

Kett

SCIENCE OF SENSING

FD-660

Infrared Moisture Determination Balance



Infrared Moisture Determination Balance FD-660

The FD-660 Infrared Moisture Determination Balance measures moisture content through the detection of weight loss by heating & drying. It is extremely similar to the "Loss on Drying Test", one of the official standard measurement methods, forming the basis of measuring moisture content. The moisture contents of almost all of samples*, regardless of their types and shapes, can be measured.

The FD-660 is more compact when compared with conventional products, and is equipped with an auto taring mechanism to alleviate the influence of scale drift. In addition it has been retooled, especially on the control panel. The integration of a highly visible LCD and keys with LEDs allows this product to be user-friendly. As an example it is very simple to display the unit status and user executable operations. The organic carbon heater, which is introduced for the first time as a heat source, is excellent in the efficiency of sample drying because it irradiates the infrared rays with the wavelength range where water reacts to heat while providing a longer life than infrared lamps or halogen heaters. In addition, this heater does not contain halides or metals, and therefore, is an environmentally friendly heat source.

The Pre Heat mode is integrated as a new function. This mode standardized the internal temperature before measurement to stabilize this product mechanically and electrically. In addition to this mode, other refinements have been added, such as the enlargement of a sample dish to improve drying efficiency. This product is the result of researching infrared moisture content measuring instruments for over 60 years.

This product can be used as a new general-purpose infrared moisture determination balance in a wide variety of applications. For example, in a quality control department where the moisture content control is required and inspection department.

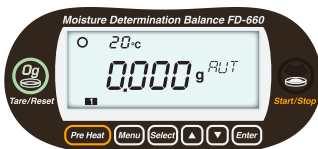
* **Samples that become explosive, flammable, or hazardous material dischargeable by heat are not measurable.**

• User-friendly LED-equipped control panel

The LEDs on the control panel light to indicate user executable operations or notify an operator of the unit status.

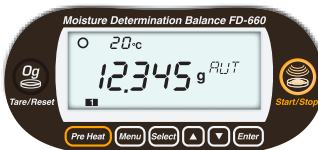


Tare/Reset key lighting

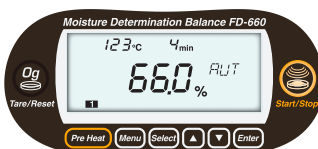


This is the initial screen. Pressing the key starts taring (zero adjustment).

Start/Stop key lighting



This is the screen indicating the measurement preparation is completed. Weight is shown on the display. Pressing the [Start/Stop] key starts the measurement.



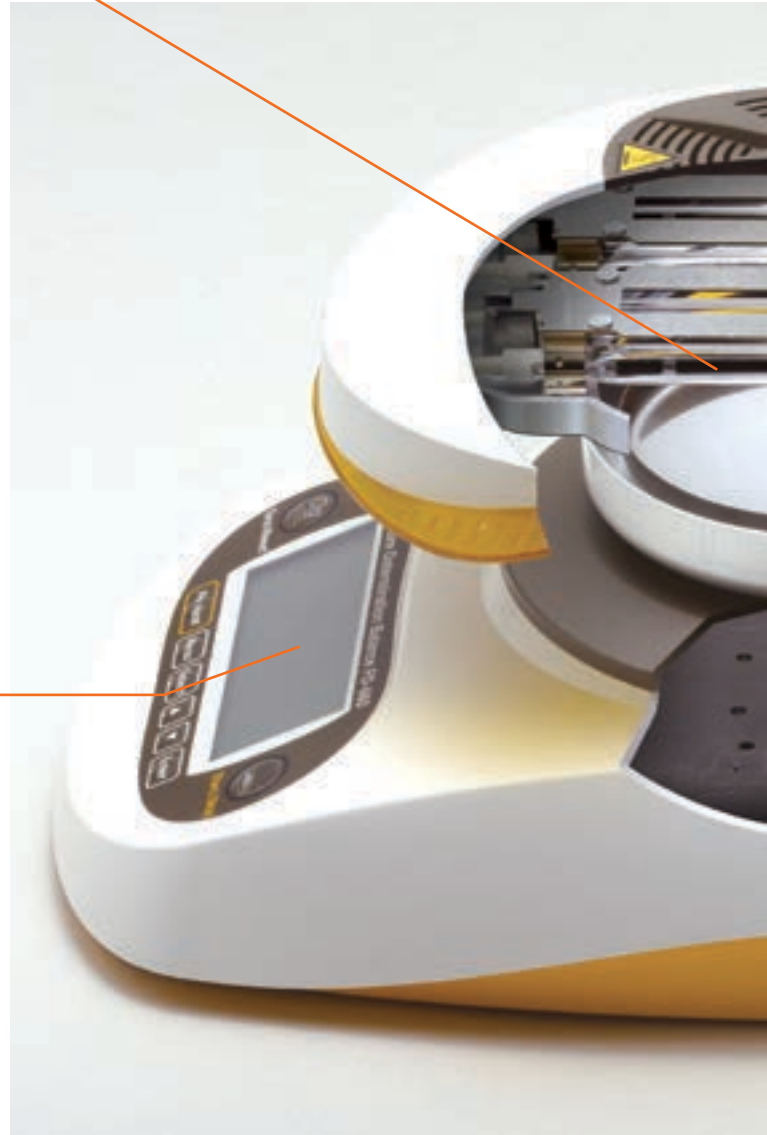
This is the screen indicating the measurement is in process. Moisture content is shown on the display. Pressing the key again stops the measurement.

