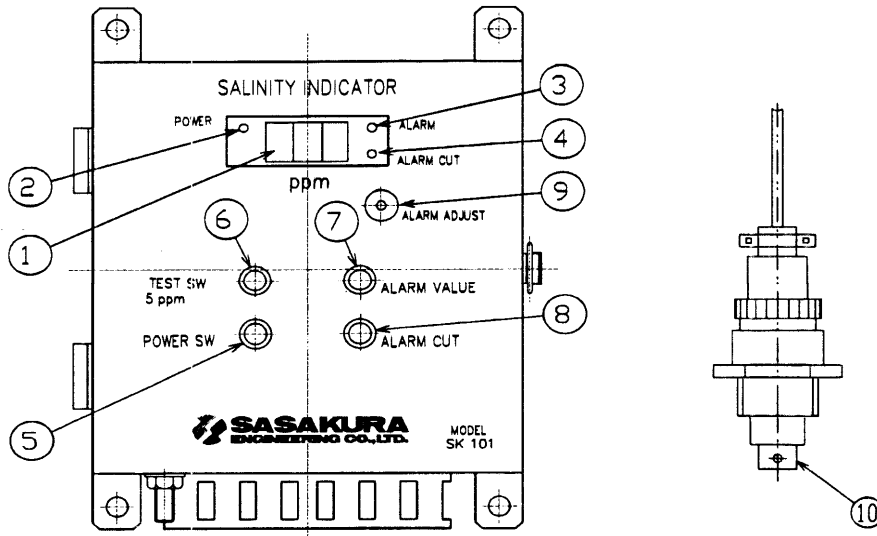
The SK 101 Salinity Indicator continuously measures the saline concentration of high-purity water, such as distilling plant water, drain water and feed water for boilers, and indicates the outcome therefrom in ppm. In case the saline content level goes higher than a preset value, the indicator will light up an alarm lamp and send out error signals (no-voltage and voltage signals).

Some types of the measuring unit would automatically activate a solenoid valve to discharge high salty water outside the system.

The alarm is automatically canceled when the saline concentration is back to a level below the preset value.

| | |
|---|---|
| 3. Specifications | |
| Measurable range: (with selection switch) | 0.1 to 20.0 ppm or 1 to 200 ppm. |
| Measuring accuracy: | ±2.5%. |
| Temperature compensation: | 30 to 80 °C. |
| LED lamps | Power: green. Alarm: red. External alarm cut: orange. |
| Power source: (switchable on voltage taps) | 100/110/115/220 VAC, 50/60 Hz; (200 V optional) |
| Finishing color: | Munsell 7.5 BG 7/2. |
| Pressure durability of cell: | 5 kg/cm ² |
| Cell mounting screws: | M30 x 2. |

4. Names of components



- | | | | |
|------|--|------|---|
| (1) | Display | (14) | RL1 (Relay 1) |
| (2) | Power LED (green) | (15) | F1 (Fuse 1,) 0.2 A |
| (3) | Alarm LED (red) | (16) | F2 (Fuse 2) 3 A |
| (4) | External alarm cut LED (amber) | (17) | Transformer |
| (5) | Power switch | (18) | TB3 Terminal block |
| (6) | Test switch | (19) | CN1 Connector (power printed circuit board) |
| (7) | Alarm value check switch | (20) | CN1 Connector (main p.c.b.) |
| (8) | External alarm cut switch | (21) | CN2 Connector (power p.c.b.) |
| (9) | Alarm value adjustment variable resistor (VR) | (22) | CN2 Connector 2 (main p.c.b.) |
| (10) | Cell | (23) | Full range selection switch |
| (11) | TB1 Terminal block (with voltage selection taps) | (24) | TB2 Terminal block * |
| (12) | RL2 (Relay 2) | (25) | RL4 (Relay 4) * |
| (13) | RL3 (Relay 3) | | |

Marked(*) is optional, not included in a standard Salinity Indicator.

5. Operations and functions

The indicating section

5.1 Display

Indicates measured values, a preset alarm value and test values (5/50 ppm) in ppm.

5.2 POWER (Power lamp)

Green LED on: power has been turned on.

Green LED off: power has been turned off.

5.3 ALARM (Alarm lamp)

Red LED on: measurement exceeds alarm value.

Red LED off: measurement remains below alarm value.

5.4 ALARM CUT (Alarm cut lamp)

Amber LED on: no alarm signal sent even if exceeded alarm value.

Amber LED off: alarm signals sent if exceeded alarm value.

