

NIR Moisture Analyzer KB-30



Operating Manual

Thank you for purchasing this product.
Please read the operating manual carefully and use this product properly.

Safety Precautions

Improper use of the NIR Moisture Analyzer in violation of the following safety notes may result in death, injury or damage to property due to fire, etc. While the safety of the product has been given considerable attention, read the precautions in the operating manual and use the instrument properly.

■ Observe the safety precautions.

Read the precautions noted in the operating manual.




The safety measure of the unit may be impaired if instructions are ignored during use.

■ Do not use if broken.

If you suspect a problem or malfunction in the unit, make sure to contact the vendor.

■ 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. These symbols have the following meanings.

	Warning	Failure to observe these items may lead to death or injury to the user.
	Caution	Failure to observe these items may lead to injury to the user or damage to property.
	Note	Items which the user should be aware of in order to use the unit safely.

Caution Symbols



Fire hazard



Burn hazard



Electric shock hazard

Prohibition Symbols



Prohibited



Do not disassemble



Do not expose to water

Symbols Requiring User Action



Required action









Disconnect plug from electrical outlet









Grounding

	Warning		
		Fire hazard	Electric shock hazard

-  • Please do not use the product in the location where there is gas or liquid that have explosive or flammable. It may cause explosion, fire, or electric shock.
-  • This product should be used only with the applicable power supply voltage. Using this product with incorrect voltage may cause the product to be overheated, which may result in trouble or fire.
-  • Make sure to connect the ground of power cable to the protective earth. If do not have grounding, there is a risk of electric shock or fire.
-  • Please do not use if the power cable was damaged (such as disconnection). It may cause electric shock or fire.
-  • If you see fire coming from the unit or notice smoke, an odd smell, or any other sign of abnormal functioning, remove the power plug from its socket, and take whatever other steps would be appropriate to deal with the problem.
-  • Do not attempt to disassemble, modify or rebuild the NIR moisture analyzer. Doing so may result in an accident, electric shock, or other problems. If you have found any abnormality in the unit, please consult your dealer.

	Caution		
		Burn hazard	Electric shock hazard

-  • Please do not place heavy objects on the power cable. Please do not heating or hurting the power cable. It may cause electric shock or fire.
-  • If connect other devices, please power off both units at first.
-  • Please do not touch the power cable by wet hands. It may cause electric shock.
-  • When installing, detaching or maintenance the unit, please take off the power cable at first for your safety.
-  • Please do not pull out the power cable grabbing the cable part.
-  • Please do not look directly into the light source. It may an adverse effect on eyes.

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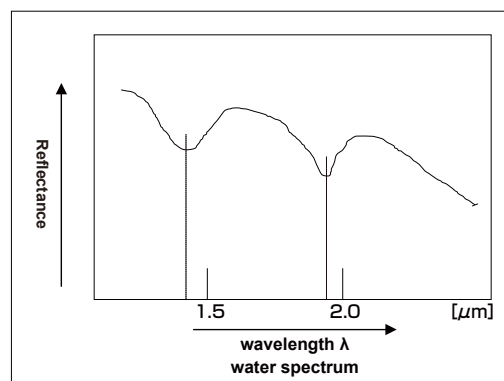
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1. Features

1-1. Measurement Principle

The absorption band of water has three wavelengths in the near-infrared spectrum area, 1.2, 1.45, 1.94 micrometers. When a sample is irradiated with light of those wavelengths, the sample will absorb light in an amount commensurate with its moisture content. The sample's moisture content determines how much light the sample will absorb. this moisture content can therefore be determined by measuring the light attenuation produced by the sample.

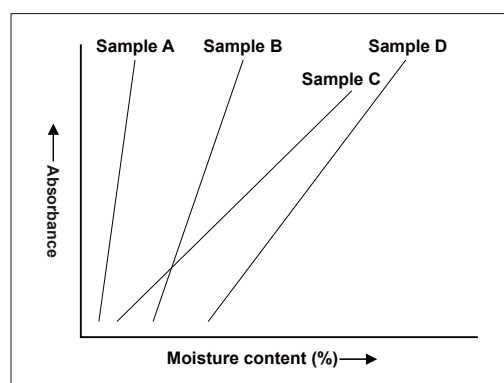
However, when measured only absorption wavelength, it can not measured stably since influence of the surface state of the material, the size of the particles, the color, etc. Therefore, the KB-30 is using also reference wavelength which is hardly affected by water.



1-2. What's the Calibration Curve?

NIR moisture meter is measuring the moisture content by converts from the near-infrared absorption degree of the object. To do this be required the formula for converting. This conversion formula is the calibration curve. The calibration curve depend on absorption characteristics of the measurement object. Therefore, It must be created for per each object before measurement.

