

MR-200 II

—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 can be measured with an appropriate probe connected to the main unit.
(Probes: for wood, for paper, for mortar/plaster)
- The moisture contents of all kinds of objects can be compared in the MC Mode.
The measurements are made by selecting appropriate probe to measuring object in the electrical characteristic with the MC setting in the main unit.
Classifications/comparisons of dry/wet of measuring objects can be easily and quickly checked as the results are indicated with numerical values of 1 to 100.

Wood	Lumbers, building wood, fitting, packing, plywood, compiled wood, particle board, furniture, flooring, MD board, textile wood, wood works such as household goods.
Papers	Moisture control of stored high quality paper, craft paper, paper board, wall paper, cardboard, used paper, used magazine, etc.
Mortar/ plaster	Moisture control for mortar, concrete, plaster, etc. Quality control for coating, clothing, tiling, all kinds of water proofing, etc.
Moisture content	Moisture control with numerical value indications of fabric, food, synthetic products, ceramic, etc. Moisture contents are indicated with a value without unit, so that the measuring result can be judged by comparison of numerical values.

2. Specifications

■ MR-200 II (common specifications)

Measuring method	DC electric resistance method
Measuring range	Depending on connecting probe (option)
Switching of mode	Moisture (%), MC level (MC content)
Indication	LC display with Hold-function, measured value, kind of probe in use, temperature compensation, HOLD, High/Low limits, mean value, battery residue.
Average value indication	Max. 20 of average value of data (switch off to delete)
High/Low limits	(one or both of either can be set), any value selectable Moisture value; 0.1% increment, MC mode; 1 increment
Temperature compensation	Automatic temperature compensation (ON, OFF Switch)
Power source	Alkaline dry battery (1.5V) × 4, noninterrupt operation hours 30 hrs. (about), Auto-power OFF
Operating temperature	0 ~ 40°C (noncondensing)
Measurements & weight	80 (W) × 35 (H) × 150 (D) mm, 200g
Accessories	Carrying case

■ MR-200 II connecting probe

• Probe for wood

Type	TG-PA (standard probe for wood)
Measuring range	3.5 ~ 50.0 % Broad leaf tree (Hard) / Conifer (Soft) switchable MC-3 (moisture content); 1 ~ 100 levels
Measurements & weight	50 (W) × 30 (H) mm × 135 (D), 320g
Accessories	Hexagonal wrench, spare needle

• Probe for paper

Type	KG-PA (standard probe for paper)
Measuring range	3.5 ~ 40.0 % MC-2 (moisture content); 1 ~ 100 levels
Measurements & weight	50 (W) × 40 (H) mm × 150 (D), 350g
Accessories	Hexagonal wrench, spare needle, spare needle

