

**Jute Moisture Tester**

**HX-400**



**Operating Manual**

## Jute Moisture Tester Safety Precautions

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If the safety precautions for the Jute moisture tester are not observed, injuries or damage to property may result. While the safety of the product has been given considerable attention, please read the precautions in the operating manual and use the instrument properly.

- Please observe the safety precautions.

Please read the precautions noted in the operating manual.

- Do not use if broken.

If the tester breaks or malfunctions, please consult our repair service.

- Meaning of warning symbols.

In order to prevent damage resulting from erroneously operating the equipment, the following symbols are indicated in the operating manual and on the product. The following are their meanings.



### **Caution**

This symbol for caution indicates something that should be strictly observed in order to use the product safely.

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# 1. Features

- Comes with 2 types of sensors

Includes a pressure sensor for measuring each jute separately and a 2 needle probe that allows jute to be measured in stacked formation.

- Handheld device with large built-in display

The portable handheld device features a large 76mm x 52mm display that's very easy to read.

- Bias adjustment

The moisture value can be corrected corresponding to each calibration in the range from -9.9% to +9.9%.

- Auto power off

When inactive, the unit will automatically turn itself off after approximately 5 minutes to avoid draining the battery.

- Alarm setting

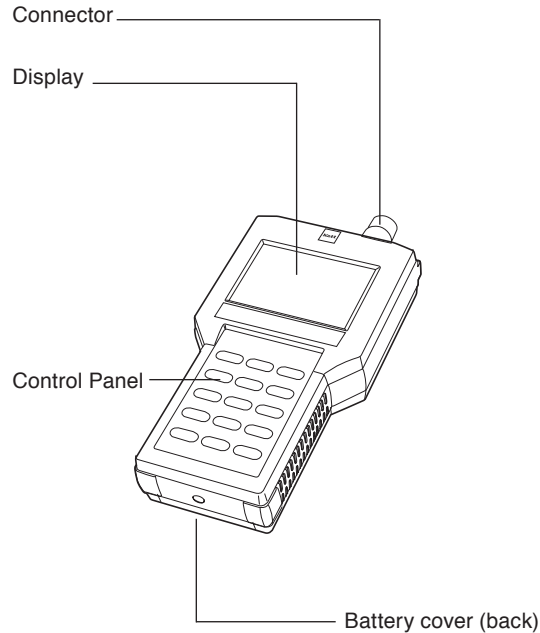
Set any moisture value, and an alarm will sound if the measured moisture value is higher than the set moisture value.

## 2. Specifications

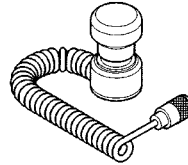
Measurement Principle	: Electrical resistance
Applications	: Jute bags/Jute yarns
Calibrations	: 2 types (for pressure sensor (jute) use and 4/12 inch 2 needle probe use)
Standard method	: JIS L1095
Measurement Range	: 6 to 100% (dry base)
Measurement Precision	: Standard error 0.9% (moisture values of 20% or lower)
Display	: Digital (LCD)
Resolution	: 0.1%
Operating Temperature Range	: 0 to 40°C
Functions	: Moisture value bias adjustment (−9.9 to +9.9%), average value, Upper limit alarm, Auto power off (automatically turns off after approximately 5 minutes),
Power Supply	: 1.5 V batteries (AA alkaline) (6)
Power Consumption	: approximately 0.45 W
Dimensions	: 110 mm (W) x 210 mm (D) x 50 mm (H)
Weight	: 0.5 kg
Accessories sensor	: pressure sensor (jute) and 2 needle probe (grip and two 4/12 inch measurement needles)
Accessories	: wrench, shoulder strap, 1.5 V battery (AA alkaline) (6), carrying case, operating manual
Options	: Printer (VZ-330), printer connecting cable (VZC-26)

### 3. Part Names

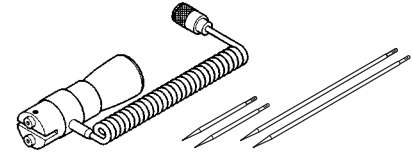
#### <Main body>



#### <Accessories sensor>

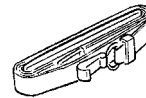


Pressure sensor  
(jute)



2 needle probe  
(grip and two 4/12 inch measurement needles)