The switching section

5.5 POWER (Power switch)

Operations:

- Press when Salinity Indicator turned off — Indicator on, power LED on, value displayed.
- Press when Indicator turned on — Indicator off, power LED off, display dead.

5.6 TEST SW (Test switch)

Operations:

Press the 20 ppm side of measuring range selection switch — 5.0±0.2 ppm displayed.

This switch is used to test the checking of function of the SK 101 Salinity Indicator except its measuring cell.

Press at 200 ppm range — 50 ppm display.

5.7 ALARM VALUE (Alarm value switch)

Operations:

Press the switch — preset alarm value displayed.

To revise a set value, see 5.9 Alarm adjustment below.

5.8 ALARM CUT (Alarm cut switch)

Operations:

Press when the switch off — alarm cut function on; alarm cut lamp on.

Press when the switch on — alarm cut function off; alarm cut lamp off.

While the alarm cut function is activated, no alarm will be output.

Turn on the alarm cut switch soon after the distilling plant starts to operate because salinity in the distilled water remains unstable.

After the salinity is stabilized, turn off the alarm cut switch.

5.9 ALARM ADJUST (Alarm value adjustment VR)

To revise a preset alarm value, while pressing the alarm value check switch (7), slowly turn the alarm value adjustment VR (9) until a desired value is displayed. Then, release both switches and now the new value has been set.

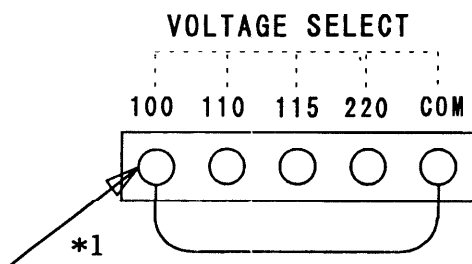
5.10 Cell (electrode)

Dipped in distilled or fresh water to measure saline content in it.

6. Wiring and connection

Break the power source during wiring work and the linking of connectors

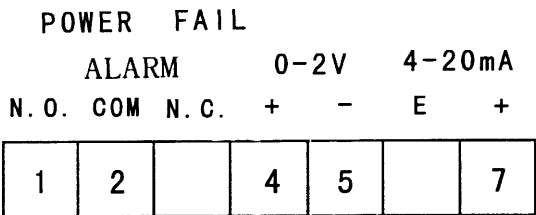
6.1 TB1 terminal block with voltage selection taps (11)



*1 Choose the voltage to be used for this Salinity Indicator from the voltage selection taps on the terminal block.

Connect the COM tap and the desired voltage tap with a jump wire.

6.2 TB2 terminal block (option) (24)

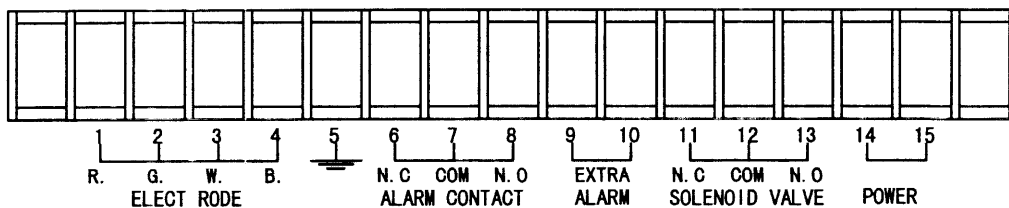


Used for a power failure alarm and the measured value output of 0-2 V, 4-20 mA.

The power failure alarm contact is a no-voltage contact.

* The TB2 terminal block is optional and not equipped in a standard Salinity Indicator.

6.3 TB3 terminal block (18)



In standard equipment, the alarm contact is a no-voltage contact and the external alarm contact is with voltage.

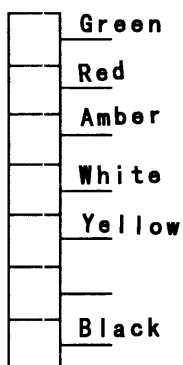
Make sure that the electrode (cell) is connected with the correct cables in accordance with the colors shown above.

6.4 Main board - Power board connection (CN1)

Check up the main and power printed circuit board to confirm if the connectors are connected as follows:

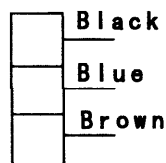
(19) Power p.c.b.

⑲ CN1



(20) Main p.c.b.