- * ***Please contact to your dealer, if you would like to know how to make calibration curve.***
- * ***Please use proper calibration curve that is made for each sample correctly.***



2. Specification

Measurement method	:	NIR reflectance / Absorbance
Light source	:	Tungsten lamp
Measurement distance	:	260mm ± 30mm
Measurement diameter	:	25mm in diameter at 260mm distance
Max. number of sensor heads	:	30
Number of calibration curves	:	50
Analog current output	:	4-20mA DC
External communications	:	RS-232C / RS-485
Ambient temperature / humidity	:	5-40°C / 30-80% RH (without condensation)
Power source	:	AC 100 - 240V (50 / 60Hz)
consumption	:	50W
Dimensions / Weight	:	268(W) × 306(H) × 140(D) mm, 7.0 kg (including the hood and cables)
Accessories	:	Reference plate, Power cable, RS-232C cable (2.9m), Bolts and washers set, Operation manual, PC software, Operation manual for PC software
Options	:	All stainless steel body, Special spec for high moisture object, Cooling box

<Accessories>



Reference plate

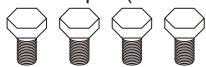


Power cable



RS-232C cable (2.9m)

- Bolts x4 pcs (M6x12mm)



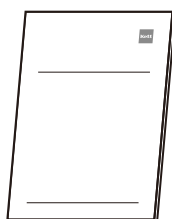
- Spring washers x4 pcs



- Washers x4 pcs



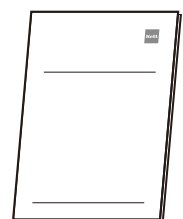
Bolts and washers set



Operation manual



PC software



Operation manual
for PC software

3. How To Use

Please read before use

- **Calibration curve**

It is necessary to set the calibration curve to the unit before measurement. Please make the calibration curve by the supplied PC software, then set it to the unit.

- **The ground of power cable**

There is a risk of fire or electric shock if the ground wire of the power cable is not grounded. When outlet is 2 pins, use the conversion plug for ground. When outlet is 3 pins and it is grounded, KB-30 will be ground automatically.

- **Vibration in environment>**

KB-30 should be installed in a place where vibration is small as possible. If it will be installed in a place where there is vibration, should be suppress the vibration by separating the installation stand of KB-30 from the vibration source.

- **Environmental temperature**

KB-30 must be used in 5 to 40°C ambient temperature. If your environment is not in this range, it is required the system to separate the ambient temperature from environment temperature, such as optional Cooling box which can be receive the cooling dry air to inside.

- **Moisture**

KB-30 must be used in the place where has no condensation. In case that KB-30 is used in the place where has much moisture or high salinity, there is a risk of corrosion and oxidation of the connector part and so on. Please do regular checks and cleaning.

- **Protection against dust**

The air purge hood is installed KB-30. If you would like to use it in the place where there is much dust, we recommend air purge. Please use external diameter 6mmφ tube to connect air source such as pump and compressor. (The tube is not attached. Please prepare by yourself.) The standard of amount used of air is 0.5-1.0 kg/cm² (about 70-140NL/min). Please use clean dry air without water and oil when you use air purge.

- **Sunlight**

Please use KB-30 after the light-blocking treatment, because the strong light as direct sunlight will disturb the measurement.

- **Consumable goods**

We recommend the replacement of consumable goods (Filter Wheel Motor, Lamp) every two years to maintain the accuracy. Please don't replace them by yourself. Please contact to your dealer.

- **Inspection**

when you do not use KB-30 for a long time (6 months or more), if you want to use it again, we recommend the inspection of KB-30. Please contact to your dealer.

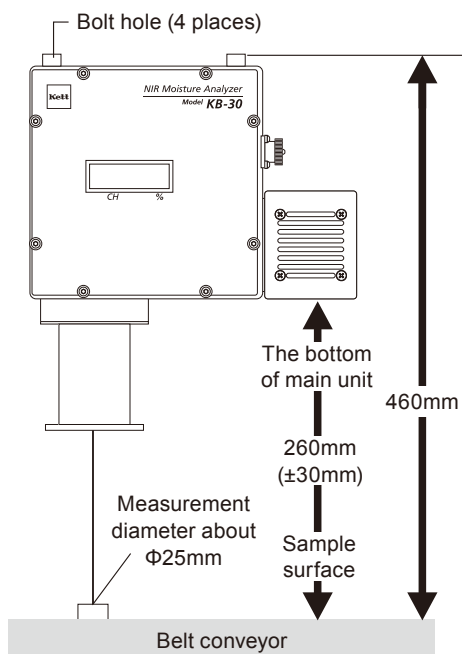


** If KB-30 is installed in a place where corrosive gas is generated, it may cause a malfunction. If you would like to install it in such a place, please contact to your dealer in advance.*