#### <Accessories>



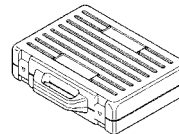
Shoulder strap



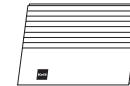
1.5 V battery (AA) (6)



Wrench

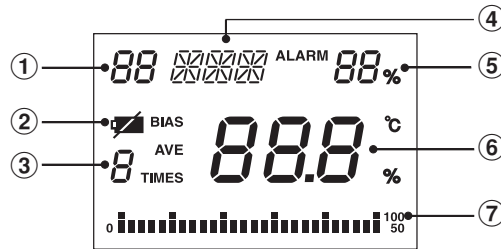


Carrying case



Operating manual

## 4. Display



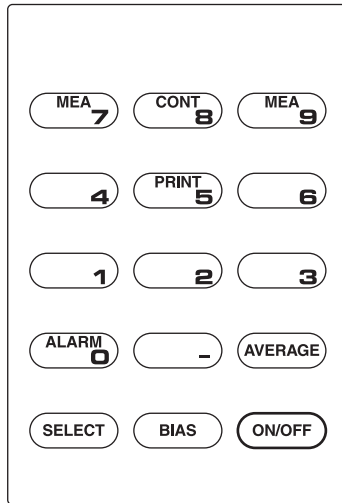
### Description of display

Item No.	Name of display area	Description
①	Calibration number display	Displays the number of the calibration being used.
②	Battery indicator	Comes on when battery is depleted.
③	Number of measurement	Displays the number of times measured.
④	Name of calibration	Displays the calibration name.
⑤	Alarm set-point value	Displays the set-point value for the alarm for the upper moisture limit that was set.
⑥	Moisture value	Displays the measured moisture value (%).
⑦	Bar graph	Displays the measured moisture value by means of a bar graph. Displays up to 50% in 2% increments.

## 5. Description of Keypad

- Of the numeric keys of 0 to 9, some combine numerical input and other functions.

### <Control panel>




Key	Function
ON/OFF	Power On and Off
BIAS	Bias correction
SELECT	Selection of a calibration
AVERAGE	Average value
-	Entering a minus input
ALARM 0	Setting of upper alarm limit
PRINT 5	Setting printer output
MEA 7, MEA 9	Use for measuring. You can use either the left or right side key.
CONT 8	Continuous measurement

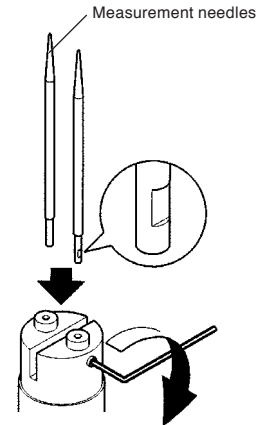


## 6. Directions

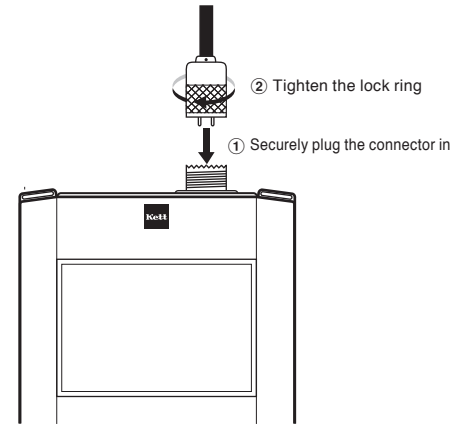
### 6-1. Before Measurement

1. The unit is powered by six 1.5 V batteries (AA, alkaline). Remove the rear battery cover, place the batteries into the compartment taking care to correctly orient the positive ( $\oplus$ ) and negative ( $\ominus$ ) terminals. Then attach the battery cover.
-  is displayed when the batteries are depleted. Replace all six with new batteries.

2. When using the 2 needle probe, attach the measurement needles to the grip. Insert the measurement needles into the sockets at the end of the grip and tighten the fixing screws with the hexangular Allen wrench (included). When inserting, orient the concave part of the measurement needles so that they come in contact with the head of the screw as shown in the diagram.



3. Plug the probe connector into the socket on the main unit, and fasten and secure the lock ring.



4. Prepare the jute sample to be measured. Allow the sample to equilibrate to the same temperature as the main unit.

- Errors may occur when there is a large difference in the temperature of the jute and the temperature of the unit. To make more accurate measurements, allow the temperature of the jute to equilibrate with the temperature of the unit.

