Wheat /Barley Composition Analyzer

AN-2000WB

Kett

Operating Manual

Contents

1. Features 4
2. Main unit & Keypad Explanation 5
3. Specifications 6
4. Preparation 7
5. Measuring Procedure 8
   - 5-1.Calibration Curve Selection, Measuring, Print & Memory Measuring Results 8
   - 5-2.Displaying Measuring Results Method from the Memory 11
6. Bias Adjustment 12
   - 6-1.Confirming the BIAS value 12
   - 6-2.Entering the BIAS value 14
7. Time settings 16
8. Maintenance 17
9. Troubleshooting 18

1.Features

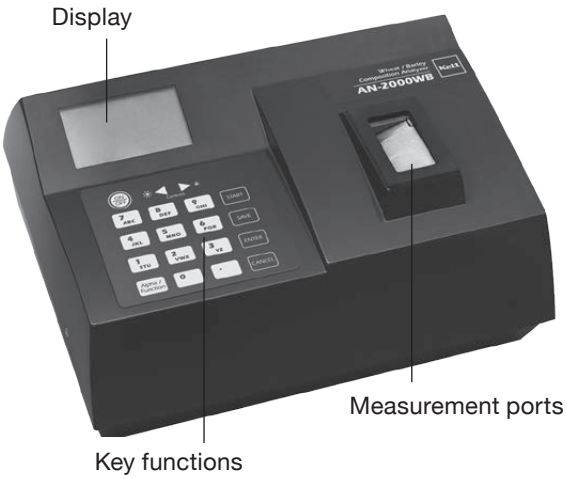
The Model AN-2000WB composition analyzer is a desk top grain tester (Transmittance type) that can measure protein and moisture content by utilizes applied near-infrared analysis technology.

By utilizing halogen lamp, grating system and NMOS photo-diode array detector, and the result is that we are able to achieve high stability.

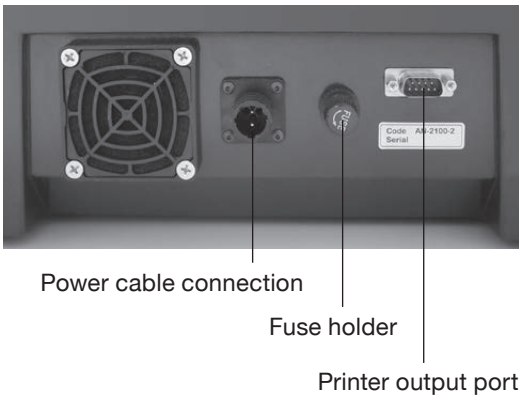
It employs total-grain measurement formulas for measuring without crushing the sample grain to pieces, so it makes possible to analyze grain quickly and easily with a simple operation of only inserting the sample case into the instrument.

2. Main unit & Keypad Explanation

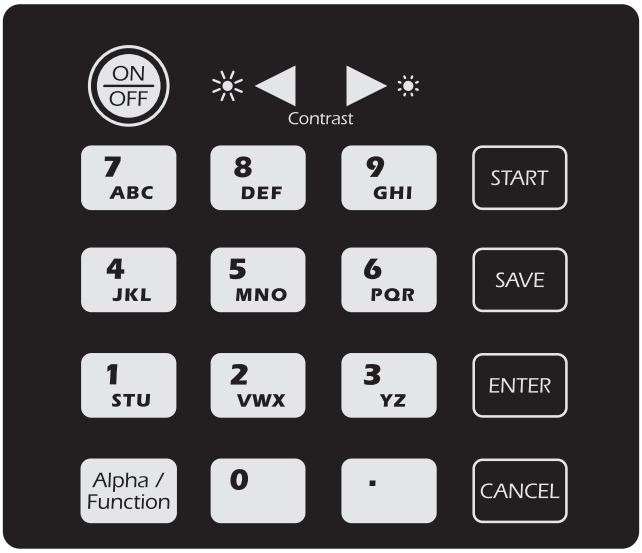
Front side



Back panel



Key functions



- [ON/OFF] Key : Press this key when turn on or off the power.
- [Contrast] Key : Press this key when adjust the contrast on display.
- [Number/Alphabet] Key : Press this key when enter the number or the alphabet.
- [Alpha/Function] Key : Press this key when switching between numbers and alphabet, or when making adjustments.
- [START] Key : Press this key when measuring.
- [SAVE] Key : Press this key when save or printing the measurement results.
- [ENTER] Key : Press this key when determining the character input.
- [CANCEL] Key : Press this key when delete the entered character or when return to the previous screen.