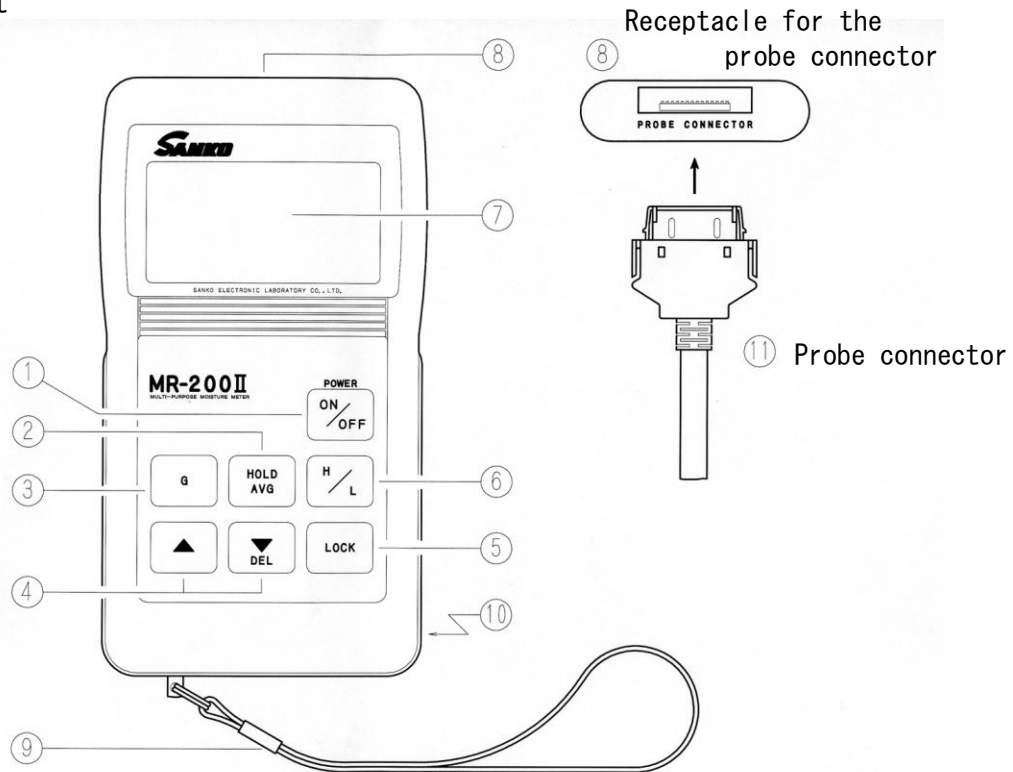
• Probe for mortar/plaster

Type	PM-PA (standard probe for mortar/plaster)
Measuring range	0.8 ~ 15.0 % Mortar/plaster switchable MC-1 (moisture contents); 1 ~ 100 levels
Measurements & weight	50 (W) × 30 (H) mm × 130 (D), 310g

※Other than the above mentioned 3 kind of probes (PA types), we will be able to prepare and produce optional probes suitable for measuring objects. Please contact us for detail.

3. Names of parts

3-1. Main unit



① Electric power (POWER)

Switch to ON or OFF.

When probe is not connected to the main unit, LCD screen indicates [PE], probe Error, on the reading and switches Power OFF.

Never fail to connect probe before switching to ON.

② HOLD/AVERAGE (HOLD/AVG) key

Every press of this key switches to ON or OFF alternately. A lengthy press (about 1 sec.) switches to measurements of Average value statistics mode (Max. measuring points 20). Finishing measurements of full 20 points turns indications to Average value automatically. Press again this key when stopping measurements to get Average value within 20 times.

A lengthy press (about 2 sec.) releases this mode and returns to common measurement mode. And switching off Power can release the mode.

③ Mode key (G)

TG-PA: Switch moisture measured value in wood (broad leaf tree HARD/conifer SOFT), and MC-3 mode.

KG-PA: Switch moisture measured value in paper, and MC-2.

PM-PA: Switch moisture measured value mortar/plaster, and MC-1 mode.

④ Setting key (▲, ▼/DEL)

This is a key to set High/Low limits.

「▲」、 「▼」 key has a 0.1% notch, (a 1 notch for MC mode) for Up/Down.

Keeping press goes to fast winding (fast rewinding).

A lengthy press of 「▼/DEL」 key (about 1 sec.) at Average value statistics mode can delete only measured value that was taken latest.

Switch Auto-Temperature-Compensation function to ON or OFF, Refer to 「7. about Temperature Compensation」 for details.

⑤ Lock key (LOCK)

Press Lock key to lock all keys except Power SW key① preventing from misoperation.
Switch to OFF to release.

⑥ High/Low limits key (H/L)

Set at High/Low limits mode.

Set a desired value with value setting key④.

⑦ LCD Reading

Indications: connecting probe, measured value, High/Low values, measuring mode,
battery residue.

⑧ Probe connector receptacle

This is a receptacle to connect a probe to.

⑨ Hand strap

Be sure of passing your wrist through the hand strap to prevent the unit from dropping.

⑩ Battery case (lower backside)

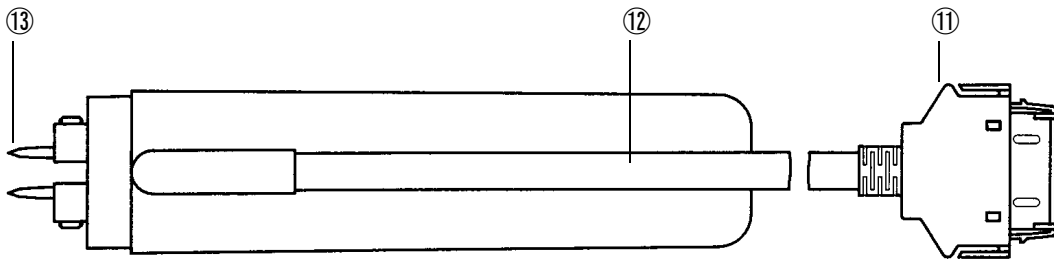
This is to store batteries.

