



MOISTURE METER  
MR - 200  
ELECTRIC MOISTURE METER  
INSTRUCTION MANUAL

CAUTIONS:

Before using the Meter, read this INSTRUCTION MANUAL thoroughly and use the Meter correctly.

Keep this INSTRUCTION MANUAL carefully and refer to this when necessary.

Connect/disconnect the probe after surely confirming the power OFF. It causes out of order.

In the event of any doubt arising, the original INSTRUCTION MANUAL in Japanese is to be final authority.

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## 1 . FEATURES & APPLICATIONS

The moisture contents for various materials/products can be measured with the probe connecting to the main body.

Kinds of the probe: probe for wood, probe for paper, probe for mortar & plaster

The moisture contents of all kinds of objects can be compared in the MC mode.

Measurement can be carried out by converting the mode of the main body keeping on each probe connecting.

Select the probe to be connected in accordance with an electrical characteristic of an object to be measured.

Classification and comparison of dry and moisture for the object can be easily and quickly checked as these are displayed with values 1 to 100.

|                     |   |
|---------------------|---|
| Wood                | : Sewn lumber, wood for buildings, fittings, packing, plywood, compiled wood, particle board, wood for furniture, flooring, MDF board, textile wood, wood works such as household goods                           |
| Paper               | : Moisture control while storing of high quality paper, craft paper, paper board, wall paper, cardboard, paper articles, used paper, used magazine, etc.  |
| Mortar<br>& plaster | : Moisture control of mortar, concrete, plaster, etc.<br>Quality control for coating, clothing, tiling, all kinds of water proofing, etc.   |
| Moisture<br>Content | : Moisture control of fabric, food, chemical synthetic products, ceramic, etc.<br>Moisture contents are indicated with a certain value, so that the object can be judged by the comparison of the measured value. |

## 2 . SPECIFICATIONS

### MR-200(Common specifications)

|                             |   |
|-----------------------------|---|
| Measuring method            | DC electric resistance method   |
| Measuring range             | Depends on connecting probe (option)  |
| Conversion of mode          | Moisture %, MC level(Moisture content)  |
| Indication                  | LCD display with hold function, measured values, kind of connecting probe, HOLD, upper & lower limit values, LOW-BATT [E]                                   |
| Upper & lower limit values  | Upper & lower limit values<br>Setting only one limit value, upper or lower limit value, is also available.<br>Setting of an arbitrary value by 0.1 % pitch. |
| Compensation of temperature | Automatic compensation of temperature with ON, OFF function   |
| Power source                | Alkaline dry batteries LR03(1.5V) × 4 pcs. With auto power off function<br>Continuously usable time is approx. 20 hours                                     |
| Operating temperature       | 0 to 40 (except dew condensing condition)   |
| Dimensions & weight         | 80(W) × 35(H) × 150(D)mm, 245g  |
| Accessories                 | Carrying bag  |
| Option                      | Moisture reading checker  |