3. Specifications

Measurement method	Near infrared penetration method
Light Source	Halogen lamp (lamp life 3000hrs)
Applications	Wheat, Barley, Soybean (Option)
Constituents	Protein, Moisture, Oil (Optional Soybean only)
Sample Volume	Approx. 240mL (Wheat)
Scan range	720 - 1100 nm
Measurement time	Approx. 75s
Display format	Backlit dot matrix LCD
Scan speed	2-4 seconds
Input/Output terminals	RS-232C, Printer output terminal
Power source	AC 100 - 240V
Dimensions	510(W) × 380(H) × 270(D) mm
NET Weight	9.2 kg
Accessories	Sample case x1pc, Standard sample (Wheat) x1pac, Standard sample (Two-rowed barley) x1pac, Standard sample (Six-rowed barley) x1 pac, Power cable x1pc, AC adapter x1pc, Fuse x1pc, Cleaning brush x1pc, Operation Manual x1pc
Options	Printer VZ-330 (AC100V/220V), Calibration Curve (Soybean)

The AN-2000WB should be used below 35°C in environment condition. If the environment temperature is over 50°C , the precision spectroscope would be damaged. Also the storage should be below 50°C environment condition.

Display ranges of preset-calibrations are as below.

Wheat	Protein	: 6 - 16% (CM13.5%*)
	Moisture	: 8 - 20%
Two-rowed barley	Protein	: 6 - 15% (DM*)
	Moisture	: 9 - 20%
Six-rowed barley	Protein	: 7 - 13% (DM*)
	Moisture	: 8 - 20%
Soybeans(Option)	Protein	: 25 - 40% (DM*)
	Moisture	: 6 - 20%
	Oil	: 15 - 27%

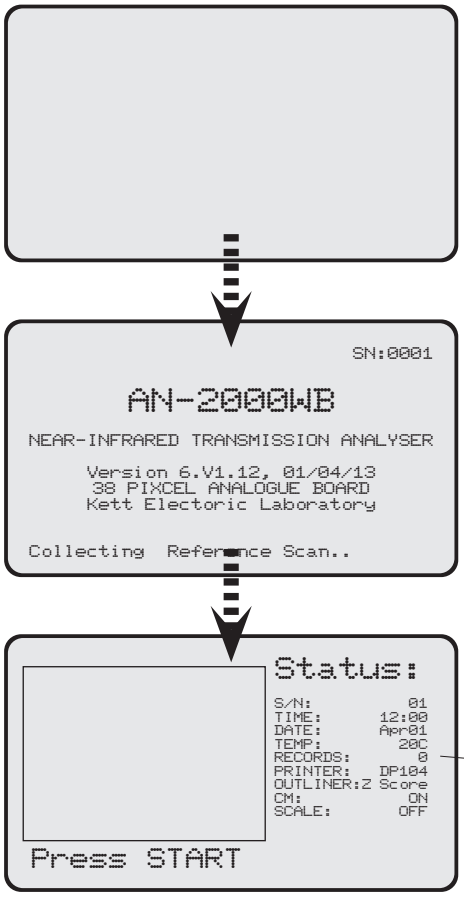
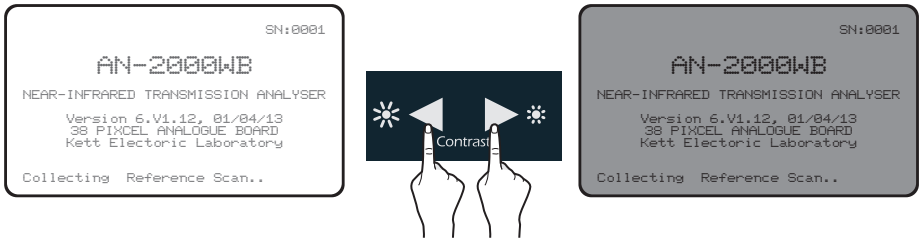
*CM :（Constant Moisture Basis）.. Calculated protein value when moisture is assumed to be constant. (13.5% at this instrument)

*DM :（Dry Moisture Basis）..... Calculated protein value when moisture assumed to be 0%.