## 6-2. Measurement Method

1. Press the **ON/OFF** key to turn on the power. All elements of the LCD will be displayed for approximately three seconds.

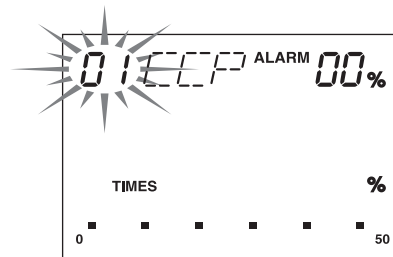
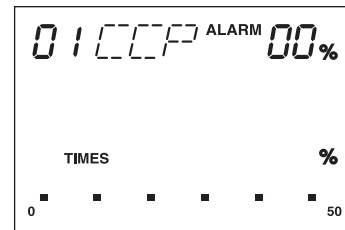
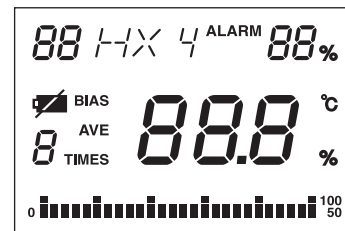
Subsequently, the “Calibration number”, “TIMES”, and “%” will be displayed.


- If the display shows something other than that described above, there may be a problem with the unit. Refer to p. 19 “7. Error Display”.

2. Select the calibration number for the appropriate sensor.

First, press the **SELECT** key. The calibration number will blink. Then, enter a 2-digit calibration number.

Number	Sensor	Calibration name	Measuring range(%)
01	Pressure sensor (jute)	CCP	6 to 100
02	Needle probe	4NP	6 to 100



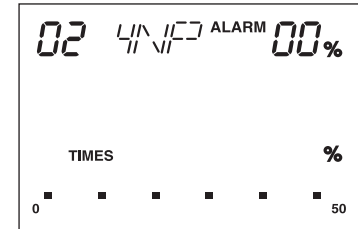
- The  symbol denotes a blinking display.

Example: Entering the value 02

Press the **ALARM** key. The first row will start blinking.

Then, press the **2** key. "02" will be displayed.

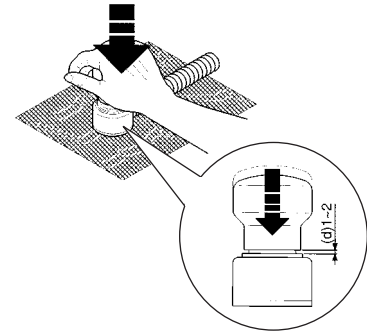
- Once calibration is set, it will be maintained in memory unless changed even when the unit's power is off.



3.Measure the jute according to the method for each sensor.

#### <Pressure Sensor (jute)>

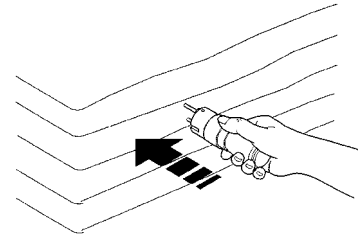
Place the jute on a level surface, push the moveable portion's distance (d) until it's 1 to 2mm and, with it touching as shown in the diagram, press the **MEA 7** key.




#### <Needle Probe>

With the measurement needle inserted into the pile of jute, press the **MEA 7** key.


- The **MEA 7** key on the left and the **MEA 9** key on the right both have the same function so it doesn't matter which one you press. Please use the one that's easier to press.



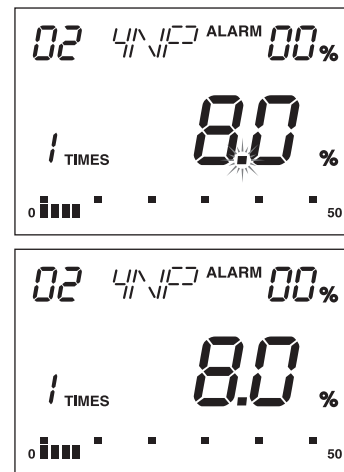
4. Press the  key. The decimal point will blink. After about 3 seconds a “beep” will sound and the “Number of measurement times”, “Moisture value”, and “Bar graph” will be displayed.

- The bar graph displays a 50% full scale in 2% increments.
- If the moisture value is outside of the measuring range, “HI” will be displayed if the value higher than the measuring range, and “LO” will be displayed if it is lower.

5. Remove the probe from the jute. At this time, the moisture value will remain on display. To continue to make further measurements, start the procedure from Step “3. Measure the jute according to the method for each sensor ”.