⑪ Probe connector

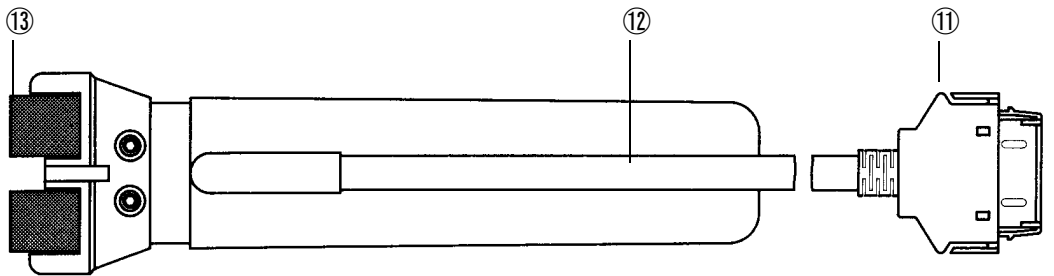
This is a probe connector to connect to a receptacle of the unit.

3 - 2. Standard probe

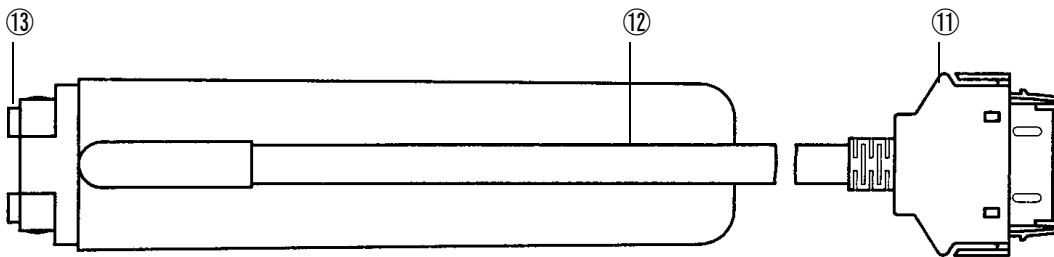
Probe for wood (TG-PA)



Probe for paper (KG-PA)



Probe for mortar/plaster (PM-PA)



①Probe connector

②Probe cord

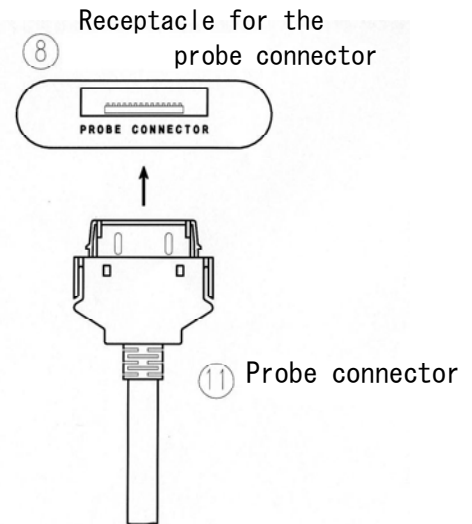
③Electrode (probe for wood (needle electrode)
probe for papaer (SB electrode/needle electrode)
probe for mortar/plaster/rubber electrode)

4. How to use

4-1 Connecting (disconnecting) probe

(Make sure that Power is OFF)

- To connect the probe:
 - Carefully insert the probe connector ⑪ of the using probe to the bottom into the receptacle for the probe connector ⑧.
- 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 ⑪.
- If the cord is pull out of the receptacle ⑧ without releasing the locks, it causes breaking of the cord or the connector.



4-2 Power ON - OFF

- Press the power switch ①, then [LLL] and the kind of connected probe is indicated on the LC display ⑦ with a beeping sound.
- Press the power switch again to switch the power OFF with a beeping sound and the indication on the reading disappears.
- The batteries consumption caused by forgetting of turning the power OFF is prevented with the auto power OFF function.