### MR-200 Connecting probe

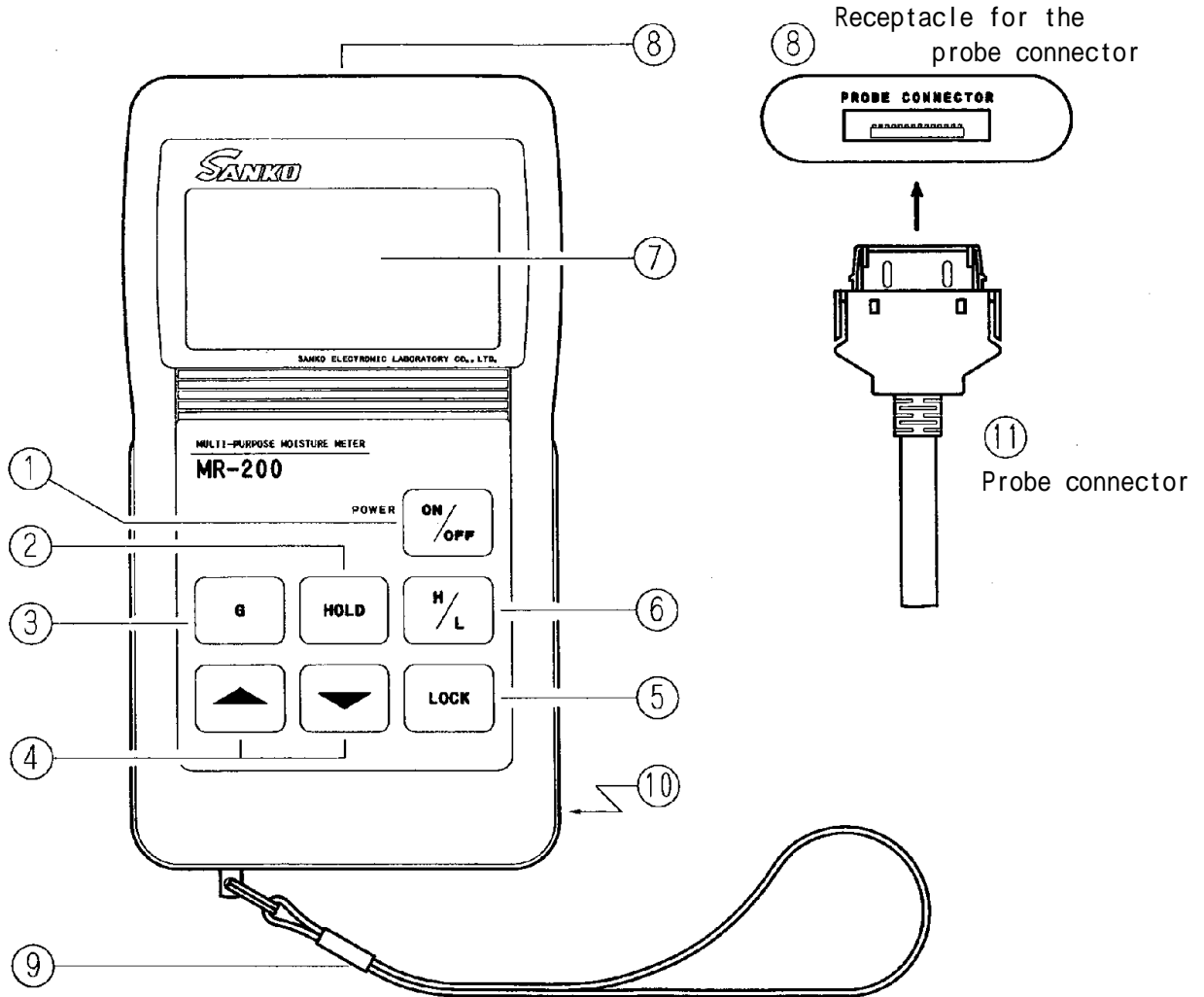
|                             |  |
|-----------------------------|--|
| Probe for wood              |  |
| Type                        | TG-PA(Standard probe for wood)   |
| Measuring range             | 3.5 to 50.0%<br>Broad leaf tree(Hard) / Conifer(Soft) by conversion<br>MC-3(Moisture content) by 1 to 100 indication |
| Dimensions & weight         | 50(W) × 30(H) × 135(D)mm, 320g   |
| Accessories                 | Hexagonal wrench, spare needle   |
| Probe for paper & cardboard |  |
| Type                        | KG-PA(Standard probe for paper & cardboard)  |
| Measuring range             | 3.5 to 40.0%<br>MC-2(Moisture content) by 1 to 100 indication  |
| Dimensions & weight         | 50(W) × 40(H)mm × 150(D), 360g   |
| Accessories                 | Hexagonal wrench, spare needle   |
| Probe for mortar & plaster  |  |
| Type                        | PM-PA(Standard probe for mortar & plaster)   |
| Measuring range             | 0.8 to 15.0%<br>Mortar/Plaster by conversion<br>MC-1(Moisture content) by 1 to 100 indication                        |
| Dimensions & weight         | 50(W) × 30(H) × 130(D)mm, 310g   |

We will prepare or fabricate the optional probe suitable to the object to be measured other than above mentioned 3 kinds of the standard probe(PA type).

