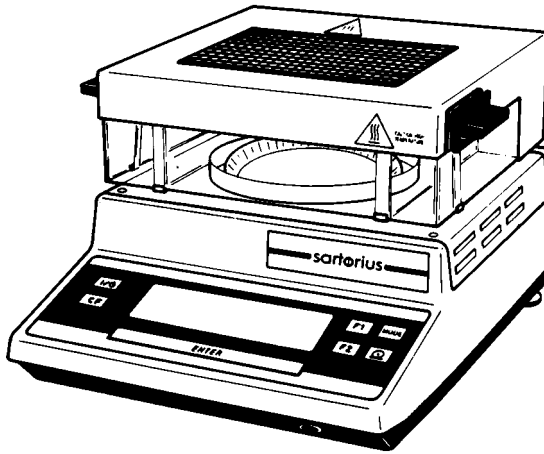
98648-004-35

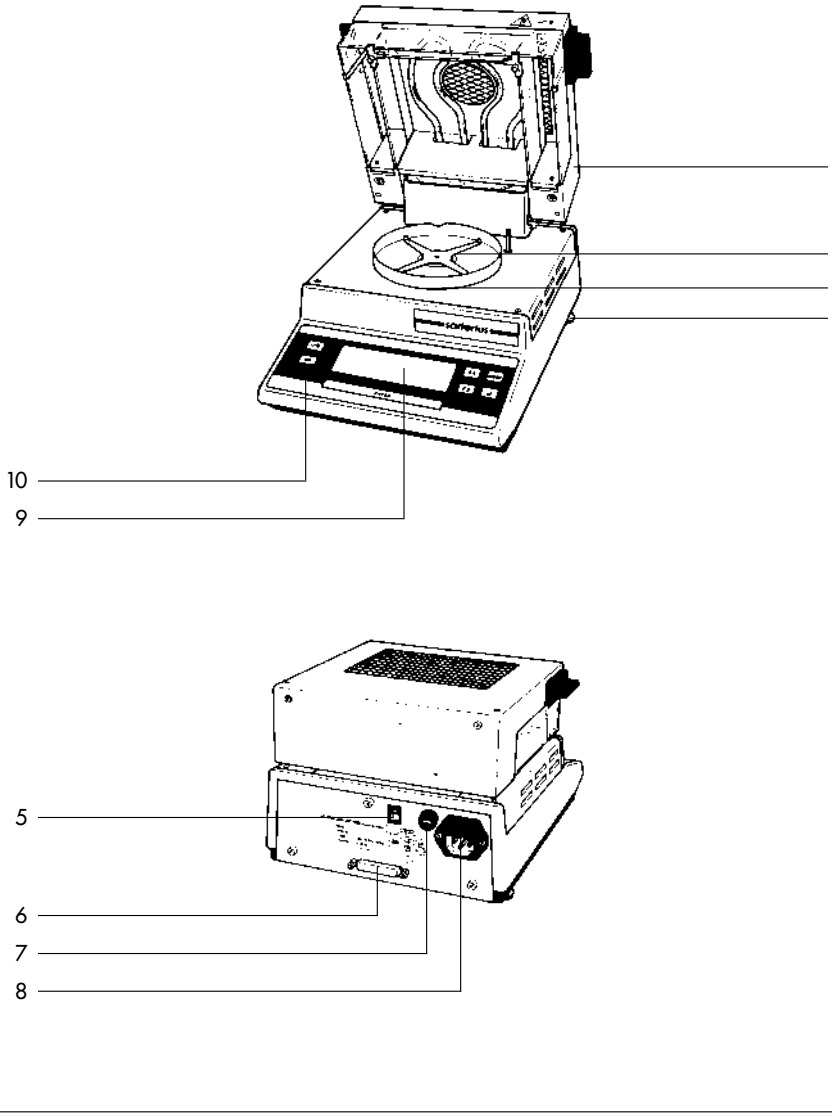
Moisture Analyzer
MA 30

Electronic Moisture Analyzer
Installation and Operating Instructions



sartorius

1 Hood
2 Sample dish/pan retainer
3 Protective disk plate
4 Leveling foot
5 Voltage selector
6 Interface
7 Fuse
8 Power receptacle (male socket), power fuse
9 LCD
10 Covered control panel with touch-activated keys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Contents

About the Product (Warranty)

With this Sartorius Moisture Analyzer, you have acquired a high-quality electronic instrument that will ease your daily workload.