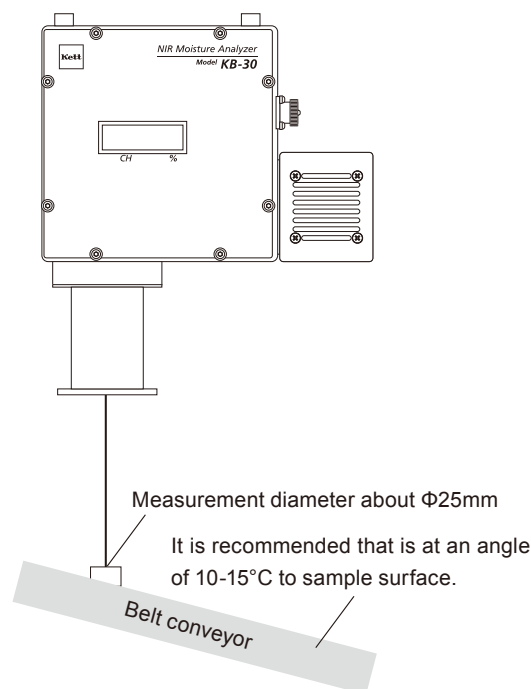
3-1. Installation

(1) The setting of height

The height from the sample surface to the bottom of main unit must be 260mm (±30mm).



<Glossy sample>



(2) Fixation of bolt

Fasten the instrument with 4 bolts between the surface that you install the instrument and the bolt hole of the upper surface of the main unit after adjusting the height.



*** Fasten sensor head tightly with 4 bolts, attached washers and spring washers. If you do not so, it may cause injury due to falling.**

- **The case that attached bolts is used. (M6×12mm)**

The thickness of the surface that you install the instrument must be from 2 to 4mm.

- **The case that the thickness of the surface you install the instrument is more than 4mm**

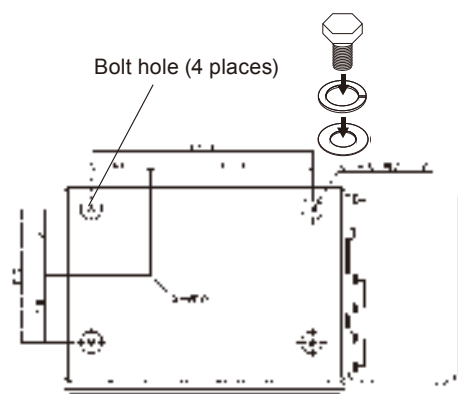
Considering the thickness of the surface you install the instrument, and then calculate the length of bolts.

$$L = [5 + (1.5+1.6) + t] \pm 1 \text{ (mm)}$$

L : The length of bolt

t : The length of angle

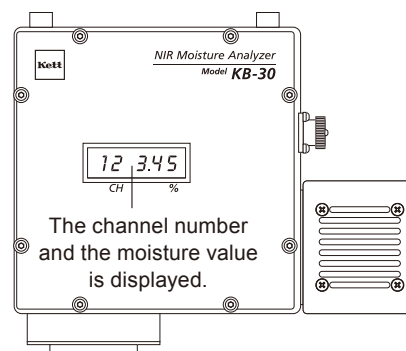
(1.5+1.6) : (The thickness of spring washer+the thickness of washer)



3-2. Measurement

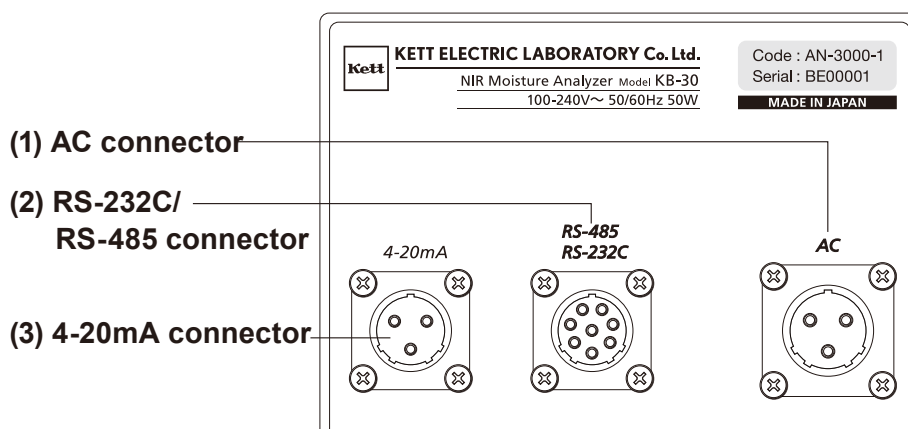
Turn on the power to start the measurement.