Please contact us at the nearest branch for details.

### 3 . NAME OF PARTS

#### 3-1 Main body



#### Power switch key (POWER)

Switch for power ON or OFF.

When the probe is not connected to the main body, [PE] probe error is indicated on the display and the power OFF. Power switch ON after surely connecting the using probe to the main body.

#### Hold key (HOLD)

ON or OFF of the hold function is converted with each press of the hold key.

The measured value is held until succeeding measurement in the hold ON state.

#### Mode key (G)

Conversion differs depending on the using probe.

TG-PA : Convert the measured values of moisture in wood (HARD/SOFT) to the MC-3 mode.

KG-PA : Convert the measured values of moisture in paper to the MC-2 mode.

PM-PA : Convert the measured values of moisture in mortar/plaster to the MC-1 mode.

#### Value setting keys

Keys for setting the upper & lower limit values

Figures increase or decrease by pressing 「 $\uparrow$ 」 or 「 $\downarrow$ 」 key by 0.1% pitch and traverse quickly by keeping on the keys continuously pressing.

#### Lock key (LOCK)

By pressing the lock key, all keys except the power switch key are locked and misoperation is avoided.

#### Upper & lower limit values setting key (H/L)

The Meter is set in setting mode of upper & lower limit values by pressing the key.

Set an arbitrary figure with the value setting key .

#### LCD display

Indicate the kind of connecting probe, measured values, upper & lower limit values, measurement mode, [E] for LOW-BATT, etc.

#### Receptacle for the probe connector

Connector for connecting the probe.

#### Hand strap

Be sure to pass a wrist through this hand strap to prevent the Meter from dropping.

#### Battery case (Lower back side of the main body)

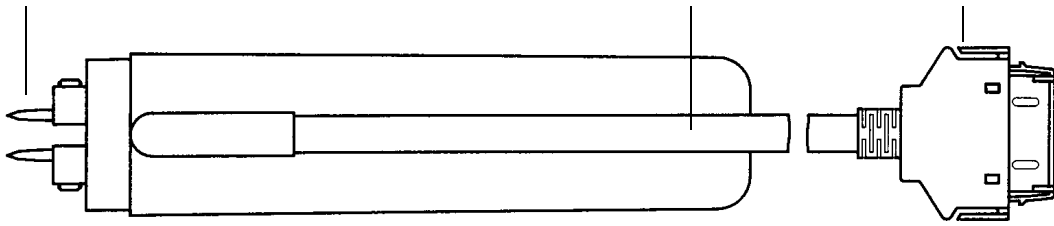
Batteries are stored in this case.

#### Probe connector

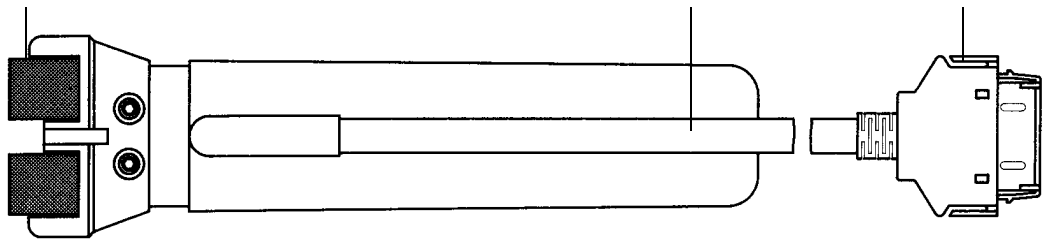
Connector for connecting the probe to the main body.