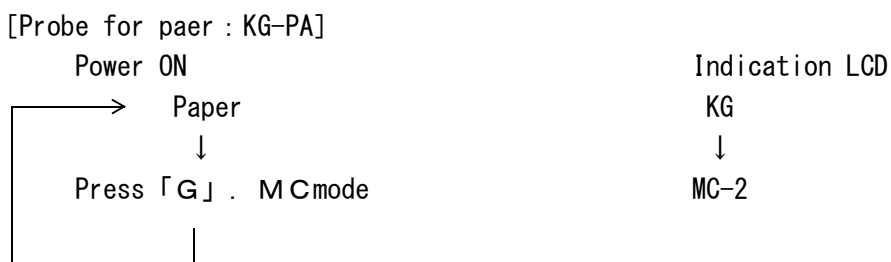
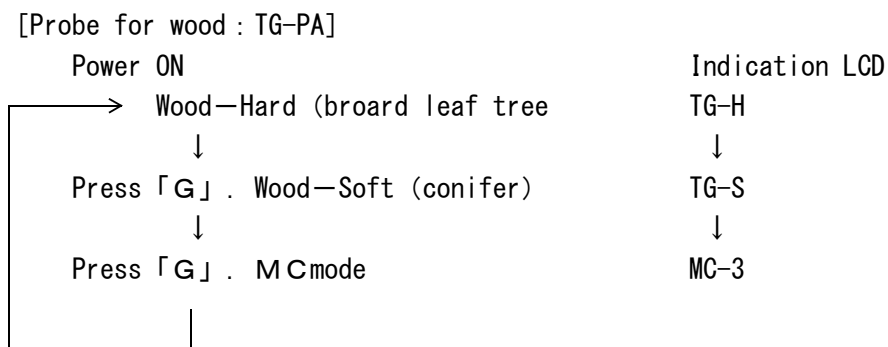


When the measurement is not carried without interruption for about 3 minutes, the power turns OFF automatically.

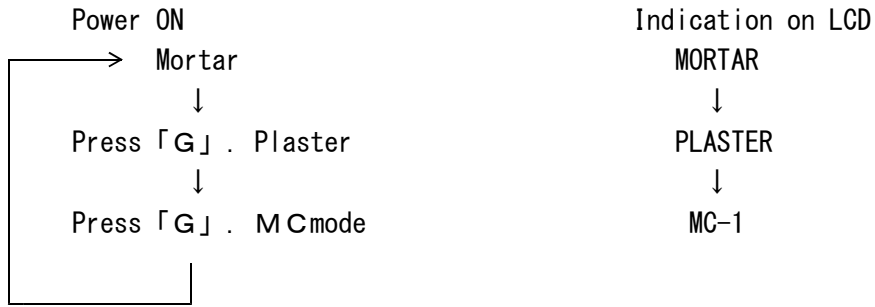
- ★ When switching over the power switch ① ON or OFF, operate the switch with an interval of 3 to 5 seconds to prevent malfunction.

4-3 Switching the measurement mode

- Normally the initial measurement mode of the selected probe is indicated on the reading..
- The measurement mode is switched at each press of the mode key ③ [G] as shown on the following:



[Probe for mortar/plaster : PM-PA]



- Mode returns automatically to the initial measuring mode when Power turns from OFF to ON.
- ★ Be sure of confirming measuring mode when switching Power to ON.

4-4 Switching Hold-mode

When HOLD/AVG key② is pressed, the displayed measured value is held until the next measurement. Hold mode turns to ON or OFF at each pres. when ON, [HOLD] is indicated on the reading on LCD⑦.

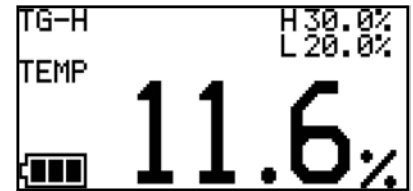


4-5 Setting High/Low limit values

High limit value & Low limit value can be set as per following procedures.

Operation	Indication
Press 「H/L」 key⑥.	High limit mark [H] blinks with a beeping sound.
Press/hold 「▲」 key④.	High limit values in the column increase like 3.5·3.6·3.7·3.8···. (wood, paper. In case of mortar, 0.8·0.9·1.0·1.1·are indicated)
Release the 「▲」 key④ when the setting value has reached to the high limit. When exceeding the limit, press 「▼」 key④ to equate with the value.	
Press 「H/L」 key⑥.	It beeps to stop the blinking of high limit mark [H] , indicating a setting value and Low limit value mark [L] blinks.
Press and hold 「▲」 key④.	Low limit values increase like 3.6·3.7·8 1.·3.9··· (wood, paper. In case of Mortar, 0.9·1.0·1.1·1.2··are indicated)
Release 「▲」 key④ when the setting value has reached to the low limit. When exceeding the limit, press 「▼」 key④ to equate with the value	
Press 「H/L」 key⑥.	It beeps to stop the blinking of low limit value mark [L] , indicating a setting value and both high/low limit setting finished to return to measuring mode.