The channel number and the moisture value is displayed.



4. How to connect the main unit to cable and Communication Function

4-1. Specification of main unit connector



• Arrangement of connector and connector pin

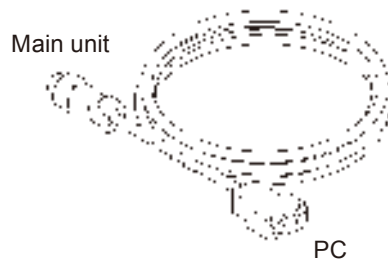
	Connector kind	Connector Type	Pin arrangement	
(1)	• AC connector Connect power cable	NJW203-RM (JP version)	1	L
		NJW203-RM-UL / CSA (US version)	2	N
		NEW203-RM (EN version)	3	F.G
(2)	• RS-232C/RS-485 connector Connect the RS-232C cable or RS-485 cable that is connected to PC.	NJW168-RF	1	RS-485 (+)
			2	RS-485 (-)
			3	GND
			4	RS-232C (RXD)
			5	RS-232C (TXD)
			6	I/F_MODE (+) *
			7	I/F_MODE (-) *
			8	F.G
(3)	• 4-20mA connector connect the cable that pick out an output electric current that is correspond to the moisture value of measurement sample.	NJW163-RF	1	4-20mA(+)
			2	4-20mA(-)
			3	F.G

* When you use RS-232C communication, connect I/F_MODE (+) and (-).

4-2. Specification of RS-232C Cable

<Main unit>

NJW Plug (Pin)	
1	NC
2	NC
3	GND
4	RS-232C (RXD)
5	RS-232C (TXD)
6	I/F_MODE (+)
7	I/F_MODE (-)
8	F.



<PC>

D sub 9 pin (female)	
1	NC
2	RS-232C (RXD)
3	RS-232C (TXD)
4	NC
5	GND
6	NC
7	RS-232C (RTS)
8	RS-232C (CTS)
9	NC

4-3. Communication Function

KB-30 can do RS-232C/RS-485 communication with the PC by the serial port on the back of the main unit. It is possible to send measurement commands from the PC to the main unit and reply measurement data from the main unit to the PC (it is necessary to prepare the PC and communication software). Please contact to your dealer if you would like to know detailed communication specification.

5. Troubleshooting

If there is an abnormality in the unit or use conditions, you receive the following error code. Please take appropriate action in follow the instructions. If occurred an error code which is not in the notation, please contact to your dealer.



*** If an error occurs, please disconnect the instrument and your system immediately.
If you continue to use, that it may be an adverse effect on the system.**

Error code	Description	Action
E01	The sample reflectance is too low. It is conceivable that the sample is too far, the lamp is burn out or has been degraded, or other trouble in the unit.	1. Confirm the distance to the sample. 2. Replace the lamp if it has been burn out. 3. Contact to your dealer.
E02	Ambient temperature is too high.	Confirm ambient temperature.
E03	Ambient temperature is too low.	Confirm ambient temperature.
E04	Absorbance trouble	Contact to your dealer.
E05	Motor rotation speed trouble.	Contact to your dealer.
E07	Calibration curve coefficient in the measurement channel is not set yet.	Set calibration curve coefficient from PC software.
E08	It is abnormal at zero calibration coefficient or temperature compensation coefficient. Memory of the system constant has been destroyed.	Contact to your dealer.
E09	Memory of the channel constant has been destroyed.	Contact to your dealer.
E12	Can not read the analog signal.	Contact to your dealer.

Notes

- Copying some or all of the contents of this user manual without prior written consent is strictly prohibited.
- The contents of this user manual may be changed at any time in the future without any prior notice.
- The appearance and/or representations of the products and parts depicted in this user manual may not appear exactly as their actual counterparts, but this does not affect their operation or functionality.
- This user manual was intended to be written as clearly and accurately as possible. However, if you are unclear about anything in this user manual or notice any missing information, please contact us directly.
- We cannot be held responsible for any actions or effects resulting from the execution of any operations outlined in this user manual.



KETT ELECTRIC LABORATORY Co. Ltd.

1-8-1 Minami-Magome, Ota-ku, Tokyo 143-8507, JAPAN

☎ +81-3-3776-1121 📠 +81-3-3772-3001

🌐 <https://www.kett.co.jp/english/> ✉ overseas@kett.co.jp