### 3-2 Standard probe

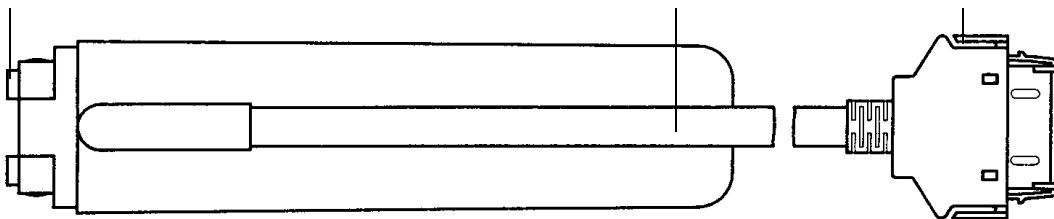
Probe for Wood (TG-PA)



Probe for Paper & cardboard (KG-PA)



Probe for Mortar & Plaster (PM-PA)



Probe connector

Probe cord

Electrode

- Probe for Wood (needle electrode)
- Probe for Paper & cardboard (SB electrode/needle electrode)
- Probe for Mortar & Plaster (rubber electrode)

## 4 . OPERATING INSTRUCTIONS

### 4-1 Connecting(Disconnecting) the probe (Be sure to confirm the power OFF.)

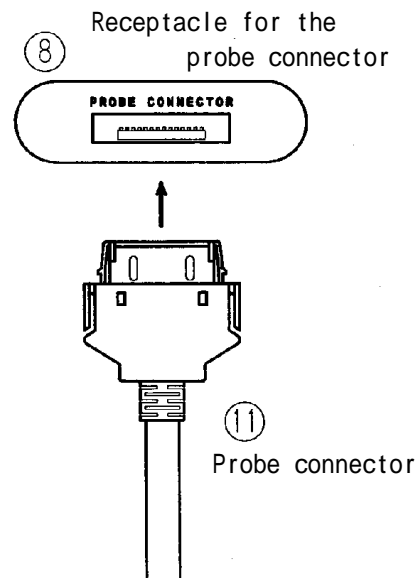
To connect the probe:

Carefully insert the probe connector of the using probe to the bottom into the receptacle for the probe connector .

To disconnect the probe:

After confirming the power OFF, carefully pull the probe connector releasing the locks located at both side of the probe connector .

If the cord is pull out of the receptacle without releasing the locks, it causes breaking of the cord or the connector.



### 4-2 Power ON • OFF

Press the power switch , then [LLL] and the kind of connected probe are indicated on the LCD display with a beeping sound.

Press the power switch again, then the power OFF with a beeping sound and the indication on the display disappears.

The batteries consumption caused by forgetting of turning the power OFF is prevented with the auto power OFF function.

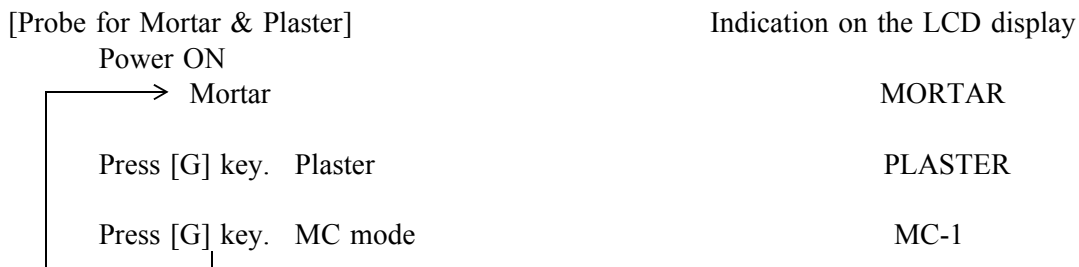
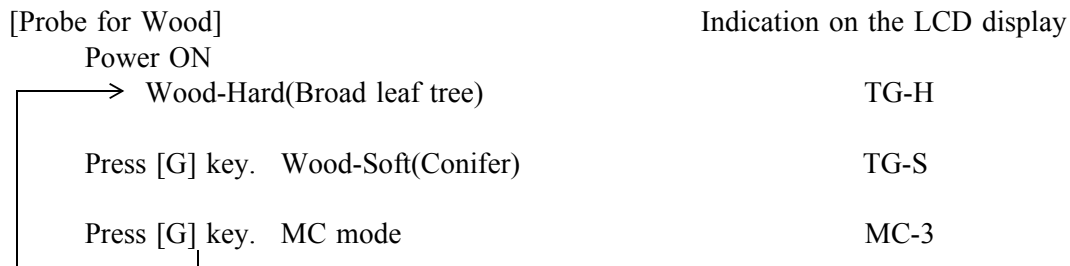
When the measurement is not carried out continuously for about 3 minutes, the power turns OFF automatically.