4. Preparation

- Power ON

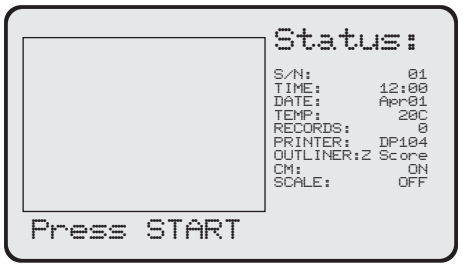
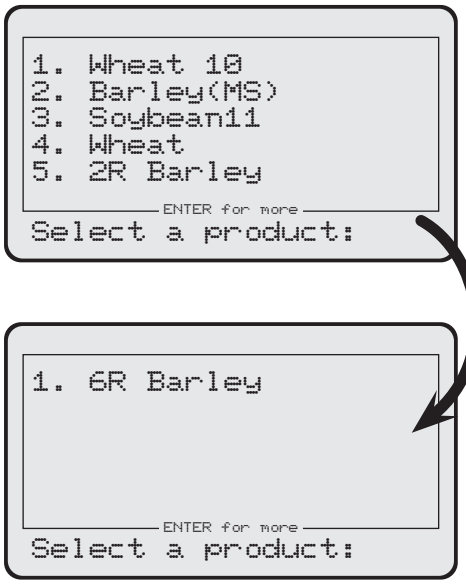
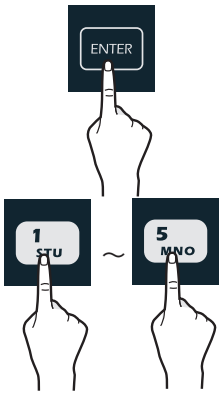
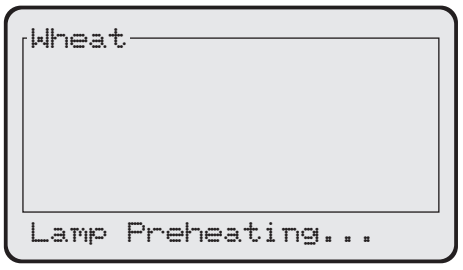
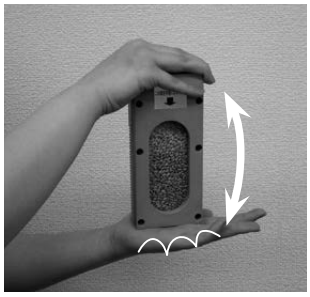
This instrument is the precision optical equipment.
Therefor, this unit requires time to stabilize. Please start the measurement after do the warm-up about two hours from turn on the power.

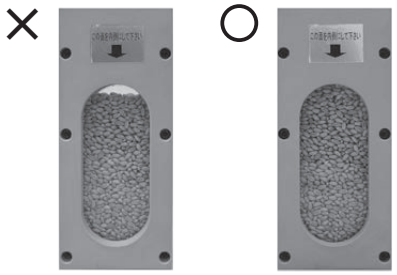
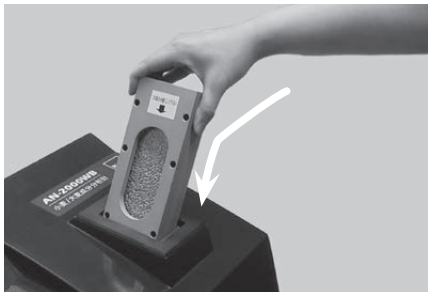
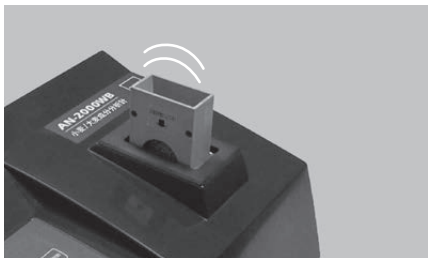
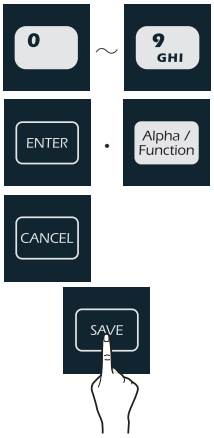
Operation
1. Connect the electrical outlet and power connector on the rear using the power cable. Tighten the screw on the connector. Cable connector needs the correct orientation, it is not plugged to have mistaken. There is a tab on the irregularities in the connector and the body, please insert after confirm the engaged position.
2. Hold down the [ON/OFF] key for 1 second or more.      Buzzer sounds will coming after a click noise. Backlight is lit few seconds, but is not displayed anything first. After few seconds, model name and other information are displayed. Then initial screen is displayed automatically. **Number of recorded measurement results in the unit** If the display is difficult to read, you can adjust the screen contrast in the [Contrast] key. 