- When upper & lower limit values have been set and the measured value exceeds either limit value, the buzzer beeps, beeps, beeps and [H] or [L] and measured value blink alternately.



- When the resetting of High/low limit values is needed, repeat above mentioned procedures after pressing [H/L] key ⑥ again. Ex: High/Low limit setting for wood

- ※ 1. When High limit value is not needed, press [H/L] key again after pressing [H/L] key ⑥ first. Then [H] showing the High limit value is deleted and mark [L] showing the Low limit value blinks instead. The low limit value is set at this step.
- ※ 2. When Low limit value is not needed, press [H/L] key ⑥ again while [L] showing the Low limit value blinks after setting the high limit value. Now, [L] showing the Low limit value deleted and only the High limit value is set.
- ※ 3. When both High limit value and Low limit value are needed to delete, turn the power OFF. When the power OFF by the auto power off function, both High and Low limit values also deleted.

4-6 Switching key lock mode

All keys except the power switch key ① are locked by pressing the lock key ⑤ and the misoperation can be avoided. The locking condition is released by turning the power OFF.

5. MEASUREMENT

- ※ Connect the probe suitable for an object (wood, paper, corrugated cardboard, mortar & plaster) to be measured.

5-1 Real time measurement

1. Switch Power ① ON and confirm the indications on the LC display ⑦.

For wood = [TG-H]

For paper = [KG]

For mortar = [MORTAR]

And each connected mode is indicated on the reading.



Example: In case of connecting a probe for wood

- ★ When probe is not connected, probe error [PE] is indicated on the LCD and the buzzer beeps, beeps, beeps to switch Power to OFF.
 - ★ When the power switch ① ON with the probe pressing against the object to be measured, once [LLL] is indicated on the LCD and the measured value is indicated in 2 to 3 seconds.
2. Press the mode key ③, select the mode suitable for the object to be measured. (Refer to 4. OPERATING INSTRUCTIONS, 4-3 Switching the measurement mode.)
 3. Press the electrode ⑬ with a constant force against the object to be measured and read the indicated value after indication became stable. (When the 2-needle electrode is used, stab it into the object to be measured.)
 4. When Hold/Average key ② is pressed, the indications on the display are held when the electrode is removed from the object. Hold condition is released by pressing the hold key ② again.

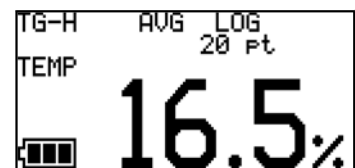
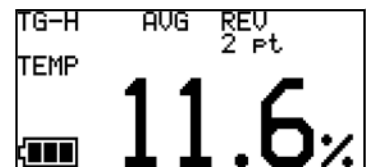
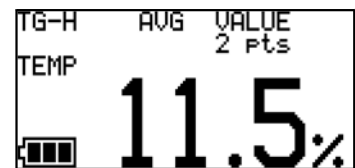
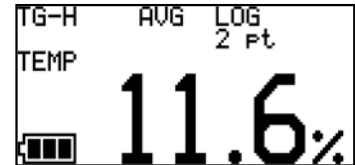
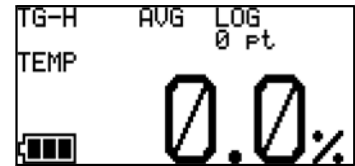
Note: In case the measurement is carried out with the probe hammered into the wood to be measured:

Release and hold the Hold mode until hammering the probe is completed. And be sure of switching to the Hold mode when the measurement is taken after completion of the hammering.

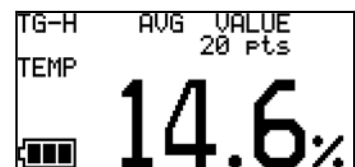
(When the hammering is carried out in Hold mode, it causes measurement error because the data while on hammering is held and indicated)