Environmentally-friendly organic carbon heater

The service life is 7,000 hours* which is approximately 4 times the life of a comparable conventional infrared lamp.

This heater emits infrared rays more than 2 times stronger than general halogen heaters with which other infrared moisture content measuring instruments are equipped in the wavelength range (2.5 to 3µm) in which moisture reacts to heat. This allows for efficient drying.

* **Indicates actual measured time for the operation of infrared heater. This is not a guarantee of service life.**



• 2 types of measuring modes

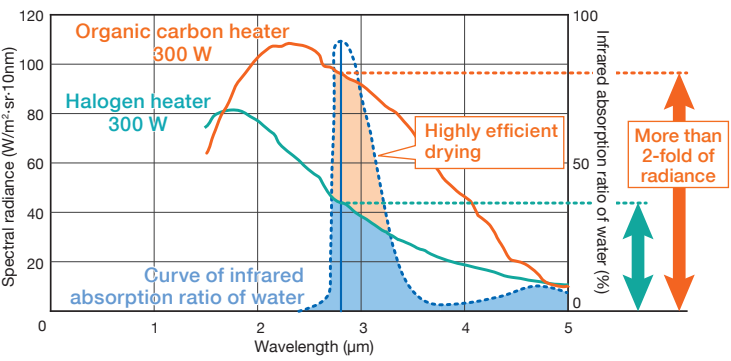
This product provides 2 types of measurement modes, "Automatic Halting Mode" and "Timed Halting Mode", and therefore, can perform measurement under appropriate drying conditions in accordance with the drying characteristics of the sample to be measured.

• The ability to store measuring conditions

Five (5) measuring condition storage numbers are provided. Storing various sample measuring conditions on numbers allows users to smoothly perform measurements.

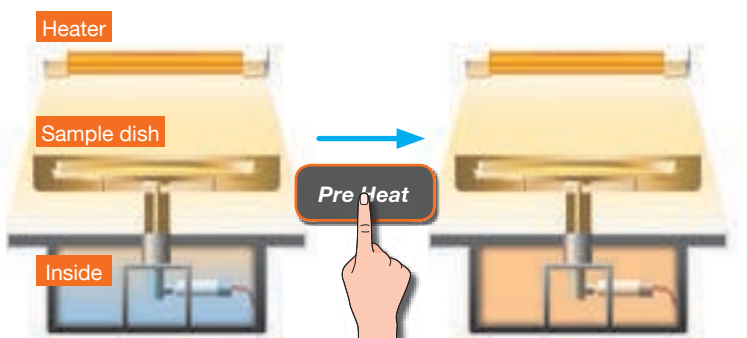
• Data memory function

This product is able to store up to 50 sets of measurement data in memory, thus making it possible to output large batches of data at one time.



• **Pre Heat mode equipped**

This product is equipped with a Pre Heat mode to eliminate a measurement error occurring immediately after turning on the power or when the temperature inside the measuring instrument is not stable.



If there is a temperature difference inside the product such as the balance, the measured value may be unstable.

Activation of the Pre Heat mode allows the temperature inside the product to be constant and a stable measurement to be performed.

• **Stainless-steel sample dish with 110 mm in diameter**

Enlargement of the sample dish results in a larger sample, which leads to improvement of sample representativeness, and also improves the drying efficiency.

• **Connectable to printer and PC**

The connection to the printer (option) and a PC and the use of the data logger, "FDL-02" (option) allows the drying state during measurement, final measurement values, and other data to be printed and displayed.