5. Measuring Procedure

5-1. Calibration Curve Selection, Measuring, Print & Memory Measuring Results

Note : Calibration curve is required in the near-infrared measuring device. In this instrument, calibration curve of Wheat and Barley has been set advance. Moreover, it is possible to add the calibration curve of soybean if you need.

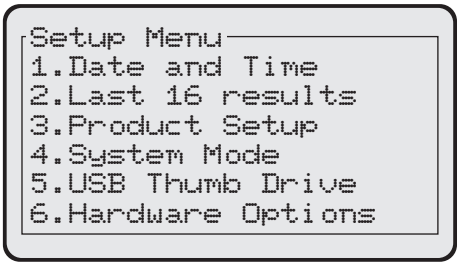
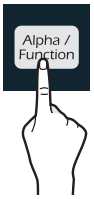
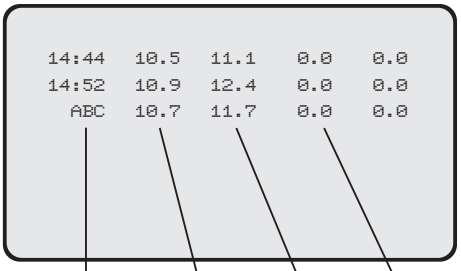
	Display	Operation
1.		Press [START] key.
2.		 Calibration caves displayed. Select the calibration curve to measure using [Number] key. • Wheat • 2R Barley (Two-rowed barley) • 6R Barley (Six-rowed barley) • Soy Bean (Option) **Note : Please don't use calibration curves other than the above, such as "Wheat10" and "Barley(MS)".** **Note : Screen can display up to five calibration curves at once. Press the [ENTER] key if the object you want is not displayed on the screen.**
3.		Lamp warm-up and adjustment is done automatically. Left figure is an example of the screen when you have selected the Wheat.
4.		 In advance, put the sample into the case after removing foreign matter such as wheat awn. So that the sample is clogged in dense, please hit the bottom of case about 10 times by hands.

	Display	Operation
		Put the sample into the case up to the position where full of glass at the sample case.  **To make that there is no gap in the glass position.**
5.	Wheat Protein Moisture Insert sample cell	 When the left screen is displayed, insert the sample case. Can be smoothly inserted if do as pushing diagonally. The sample case label should be inside direction. (jagged part should be outside.) **Don't insert forcefully, it causes malfunction.**
6.	Wheat Protein: 10.6% Moisture: 11.4% Scanning ...	 The measurement is started automatically. Sample case move up and down, measure some of points. The results of each point is displayed in real-time. **Note : If the sample case does not come up until the top, perform the following steps.** First save the results by pressing the [SAVE] key. Secondly press the [CANCEL] key, then the sample case come up until top. Do not forcibly pulled out. It causes malfunction.
7.	Wheat Protein: 10.7% Moisture: 11.3% (CM)(Z SCORE) Press START or SAVE	 The measurement result is displayed after the measurement is finished. If press [SAVE] key, the screen for input sample ID is displayed.
8.	Wheat Protein: 10.7% Moisture: 11.3% (CM)(Z SCORE) Enter Id:	 This is the screen that the sample ID is entered. [Number/Alphabet] key is for letter select, [ENTER] key is for letter decision, [Alpha/Function] key is for letter switching, [CANCEL] key is for delete entry. Press [SAVE] key to decide after finishing entering. Press [SAVE] key left blank if sample ID input is not necessary. It is not essential. When you have connected the optional printer, sample ID and the results will be printed.