When switching over the power switch ON or OFF, operate the switch with an interval of 3 to 5 seconds to prevent malfunction.



### 4-3 Converting the measurement mode

Normally the initial measurement mode of the selected probe is indicated on the LCD display. The measurement mode is converted each press of the mode key [G] as shown in the following charts.



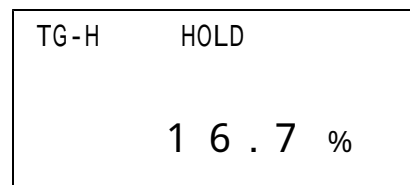
When power ON again after power OFF once, the mode will automatically return to the initial measurement mode.

Be sure to confirm the measurement mode when the power is ON.

### 4-4 Converting the hold mode

When the hold key is pressed, the indicated measured value on the display will be held until the next measurement.

Hold mode will be converted ON or OFF each press of the key. [HOLD] is indicated on the LCD display at ON condition of the hold mode.



#### 4-5 Setting upper & lower limit values

Upper limit value & lower limit value can be set as per following procedures.

| Operation   | Indication   |
|---|--|
| Press the [H/L] key .   | [H] showing the upper limit value is blinking with a beeping sound of the buzzer.  |
| Keep on the [ ] key pressing.   | Values in the column of the upper limit value increase as 5.0... 5.1... 5.2... 5.3... for wood or paper and 2.0... 2.1... 2.2... 2.3... for mortar or plaster.                               |
| When the value in the column of the upper limit value reaches to the setting value, release the [ ] key .<br>When the value exceeds the setting value, readjust the value by pressing [ ] key .     |  |
| Press the [H/L] key .   | [H] showing the upper limit value is converted from blinking to go on with a beeping sound of the buzzer, and [L] showing the lower limit value is blinking.                                 |
| Keep on the [ ] key pressing.   | Values in the column of the lower limit value increase as 3.5... 3.6... 3.7... 3.8... for wood or paper and 0.8... 0.9... 1.0... 1.1... for mortar or plaster.                               |
| When the value in the column of the lower limit value reaches to the setting value, release the [ ] key .<br>When the value exceeds the setting value, readjust the value by pressing the [ ] key . |  |
| Press the [H/L] key .   | [L] showing the lower limit value is converted from blinking to go on with a beeping sound of the buzzer. Setting of upper & lower limit values complete and return to the measurement mode. |

- When upper & lower limit values have been set and the measured value exceeds upper limit value or under lower limit value, [H] or [L] and measured value are blinking by turns with 3 beeping sounds of the buzzer. (When the hold mode is ON)

Ex: In case upper & lower limit values are set for wood

|      |      |        |
|------|------|--------|
| TG-H | HOLD | H20.0  |
|      |      | L10.0  |
|      |      | 16.7 % |

- When the resetting of upper & lower limit values are needed, repeat above mentioned procedures after pressing [H/L] key again.

- When the upper limit value is not needed, press the [H/L] key again after pressing the [H/L] key first.  
Then [H] showing the upper limit value is deleted and mark [L] showing the lower limit value is blinking instead. The lower limit value is set at this step.
- When the lower limit value is not needed, press the [H/L] key again while [L] showing the lower limit value is blinking after setting the upper limit value.  
Now, [L] showing the lower limit value deleted and only the upper limit value is set.
- When both the upper limit value and the lower limit value are needed to delete, turn the power OFF.  
When the power OFF by the auto power off function, both upper and lower limit values are also deleted.

#### 4-6 Converting the key lock mode

All keys except the power switch key are locked by pressing the lock key and the misoperation can be avoided.