When finished making measurements, press the  key to turn off the power.

- With it’s auto power off function, the unit will automatically turn itself off when inactive after approximately 5 minutes.




- The  symbol denotes a blinking display.

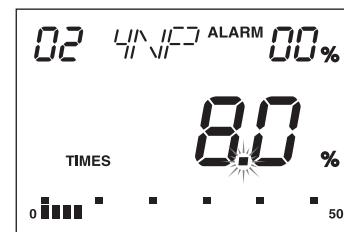
## 6-3. Setting the Measurement Mode

There are two measurement modes: “Normal measurement mode” and “Continuous measurement mode”. Immediately after pressing the  key and turning on the power, the unit will be set to “Normal measurement mode”. If the unit is set to “Continuous measurement mode”, measurements can be made without pressing the  key for each measurement.


### 1. Continuous measurement mode setting


In step “6-2. Measurement Method 4. Press the...”, press the  key. The decimal point will blink, and the moisture value and bar graph will be displayed.

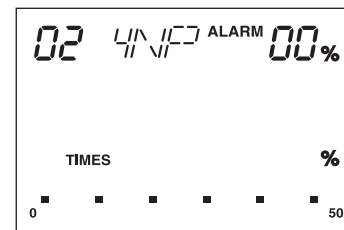
- If the sample is not held against the sensor electrodes, or if the measured value is outside of the measuring range, either “HI” or “LO” will be displayed, and the decimal point will blink.



### 2. Canceling the continuous measurement mode

Press the  continuously for at least 2 seconds until a “beep” sounds. The display will momentarily go blank. When you take your finger off the key, the unit will return to normal measurement mode.

- Pressing the  key turns off the power and automatically cancels this mode.
- Note that the battery life is shorter in continuous measurement mode.

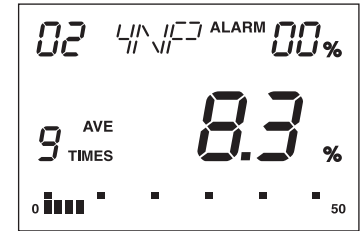


• The  symbol denotes a blinking display.

## 6-4. Displaying the Average Value

When the number of measurements is from 2 to 9, and you press **AVERAGE**, the “AVE”, “average value”, and “number of measurement times” will be displayed. At this time, the “AVE”, “average value”, and “number of measurement times” remain displayed, but if you proceed to make a measurement, the “number of measurement times” resets to “1”.

- If the number of measurement times exceeds 9, the measured value up to that point resets and measurement starts from measurement number 1.
- The average value cannot be determined when making measurements in continuous measurement mode.



## 6-5. How to make Bias Adjustment

The calibrations for this unit were prepared by determining the relationship between the moisture of jute resulting from a drying method and the electrical resistance of the jute, and then statistically processing these results. However, depending on various conditions, there are cases where the reference measurement method and the moisture value do not agree. In these cases, a moisture value bias adjustment can be made (−9.9% to 9.9% with respect to each calibration) by the following method.

1. Press the **SELECT** key and select the calibration.

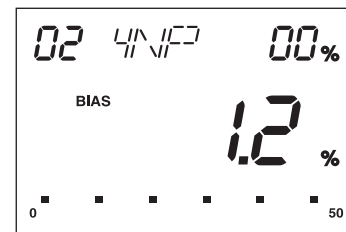
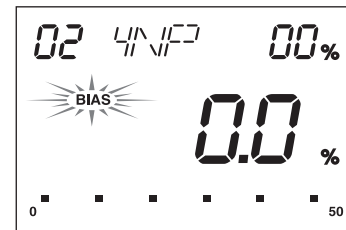
2. Press the **BIAS** key. The “BIAS” indicator will blink, and the previously entered bias value will be displayed. The bias is initially set to “0.0%”.

3. Enter the bias value.

Enter a 2-digit number. To enter “1.2%”, press the **1** key and the **2** key in succession. For a negative value, press the **-** key before the numbers.

4. Press the **MEA** key to make measurements.

- If a bias adjustment value has been entered, “BIAS” will be displayed during measurements.
- To cancel the bias adjustment value, enter “0.0%”.




• The  symbol denotes a blinking display.





## 6-6. Setting the Alarm


An upper limit moisture alarm can be set. When jute is measured having moisture higher than the set moisture value, the alarm sounds with a beeping tone.