	Display	Operation	
9.	1. Wheat 10 2. Barley(MS) 3. Soybean11 4. Wheat 5. 2R Barley ENTER for more Select a product:		Press the [START] key to do the next measurement. Move to the selection screen of the calibration curve, and repeat the selection of the calibration curve. Every time, it will be the start of the measurement from the selection of the calibration curve. **Note : When you continue the measurement, it must be done after disconnecting the sample case. There are cases that correct measurement is not performed when you measure the same sample as it is because sample is warmed by the heat from the light source, please perform the measurement again after cooling the sample to ambient temperature.** **Note : If the sample case is dirty, correct measurement may not be performed. Please clean it by soft cloth.**

5-2. Displaying Measuring Results Method from the Memory

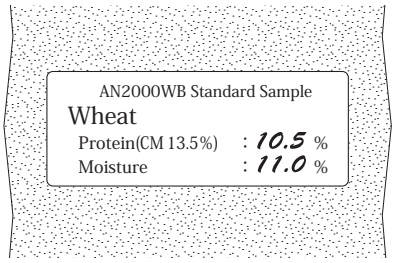
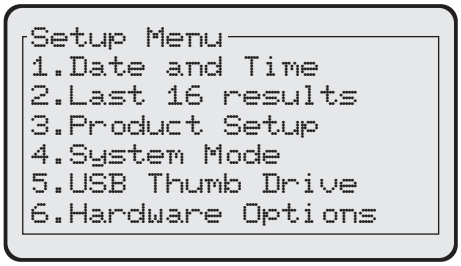
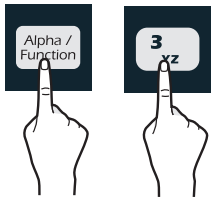
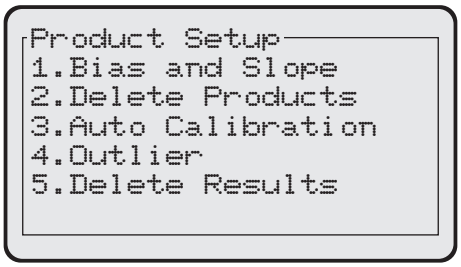
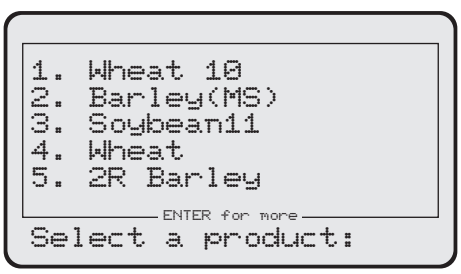
This device has internal memory, most recent 16 measurement results have been saved.

	Display	Operation
1.		 In the initial screen, press the [Alpha/ Function] key to display the Setup Menu screen. Press the [2]key, and then select "Last 16 results".
		Display last 16 result. From left, display as below. • Sample ID (If you do not enter it, display measurement time.) • Protein • Moisture • Oil (Option) If you measure nothing, display "No Sample Scanned".

6. Bias Adjustment

If the difference between measurement value and component value have been arisen on attached standard sample or the sample which is known correct component value, the bias adjustment is required to compensate for this difference.
Please do the bias adjustment in accordance with the following procedure.

6-1. Confirming the BIAS value

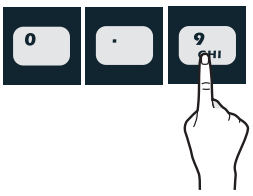
	Operation
1.	Measure a standard sample three times. Attached standard samples are wheat, two-rowed barley, six-rowed barley, soybean (option only). Please select the same sample as the actual measured. **Measured value should be determined from the average of three measurements.** For example, describe the case where you measure the wheat. Measured values was assumed 10.0% protein, and 11.5% moisture.
2.	 Make a note the difference between measurement value and the standard value that is listed on the label of the attached standard sample. Here, the difference of protein is +0.5, moisture is -0.5.
3.	  Confirm the original bias value that is currently set. Press [Alpha/Function] key in the initial screen. "Setup Menu" screen is displayed. Select "Product Setup" by press [3] key.
4.	 Select "Bias and Slope" by press [1] key.
5.	 Select product number that you want to calibrate by using [Number/Alphabet] key. Five calibration curves are displayed in the screen. If the calibration curve you want is not displayed, press [ENTER] key and select in next screen.