⑳ CN1



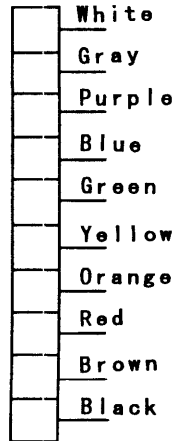
6.5 Main board - Power board connection (CN2)

Check up the main and power printed circuit board to see if the connectors are connected as follows:

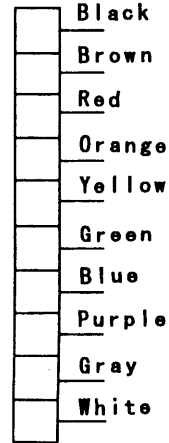
(21) Power p.c.b.

(22) Main p.c.b.

②① CN2



②② CN2



7. Maintenance

7.1 Cleaning of electrode (cell)

To keep the indicator operating accurately all the time, detach the electrode (cell) and clean the sensor at least once a month.

In cleaning the electrode, carefully wipe off dust and scale from its surface with soft cloth. Do not use sandpaper, a file or other material which may hurt the surface.

8. Errors and remedies

| Error | Cause | Remedy |
|--|---|--|
| Powered but fails to operate; power LED dead. | Error in power source or F1 fuse(0.2A) blown by abnormal current flow in the circuit. | Remove the cause(s) of abnormal current and replace F1 fuse(0.2A) with a spare. |
| | Excess current flows in external alarm. | Remove the cause(s) of abnormal current and replace F2 fuse(3A) with a spare. |
| Alarm LED fails to light. | The set alarm value is inadequate. | Check the set alarm value. See Item 5.9 in this brochure for changing set values. |
| | Broken relay | Replace the power p.c.b. with a new one because the relay is directly bonded on the board. |
| Displayed value unusually low. | Foreign matter deposited on sensor surface working as insulator. | Clean the electrode (cell). |
| | Sensor out of the water. | Dip the electrode (sensor) in the water completely. |
| | Electrode fastening screws loosened. | Fasten the screws. |
| | Broken wire in the sensor. | Renew the sensor. |
| Displayed value unusually high. | Foreign matter deposited on sensor surface increases conductivity. | Clean the electrode (cell). |
| Alarm LED remains lit. | The set alarm value is inadequate. | Check the set alarm value. See Item 5.9 in this brochure for changing set values. |
| | Broken relay | Replace the power p.c.b. with a new one because the relay is directly bonded on the board. |
| Alarm output error. | Broken relay | Replace the power p.c.b. with a new one because the relay is directly bonded on the board. |
| Test SW pressed but neither 5 ± 0.2 displayed. | Power not turned on. | Turn on power. |
| | Error in main board circuitry | Renew the main board. |
| | Error in LED lamp circuit. | Renew the main board. |
| Test SW pressed but displayed value exceeds 5 ± 2 limitations. | Chosen power tap not matching supplied voltage. | Check the connected tap voltage. [Choose the correct tap and connection ?] |