5-2 Average value indication (temporary memory) measurement

1. Press and hold HOLD/AVG key② for (about 2 sec.) to take a mean value indication measurement with temporary memory (Max. measurement points with temporary memory is 20point)
2. This temporary memory is deleted when Power turned to OFF. (Auto-power OFF has the same as well))
3. Average value indications measurement is taken at Hold mode. Measuring data are like [1 pt]、[2 pt]、...and, up to [20 pt] at Max.
4. Press HOLD/AVG key② while in measurements to turn to Average value indication mode and indicate [AVG VALUE], [X and X pts] and Average value on the reading⑦ measured up to the point when measurements have been taken. The confirmation is made by pressing 「▲」, 「▼」 key④ to call data memorized temporarily.
(1~20pt) called under 「REV」 on the bottom are indicated and each measured data is confirmed. Then, [HOLD] is not indicated.
* While in this mode, Auto-Power is not activated.
* When in AVERAGE value mode, operation can not return to measuring process. When returning, refer to 7 below and make a setting again.
5. When reading the wrong data in measuring AVERAGE value indication, press and hold 「▼/DEL」 key④ for a long period (about one sec.) to delete one last data. ※Measuring date of one last entry only is possible).
6. When measuring points reached to 20 points, it switches automatically to AVG mode. (this 20th data can not be deleted by key operation)
To return to measuring operation, release this mode.
7. To release this mode, press and hold again HOLD/AVG key② for a long (about 2 sec.).



one second later.



- ◆ While in measuring AVERAGE value indication, Power Source key① and HOLD/AVG key② only can be used.
- ◆ When taking this AVERAGE value indication measurement under use of High/Low limit function, the High/Low limits setting function is useless.
However even under this conditions, as far as Power Source is not cut, the High/Low limit values are kept memorized, and when AVERAGE value indication measurement finished, It returns to High/Low limit values setting mode.

6. MEASUREMENT IN THE MOISTURE COMPARISON (MC) MODE

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

Select the connecting probe based on the electric characteristics of the object and usage. The changes of the electric resistance caused by the dry or the moisture of the object are indicated by numeric values 「0 to 100」. Classification and comparison can be easily checked by obtaining the relative comparison values.

Using probe	Measurement mode	Resolution
For TG	MC-3	0 to 100 by a 1 notch
For KG	MC-2	0 to 100 by a 1 notch
For PM	MC-1	0 to 100 by a 1 notch

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 initial setting of automatic temperature compensation is set at ON and [TEMP] on the LCD reading is indicated. (There is no temperature compensation with MC mode.)



- The indicating value is automatically temperature-compensated based on 20°C.

- When a measuring object is of high temperature due to dry treatment by heating, etc, take measurements by switching auto temperature compensation function to OFF.

- Temperature differences between main unit and probe may cause measuring errors.

- Switching ON/OFF of automatic temperature compensation function is activated by pressing value setting key④ 「▲」 and 「▼」 at the same time. And then on the LCD reading⑦, [TEMP] is indicated or not depending on the pressed key, which shows mode switched or not.



- Switching mode does not affect ON, OFF of automatic temperature compensation and the setting is held. Ex:when compensation for wood is OFF. In case automatic temperature compensation function is OFF, refer to compensation below.

◎for wood

Temp. (°C)	Moisture (%)		
	4 ~ 11	12 ~ 20	21 ~ 30
0 ~ 2	+2.0	+2.0	+3.0
2 ~ 4	+1.5	+2.0	+2.5
4 ~ 6	+1.5	+1.5	+2.0
6 ~ 8	+1.0	+1.5	+2.0
8 ~ 10	+1.0	+1.0	+1.5
10 ~ 12	+1.0	+1.0	+1.0
12 ~ 14	+0.5	+0.5	+1.0
14 ~ 16	+0.5	+0.5	+0.5
16 ~ 18	0	+0.5	+0.5
18 ~ 20	0	0	0
20 ~ 22	0	-0.5	-0.5
22 ~ 24	-0.5	-0.5	-0.5
24 ~ 26	-0.5	-0.5	-1.0
26 ~ 28	-1.0	-1.0	-1.0
28 ~ 30	-1.0	-1.0	-1.5
30 ~ 32	-1.0	-1.5	-2.0
32 ~ 34	-1.5	-1.5	-2.0
34 ~ 36	-1.5	-2.0	-2.5
36 ~ 38	-2.0	-2.0	-3.0
38 ~ 40	-2.0	-2.5	-3.0

※Extracted from 「Electric moisture meters」 /Nikkan Kogyo Shinbun issued in 1960

◎In case of paper, mortar/plaster

Measuring temperature	Compensation to indicated values
Above 20°C	-0.1% per 1°C
Below 20°C	+0.1% per 1°C

8. NOTES FOR MEASUREMENT

The electric resistance type Moisture meter utilizes the characteristics that the electric characteristics of an object reacts specially sensitively on its moisture contents, but the co-relations is not perfectly related in one-to-one ratio. When its composition and proportion differ or change in quality, when contamination, deformation, salty etc exist, when special processing and chemical treatment are performed even with the same object, it is necessary to avoid measurement at these places or to use values after compensating or averaging. When the measured values are compensated, it is general to compensate based on the moisture measurement method by a dry method.