	Display	Operation
9.	Wheat Protein Bias (+0.40): _ Enter values & Save	 An original bias value of protein is displayed in parentheses. Make a note this value. Here is "+ 0.40". Original bias value: Protein +0.40 Press [SAVE] key.
10.	Wheat Protein Bias (+0.40): Protein Slope (+1.040): _ Enter values & Save	 Protein Slope is displayed, but it does not need to the bias adjustment. Press [SAVE] key to move to the next screen.
11.	Wheat Moisture Bias (+0.20): _ Enter values & Save	 An original bias value of moisture is displayed in parentheses. Make a note this value. Here is "+ 0.20". Original bias value: Moisture +0.20 Press [SAVE] key.
12.	Wheat Moisture Bias (+0.20): Moisture Slope (+1.000): _ Enter values & Save Product Setup 1.Bias and Slope 2.Delete Products 3.Auto Calibration 4.Outlier 5.Delete Results	 Moisture Slope is displayed, but it does not need to the bias adjustment. Press [SAVE] key. The screen return to Product Setup.

Note : The bias adjustment can not be performed correctly if the sample case is dirty or damaged. If so, clean or replace it.

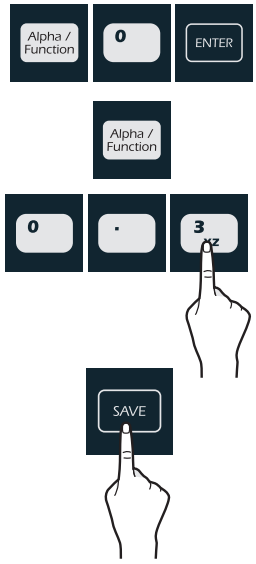
6-2. Entering the BIAS value

<table>
<tr><th></th><th>Display</th><th>Operation</th></tr>
<tr><td>1.</td><td></td><td>Enter the sum of "differences between the measurement value and the standard sample value" and "original bias values" in accordance with the following procedure.
In this example, as follows.
<table>
<tr><th></th><th>Difference</th><th>Original bias value</th><th>New bias value</th></tr>
<tr><td>protein</td><td>+0.5</td><td>+0.40</td><td>+0.9</td></tr>
<tr><td>moisture</td><td>−0.5</td><td>+0.20</td><td>−0.3</td></tr>
</table></td></tr>
<tr><td>2.</td><td>Product Setup
1.Bias and Slope
2.Delete Products
3.Auto Calibration
4.Outlier
5.Delete Results</td><td>
Select "Bias and Slope" in Product Setup screen by press [1] key.</td></tr>
<tr><td>3.</td><td>1. Wheat 10
2. Barley(MS)
3. Soybean11
4. Wheat
5. 2R Barley
ENTER for more
Select a product:</td><td>
Select product number that you want to calibrate by using [Number/Alphabet] key. Five calibration curves are displayed in the screen.
If the calibration curve you want is not displayed, press [ENTER] key and select in next screen.</td></tr>
<tr><td>4.</td><td>Wheat
Protein Bias
(+0.40): _
Enter values & Save

Wheat
Protein Bias
(+0.40): 0.9_
Enter values & Save</td><td> 
Enter the new bias value by using [Number/Alphabet] key.
Here is "+ 0.90".

When you enter " - " (minus), it is displayed by pressing [Alpha/Function], [0] and [Enter] key to decide it. (There is example in the next page.)
If you make a mistake the numeric entry, you can delete one by one in the [CANCEL] key. Once all letters is deleted, return to the previous.