The locking condition is released by turning the power OFF.

## 5 . MEASUREMENT

1. Connect the probe suitable for an object (wood, paper, cardboard, mortar & plaster) to be measured.
2. Power switch ON and confirm the indications on the LCD display .  
 For wood = [TG-H]                      For paper = [KG]                      For mortar = [MORTAR]

Example: In case of connection  
of the probe for wood



When the probe is not connected, probe error [PE] is indicated on the LCD display and the power OFF with 3 beeping sounds of the buzzer.

When the power switch ON with the probe pressing against the object to be measured, once [LLL] is indicated on the LCD display and the measured value is indicated in 3 to 4 seconds.

3. Press the mode key , select the mode suitable for the object to be measured.  
(Refer to 4. OPERATING INSTRUCTIONS , 4-3 Converting the measurement mode.)
4. Press the electrode with a constant force against the object to be measured and read the indicated value after settlement of the indication.

When the 2-needle electrode is used, stab it into the object to be measured.

5. When the hold key is pressed, the indications on the display are held when the electrode is removed from the object or the measured values become stable.

Hold condition is released by pressing the hold key again.

Note: In case the measurement is carried out with the probe hammered into the wood which is an object to be measured:

Keep on the hold mode releasing until the hammering of the probe is completed. Pay attention to convert the mode to the hold mode at the time when the measured value is read after completion of the hammering.

When the hammering is carried out in hold mode, it causes measurement error as the data during hammering is held and indicated.

## 6 . MEASUREMENT IN THE MOISTURE CONTENT(MC)MODE

MC mode of moisture content is applicable to the wide range of object relating to the resistance.

Select the connecting probe based on the electric characteristics of the object to be measured and usage of the Meter.

The changes of the electric resistance caused by the dry or the moisture of the object to be measured are indicated by the values 「 1 to 100 」.

Classification and comparison can be easily checked by checking the relative comparison values.

| Using probe | Measurement mode | Resolution |                               |
|-------------|------------------|------------|-------------------------------|
| For TG      | MC-3             | 1 to 50    | 0.5 pitch , 50 to 100 1 pitch |
| For KG      | MC-2             | 1 to 100   | 0.5 pitch                     |
| For PM      | MC-1             | 1 to 100   | 1 pitch                       |

Optional probes suitable for an object to be measured in addition to 3 kinds of the standard probe(PA type) can be prepared or fabricated.

Please contact us at the nearest branch for the details.

## 7 . TEMPERATURE COMPENSATION

The automatic temperature compensating function is set ON at the initial setting condition and the indicating value is automatically temperature compensated based on 20 .

When an object to be measured is high temperature due to dry treatment by heating etc., measure it after turning the automatic temperature compensating function OFF. In case the temperature of the main body differs from the probe, it will cause the error in measurement.

ON or OFF of the automatic temperature compensating function can be converted by pressing both 「 」 key and 「 」 key of the value setting keys simultaneously.

Then, [TEMP OFF] or [TEMP ON] is indicated on the LCD display for about 2 seconds and the setting condition is converted.

Ex: In case the compensation is set OFF for wood

|          |      |
|----------|------|
| TG-H     | HOLD |
| TEMP OFF |      |
| 16.7 %   |      |

When the automatic temperature compensating function is set OFF, refer to the following list for the temperature compensation.