9. Battery

9-1. Indication of voltage drop

When Battery mark on the left bottom on LCD reading⑦ becomes one block, it shows that battery run out. Slide down and open the lid of battery case⑩ on the back side and replace all with new batteries. (ensure battery life). Alkaline batteries, LR03x4 pcs.

When operated further with one block indication, battery frame only is indicated and switched Power to OFF in 5 sec. and will be no more useful.. Immediately replace with new ones.

◆Battery residue indication



Full



Half full



Almost empty



About 5 sec. Power switches to OFF.
Immediately replace with new ones.

9-2. Handling while meter is not in use.

- When Power source is OFF, a slight amount of battery will be consumed.
- When not in use more than one month, batteries should be removed from the battery-case to be stored.

10. Maintenance and 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 Meter from exposing to shock, direct sunlight, high temperature, high humidity, etc.
- ◆ Select a dust free, clean and well-dried place for storing 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 Moisture reading checker (option)

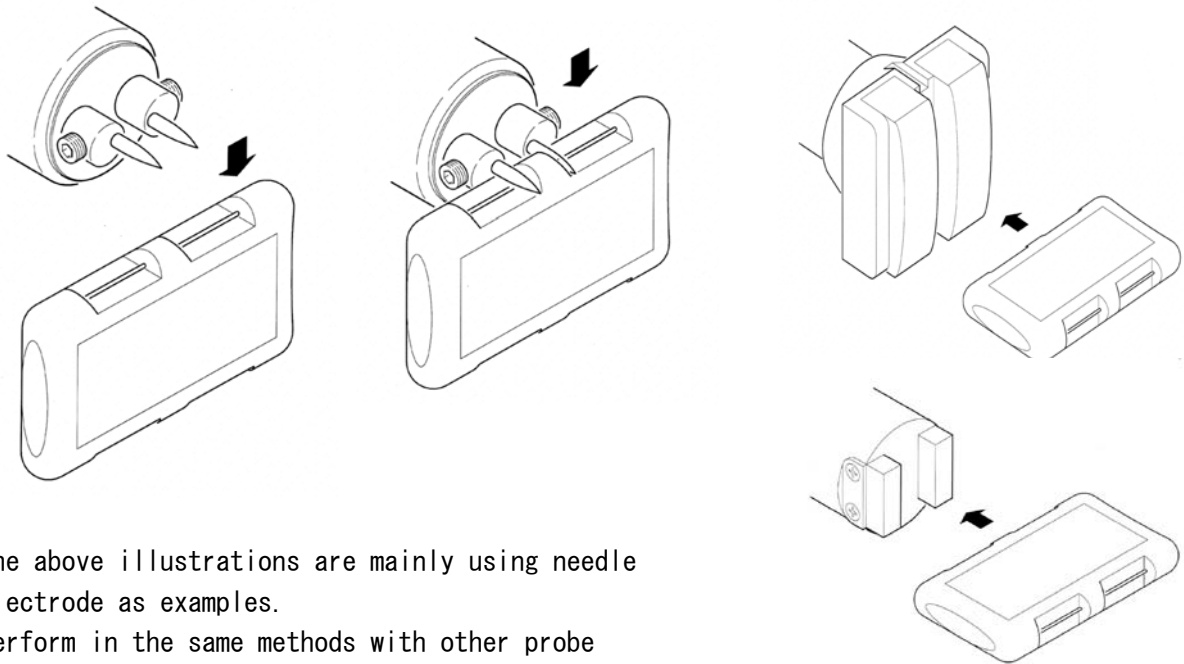
Press the electrode against the checker as shown in the following sketch with power switched to ON. When the reading of the Meter matches the figure on the checker, the Meter's reading is acceptable. When the reading deviates from the checker's, please request our agent or our nearest branch to have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

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

Refer to 7.TEMPERATURE COMPENSATION for the details.