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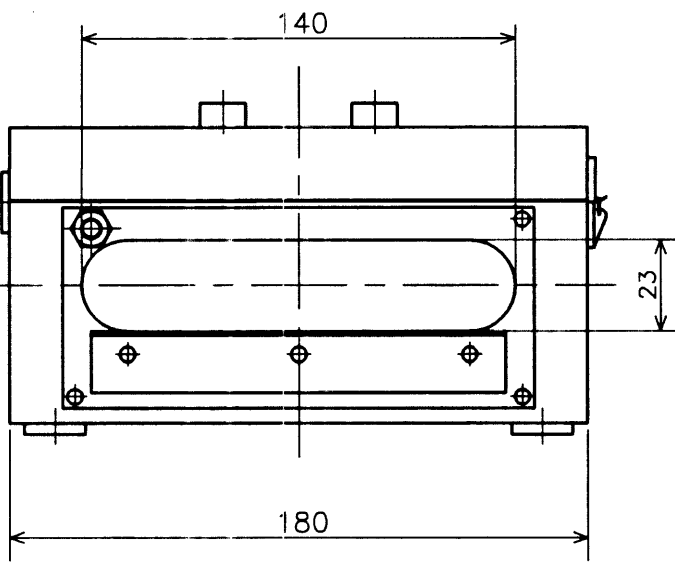
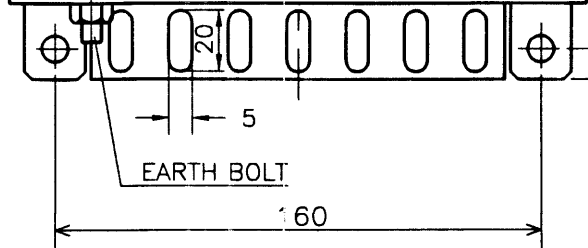
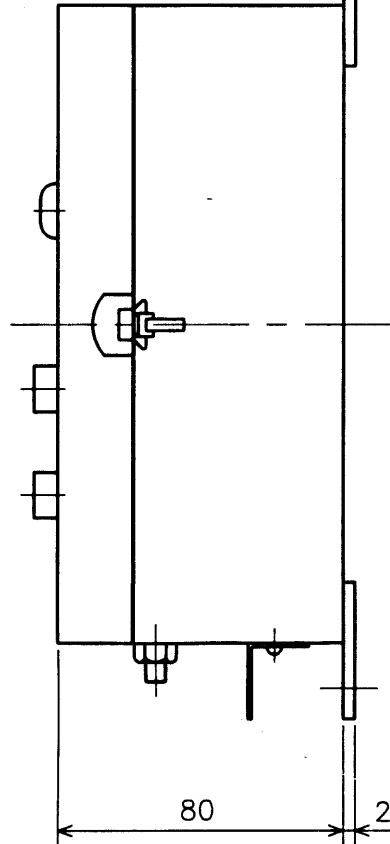
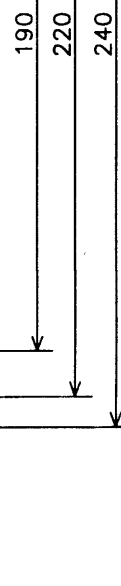
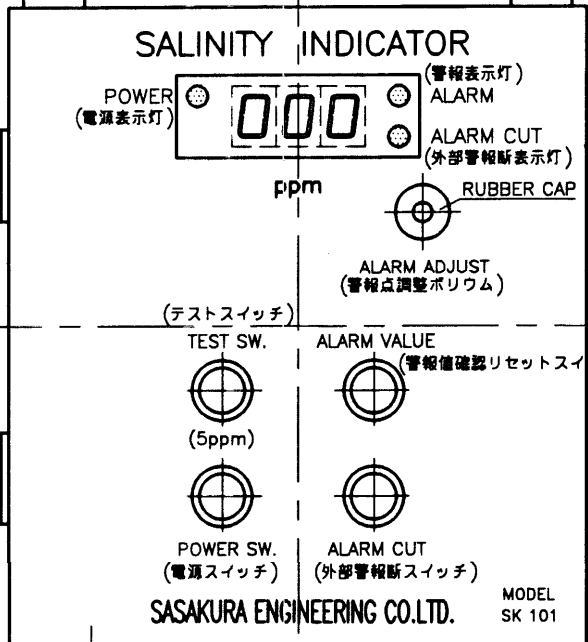
MACHINE

SK 101 SALINITY INDICATOR

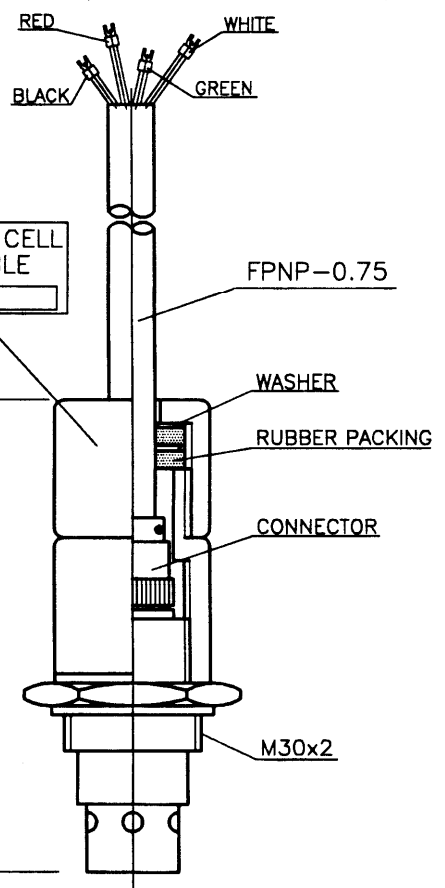
IP44

4-φ9 HOLES

| | |
|-------------------|-------|
| BODY | 2.3kg |
| CELL & CABLE | 0.4kg |
| POWER CONSUMPTION | 10W |



| SALINITY CELL | L (mm) |
|----------------|--------|
| Model : M30L37 | 105 |
| Model : M30L90 | 160 |



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MACHINE

SK 101 SALINITY INDICATOR BLOCK DIAGRAM