Press [SAVE] key, when you finish entering number.</td></tr>
<tr><td>5.</td><td>Wheat
Protein Bias
(+0.40):
Protein Slope
(+1.040): _
Enter values & Save</td><td>
The under bar moves to Protein Slope, but do not enter any number.
Press [SAVE] key to move to the next screen.</td></tr>
</table>

	Display	Operation
6.	Wheat Moisture Bias (+0.20): _ Enter values & Save Wheat Moisture Bias (+0.20): -0.3_ Enter values & Save	 An original bias value of moisture is displayed in parentheses. Enter the new bias value by using [Number/Alphabet] key. Here is "- 0.30". When you enter " - " (minus), it is displayed by pressing [Alpha/Function], [0] and [Enter] key to decide it. Here is enter -0.3 by entering in the order of [Alpha/Function], [0], [ENTER], [Alpha/Function], [0], [.], [3]. Press [SAVE] key, when you finish entering number.
7.	Wheat Moisture Bias (+0.20): -0.3 Moisture Slope (+1.000): _ Enter values & Save	 The under bar moves to Protein Slope, but do not enter any number. Press [SAVE] key to move to the next screen. The bias adjustment is completed.

7. Time settings

	Display	Operation
1.	Status: S/N: 01 TIME: 12:00 DATE: Apr01 TEMP: 20C RECORDS: 0 PRINTER: DP104 OUTLINER:Z Score CM: ON SCALE: OFF Press START	 Press the [Alpha/Function] key in the initial screen. Setup Menu screen is displayed. **Note : If another screen is displayed, press [CANCEL] key until you see the initial screen.**
2.	Setup Menu 1.Date and Time 2.Last 16 results 3.Product Setup 4.System Mode 5.USB Thumb Drive 6.Hardware Options	 Select "Date and Time" by press [1] key.
3.	Enter the date (dd.mm.yy):01.04.13■ Enter values & Save	Has been set date are displayed in first line. In the example shown on the left, it is representing the April 1 2013.
4.	Enter the date (dd.mm.yy):0■ Enter values & Save Enter the date (dd.mm.yy):02.0■ Enter values & Save	 When press the [CANCEL] key, numbers are erased one by one from right side. Delete until the point which should be changing. Enter date, month and year by using [Number/Alphabet] key. **Note : Enter [.] in each double digits of date.** Press [SAVE] key, when you finish entering.
5.	Enter the date (dd.mm.yy):02.04.13 Enter the time (hh.mm):14.30■ Enter values & Save	 Time is displayed in second line. Enter time by using [CANCEL] key, [Number/Alphabet] key. When you finish entering, press [SAVE] key. The setting is completed.

8. Maintenance

- **Replacement of fuse**

  When the power doesn't turn on although the power cable is connected and press "ON/OFF" key, there is the possibility that fuse is broken. Remove the fuse as follows, please check and replace.

Operation	
1.	Unplug the power cable.
2.	Remove the fuse holder on the back of the instrument by
3.	Make sure the fuse is blown, replace with a new one.
4.	Return the fuse holder to its original position.

- **Cleaning**

  When the body surface is dirty, please wipe with a soft cloth. For terrible stains, and soak the soft cloth in water and put a little mild detergent, please wipe dirt from squeezing well.
  Please do not use volatile chemicals such as thinner or benzine.

9. Troubleshooting

When the following error is displayed and trouble has occurred, please check and deal in each method.
If it does not improve, if it is an error that is not listed below, please contact to your dealer.

Display	Explanation	Solutions
	The power does not turn on	Confirm the connection of the power cable. (P.7) Confirm the fuse is broken or not. (P.17)
	Nothing in display	Confirm device is active or not. (P.7) Adjust the contrast by using [Contrast] key.
	After the measurement, does not come up the sample case	Press [CANCEL] key after you save the result by using [SAVE] key. (P.9)
Outside Temperature Range or Instrument Temperature Out of Range	Instrument body or sample temperature is out of permissible range	If the body temperature is high, leave it for cool down after turn off the power. If the temperature is low, leave it for the warm-up after turn on the power. If sample temperature is outside the measurement range, measure with a new sample.
Lamp Intensity Error	Light is weak	Clean the window portion of the sample case. If the lamp is broken, contact to your dealer.
Low Absorbance Sample	There are some gaps inside of sample case	Pack the sample correctly by hitting the bottom of the sample case after have added the sample to increase the density. (P.8)
High Level Of Condensation	Condensation occurs in the internal instrument	Eliminate condensation by adapt the instrument temperature to the environment temperature. Do not place the instrument to a cold environment on a routine basis.

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.

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