| For wood<br>Temperature( ) | Moisture(%) |          |             |
|----------------------------|-------------|----------|-------------|
|                            | 4 to 11     | 12 to 20 | above or 21 |
| below 0                    | + 2.0       | + 2.5    | + 3.0       |
| 0 to 1                     | + 2.0       | + 2.5    | + 3.0       |
| 2 to 3                     | + 2.0       | + 2.0    | + 3.0       |
| 4 to 5                     | + 1.5       | + 2.0    | + 2.5       |
| 6 to 7                     | + 1.5       | + 1.5    | + 2.0       |
| 8 to 9                     | + 1.0       | + 1.5    | + 2.0       |
| 10 to 11                   | + 1.0       | + 1.0    | + 1.5       |
| 12 to 13                   | + 1.0       | + 1.0    | + 1.0       |
| 14 to 15                   | + 0.5       | + 0.5    | + 1.0       |
| 16 to 17                   | + 0.5       | + 0.5    | + 0.5       |
| 18 to 19                   | 0           | + 0.5    | + 0.5       |
| 20 to 21                   | 0           | 0        | 0           |
| 22 to 23                   | 0           | - 0.5    | - 0.5       |
| 24 to 25                   | - 0.5       | - 0.5    | - 0.5       |
| 26 to 27                   | - 0.5       | - 0.5    | - 1.0       |
| 28 to 29                   | - 1.0       | - 1.0    | - 1.0       |
| 30 to 31                   | - 1.0       | - 1.0    | - 1.5       |
| 32 to 33                   | - 1.0       | - 1.5    | - 2.0       |
| 34 to 35                   | - 1.5       | - 1.5    | - 2.0       |
| 36 to 37                   | - 1.5       | - 2.0    | - 2.5       |
| 38 to 39                   | - 2.0       | - 2.0    | - 3.0       |
| above or 40                | - 2.0       | - 2.5    | - 3.0       |

\* Extracted from the 「 Electric Moisture Meters 」 issued in 1960 by THE NIKKAN KOGYO SHINBUN, Ltd.

For paper, mortar & plaster

| Temperature in measurement | Compensating values to the indication |
|----------------------------|---------------------------------------|
| Over 20                    | - 0.1% per temperature 1              |
| Below 20                   | + 0.1% per temperature 1              |

## 8 . NOTES FOR MEASUREMENT

The electric resistance type Moisture meter utilizes the characteristics that the electric characteristics of an object to be measured reacts specially sensitively on its moisture contents, but the relation is not perfectly related in one-to-one ratio.

When its composition and proportion are different or change in quality and contamination exist or special processing and chemical treatment are performed even though the same object, it is necessary to avoid the measurement at these places or to use the measured values after compensating.

Measuring values may disperse according to measuring circumstances.

## 9 . BATTERY

### 9-1 Indication of the voltage drop

When [E] showing the voltage drop is indicated in the left of the LCD display , the batteries close to the limit of use due to consumption.

Open the battery case by sliding the cover downward and replace all alkaline batteries LR03(1.5V) × 4 pcs. with new ones. (ensure the limit of use.)



When the Meter is continuously used after voltage drop mark [E] was indicated on the LCD display, following conditions will occur.

- Though it differs depending on the characteristic and using condition of the dry batteries, the Meter can work for several hours.  
(Replace all 4 batteries with fresh specified dry batteries earlier.)
- When the Meter is continuously used as it is, measured values will become unstable.
- When the power switch is turned ON, the buzzer continuously sounds and key operation become impossible simultaneously.  
(Remove the batteries from the Meter.)
- When no indication is on the LCD display, the batteries are completely consumed.

### 9-2 Handling while the Meter is not in use

- Even if the power switch OFF, the battery capacity has been slightly consumed.
- In case the Meter will be not used for 1 month or more, it is recommended to store the Meter after removing the batteries from the case.

## 1 0 . MAINTENANCE & INSPECTION

Wipe dirt off with soft cloths, etc. after using the Meter.

Specially care to keep the probe connector, electrodes, groove between electrodes, etc. clean and dry.

Prevent the Meter from exposing to shock, direct sunlight, high temperature, high humidity, etc.

Select a dust free, clean and well-dried place for storing the Meter.

In case the Meter will be not used for 1 month or more, remove the batteries from the Meter.