※ Moisture Reading Checker has 2 different checking points in a front side and a back side.

Use The Checker after ensuring type of probe and measurement mode suitable to an object.



The above illustrations are mainly using needle electrode as examples.

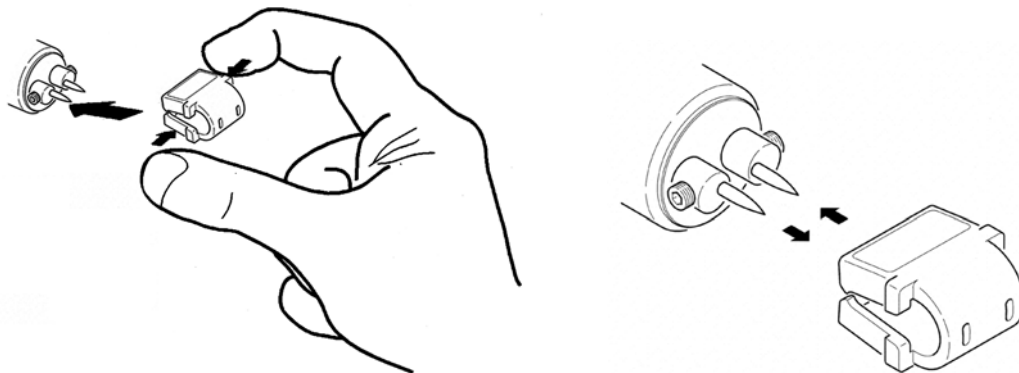
Perform in the same methods with other probe

1 1 – 2. Cover of Needle electrode (fitting/removing methods of the cover)

Attach the cover over to the Needle electrode by spreading out and holding both sides of the cover with fingers.

When the cover is tight, fit the cover by pushing and prying it.

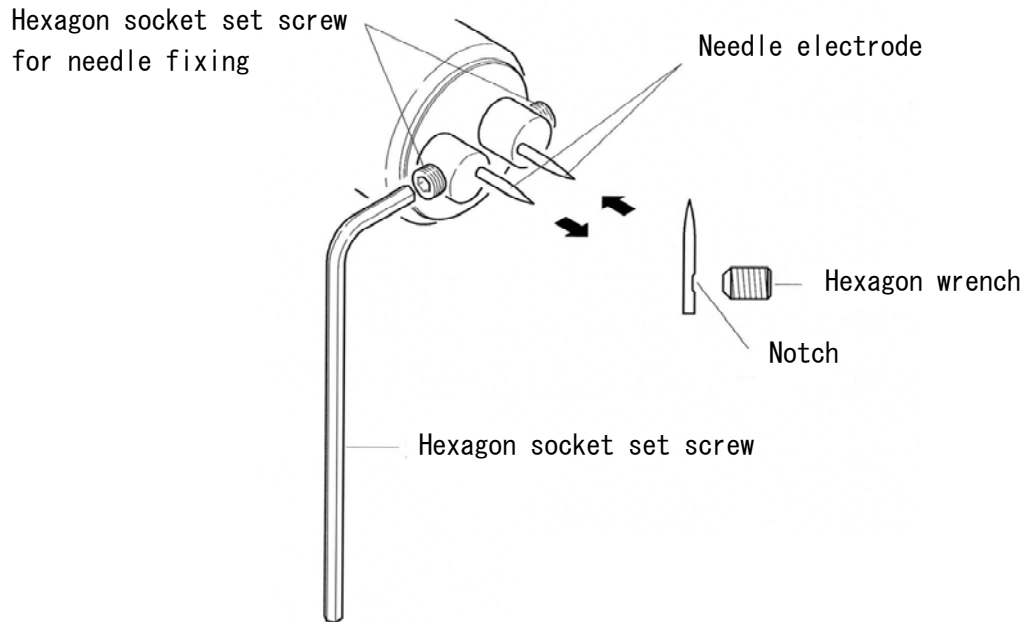
Perform in the same procedures to remove the case. Performing by force may cause injuries. Attach /detach the cover with full attention.



1 1 – 3. Replacement of Needle electrode

Use a furnished accessory hexagon wrench to loose a hexagon socket set screw ⑭ for replacement of Needle electrode⑫.

Make sure that the hexagon socket set screw for needle fixing is set to strike the notch face of the electrode, otherwise it may cause the electrode to loose and drop off the body



Jun.2010 revised

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,
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