Printing example

```

4877 ELECTRIC LABORATORY
Model : FD-403
S/N : 2001234
Condition : 4
Unit : Unit Base Piece
Mode : Auto
Drying Time : 1500
Auto Stop Cond. : 1, 2, 3, 4
Base : 0.00

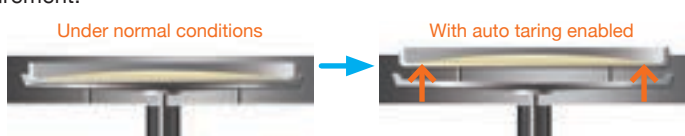
Time  Temp.  Mass  Moist.
Start  (°C)   (g)   (%)
0.0  127  4.2639  9.9
1.0  127  4.2639  9.9
1.5  127  4.1991  9.1
2.0  127  4.1974  9.1
2.5  127  4.1428  8.2
3.0  127  4.1981  9.5
3.5  127  4.1925  9.4
4.0  127  4.1479  8.8
4.5  127  4.1494  8.8
5.0  127  4.1222  8.7
5.5  127  4.1493  9.9
6.0  127  4.1482  9.2
6.5  127  4.1428  8.8
7.0  127  4.1441  8.9
8.0  127  4.1370  8.8
8.5  127  4.1429  9.5
9.0  127  4.1428  9.5
9.5  127  4.1441  9.5
10.0  127  4.1476  9.5
10.5  127  4.1428  9.4
11.0  127  4.1441  9.5
11.5  127  4.1476  9.5
12.0  127  4.1476  9.5

```

Not only the final result of the measured moisture content but also measuring conditions, temperature, weight, and moisture content are printed in real time and updated during the test. Therefore, the change in the measured values and intermediate changes can be observed.

• **High performance balance and auto taring mechanism**

The integrated electronic balance can be calibrated with use of standard weights. However, even with a high performance electronic balance, drift cause by change in the temperature of parts during measurement cannot be avoided. Thus, this product is equipped with the "Auto Taring Mechanism" which provides zero adjustment even during measurement. This mechanism can minimize the influence of scale drift and lead to a highly reliable measurement.



The sample dish rises once per 30 seconds and an error is reset.

Example of data logger software, "FDL-02"



"FDL-02" allows the measured data to be written in Microsoft Excel in real time. The graphs of time-temperature, time-change in mass, and time-moisture content are also created.

For a wide variety of samples and shapes



Grain

Food

Chemical



Powder

Particles

Paste/Liquid

Option



VZ-330 Printer



Deodorizing windproof case FW-100



Specifications

Measurement method	Detection of weight loss by heating & drying
Sample weight	1 - 80 g (optional weight sampling format)
Resolution	Moisture content/Solid content: 0.1 % or 0.01 % (selectable) The indication of 0.01 % is not guaranteed for accuracy. Weight: 0.005 g
Measurement units	Moisture content (wet base & dry base), solid content
Measurable range	0 - 100 % (wet base, solid content) 0 - 500 % (dry base)
Repeatability (Standard deviation)	Samples with a weight of 5 g or more, 0.1 % (When using standard samples and measuring conditions as determined by Kett Electric Laboratory)
Measurement mode	Automatic halting mode Timed halting mode (1 to 120 min.)
Drying Temperature range	30 - 180 °C (in steps of 1 °C)
Display	Backlit LCD display (96 x 40 mm)
External output	RS-232C interface
Communication function	Data output from "the data logger software FDL-02" (option)
Storage of measurement conditions	5 types
Temperature/Humidity operating range	5 - 40 °C, 85 % RH or less (no condensation)
Heat source	Organic carbon heater (280 W x 2)
Temperature sensor	Thermistor
Power supply	100 - 120 V AC / 220 - 240V AC (50/60 Hz)
Power consumption	Max. 900 W
External Dimensions & Weight	222 (W) x 360 (D) x 196 (H) mm, 3.2 kg
Sample dish	Stainless steel (110 mm in diameter, 11 mm in depth)
Accessories	2 sample dishes, sample dish handler, wind shield, sample dish stand, spoon, 2 spare fuses, aluminium sheet set (10 sheets), power cord (with 3P-2P plug adapter), operating manual
Option	Printer set (includes a printer "VZ-330", a printer interface cable "VZC-14", printer paper, and an AC adapter), printer paper (10 rolls), package of aluminium foil sheets (500 sheets), RS-232C cable "VZC-52", data logger software "FDL-02", sample crusher "TQ-100", deodorizing windshield case "FW-100"



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Management System Enhancement Department of the Japanese Standards Association (JSA) registers the Quality Management System of the above organization, which conform to JIS Q 9001, ISO 9001. The Scope of the Registration.

Design, development and production management of Moisture Testers, NIR Composition Analyzers, Grain Inspectors and Coating Thickness Testers. Calibration and repair of Moisture Testers, NIR Composition Analyzers, Grain Inspectors and Coating Thickness Testers.

Requests