## 1 1 . Miscellaneous

### 11-1 How to use the Moisture reading checker(option)

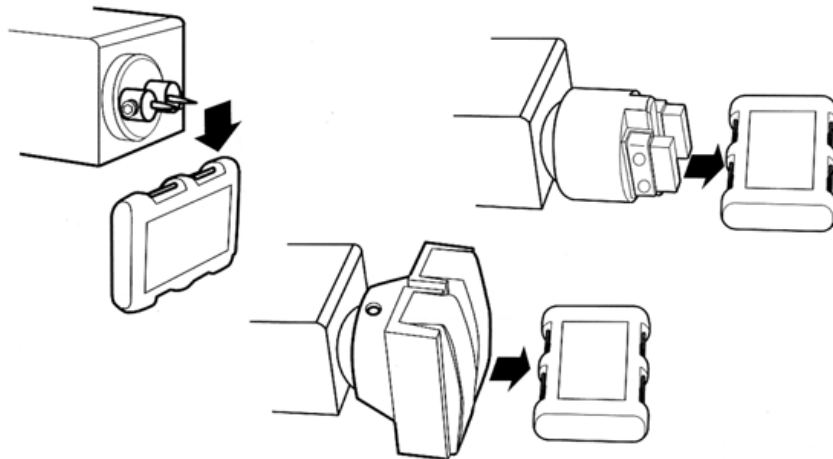
Press the electrode against the checker as shown in the following sketch in power ON condition.  
When the reading of the Meter matches the figure on the checker, the Meter's reading is acceptable.  
When the reading deviates from the checker's, please request our agent or the nearest our branch to calibrate the Meter. (subject to pay)

An object for checking by the Moisture reading checker differs face side from back side.

Use after surely confirming model, type of the Meter and measurement mode.

When checking the Meter, carry out after turning the temperature compensating function OFF.

Refer to 7.TEMPERATURE COMPENSATION for the details.



### 11-2 Cover for the needle electrode (Fitting/removing methods of the cover)

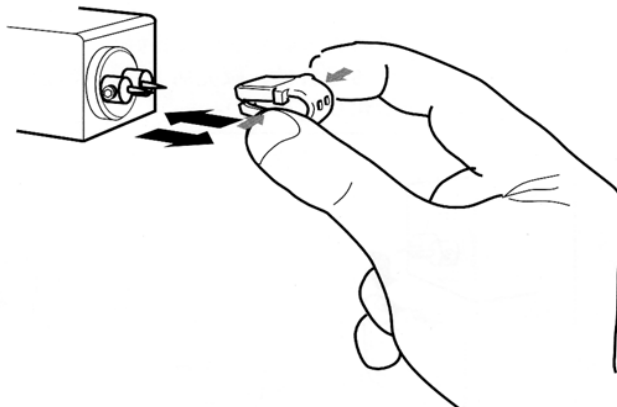
Fit the cover in the needle electrode spreading out by fingers holding both sides of the cover for the electrode.

When the cover is tight, fit by force prying it.

Carry out the same procedures for removing the cover.

Fitting / removing the cover by force causes an injury occasionally.

Attach or detach the cover with full care.



Be careful not to be injured with the needle electrode.

Show rooms:

You are welcomed to the show rooms located at the following places.

- Tokyo show room near the Otemachi station of the subway
- Osaka show room at Tenjinbashi-kitazume
- Nagoya show room near the Kurokawa station of the subway
- Fukuoka show room near the Gofukucho station of the subway

Products sold:

Sales of Coating thickness meter, Pinhole detector, Condensator, Viscosity cup, Moisture meter, Needle detector, Iron piece detector

Manufacturer:

Sanko Electronic Laboratory Co., Ltd.

Tokyo branch      Shibata Bldg., 2-6-4, Uchikanda, Chiyoda-ku,  
Tokyo 101-0047, Japan

Tel 81-3-3254-5031 Fax 81-3-3254-5038

Osaka branch      Konishi Bldg., 2-3, Sugawara-cho, Kita-ku,  
Osaka 530-0046, Japan

Tel 81-6-6362-7805 Fax 81-6-6365-7381

Nagoya branch    Meihoku Bldg., 3-11-27, Kinjo, Kita-ku,  
Nagoya 462-0847, Japan

Tel 81-52-915-2650 Fax 81-52-915-7238

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Fukuoka 812-0023, Japan

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Kawasaki 213-0026, Japan

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