1. Press the  key.

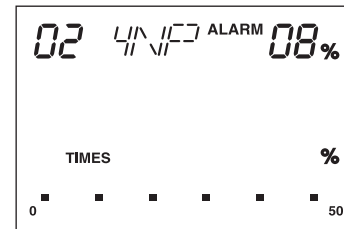
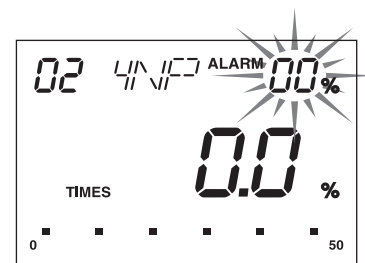
The numbers to the right of “ALARM” will blink.

2. Enter the alarm value.

Enter a 2-digit number. To enter “8%”, press the  key and the  in succession.

3. The set value for the alarm is displayed. Then, press the  key to make measurements.

- To cancel the set value for the alarm, enter “0.0%”.



- The  symbol denotes a blinking display.

## 6-7. Printer Output

Measured values can be printed out by using the optional printer (VZ-330). The output content is “calibration number”, “number of measurement times”, “moisture value”, and “average moisture value”.


### 1. How to set up

Press the  in normal measurement mode.

“P” will be displayed to the right of “TIMES”. Set up is complete.

- The timing of the output is just after the measurement or just after the display of the average value. However, there is no output if the measured value is outside the measuring range.
- After setting up the printer (VZ-330, sold separately), connect the printer cable (VZC-26, sold separately). Refer to the operating manual for the printer for how to set up the printer.

### 2. How to cancel the settings

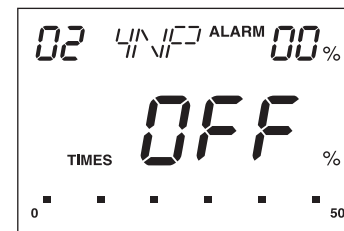
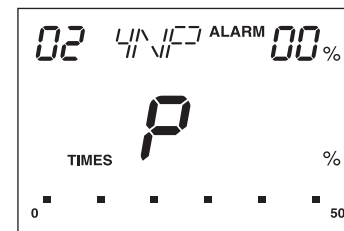
Press the  key in normal measurement mode.

“OFF” will be displayed to the right of “TIMES”. The settings have been cancelled.

- The settings in both 1 and 2 will be retained in memory when the power is turned off.

[Printout example]

HX-400	CALIBRATION	No.01
TIMES	[%]	
1	8.8	
2	8.9	
3	8.7	
4	9.0	
5	8.9	
6	8.8	
AVERAGE	8.9	



## 7. Error Display

When there is a problem with the unit or with the measurement conditions, the following errors will be displayed for 4 seconds, and then the power will turn off.

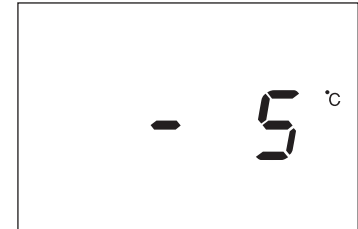
1. There is a problem with the temperature sensor. Servicing is required.

A digital display showing the error code "001" in a seven-segment font.

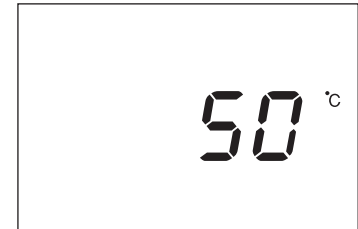
2. When either of the errors on the right are displayed, there is a problem with the electronic circuit used for moisture measurement. Servicing is required.

A digital display showing the error code "002" in a seven-segment font.A digital display showing the error code "011" in a seven-segment font.

3. The measurement cannot be made because the temperature of the unit is below  $-5^{\circ}\text{C}$ . Bring the temperature of the unit up to the operating temperature range (0 to  $40^{\circ}\text{C}$ ), and make the measurement again.



4. The measurement cannot be made because the temperature of the unit is above  $50^{\circ}\text{C}$ . Bring the temperature of the unit down to the operating temperature range (0 to  $40^{\circ}\text{C}$ ), and make the measurement again.



## 8. Calibration List

Number	Sensor	Calibration name	Measurement range(%)
01	Pressure sensor (jute)	CCP	6 to 100
02	Needle probe	4NP	6 to 100

**MEMO**





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