Please read the sections entitled **"Installation Instructions" and "Startup"** carefully before operating your new Moisture Analyzer.

Do not miss out on the benefits of our full warranty. Please complete the warranty registration card, indicating the date of installation, and return the card to your Sartorius dealer.

Storage and Shipping Conditions

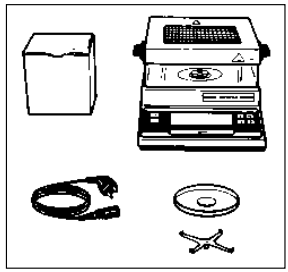
Storage temperature: –40°C ... +70°C
–40°F ... 158°F

After unpacking the moisture analyzer, please check it immediately for any visible damage as a result of rough handling during shipment. If this is the case, proceed as directed in the section entitled "Safety Inspection."

Save all parts of the packaging and the box because you may need to ship your moisture analyzer. Before you pack the moisture analyzer to ship it, unplug all connected cables to prevent damage.

Do not expose the moisture analyzer unnecessarily to extreme temperatures, moisture, shocks, blows or vibrations.

Equipment Supplied



The equipment supplied includes the components shown on the left:

– Moisture analyzer

– Protective disk plate

– Dish retainer

– Power cord

– Exchange fuses

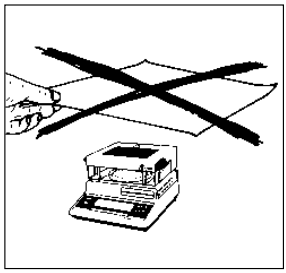
– 80 disposable aluminum sample dishes

Installation Instructions

Ambient Conditions

Please choose a suitable place to set up your moisture analyzer. It should not be exposed to vibrations or strong drafts.

The MA 30 may not be used in hazardous areas/ locations, since it has not been approved for these areas/locations and a Certificate of Conformity has not been issued for this unit.



When the moisture analyzer is being used, it gives off heat through the mesh on the hood. For this reason, the mesh must remain uncovered when the unit is in the standby mode and during operation.

After prolonged use, the components of the moisture analyzer can be very hot to touch. Therefore, please be careful as you operate the unit to avoid burns.

Do not expose the moisture analyzer to extreme moisture over long periods. If a cold moisture analyzer is brought to a substantially warmer place, moisture in the air can condense on its surfaces. If you transfer the moisture analyzer to a warmer area, make sure to condition it for about 2 hours at room temperature, leaving it unplugged. Afterwards, if you keep the moisture analyzer connected to line power, the continuous positive difference in temperature between the inside of the moisture analyzer and the outside will practically rule out the effects of moisture condensation.

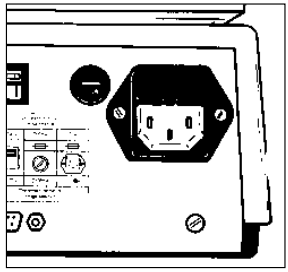
The Sartorius Moisture Analyzer delivers accurate results, even when it is exposed to unfavorable ambient conditions.

Connecting Electronic Devices (Peripherals)

Unplug the moisture analyzer before you connect or disconnect devices to or from the interface port.

Startup

Raise the hood on the moisture analyzer and position the protective disk plate **(3)** and the dish retainer **(2)** on the unit.
The moisture analyzer has been factory-set to 220–240 volts.



How to change the voltage setting to 100–120 volts: Move the voltage selector **(5)** down to the setting indicated on the manufacturer's label.
Whenever you change the operating voltage, make sure to exchange both installed fuses: the T 50 mA fuse **(7)** for the T 100 mA one that comes with the moisture analyzer and, in addition, the F 2 A fuse **(8)** for the F 3.5 A fuse in the fuse holder above the power socket.

220/240 V – T 50 mA, F 2 A
100/120 V – T 100 mA, F 3.5 A

The moisture analyzer, rated to Class 1, must be plugged into a properly installed wall outlet which has a protective grounding conductor (PE).

Safety Precautions

If you attach an extension cord without a protective grounding conductor, it may not inhibit the protection provided by the moisture analyzer. If you use an electrical outlet that does not have a protective grounding conductor, make sure to have an equivalent protective conductor installed by a certified electrician as specified in the applicable regulations for installation in your country.

To ensure safety, the data interface (see "Interfacing Devices" on page 26) is separated from line power by a transformer with a Class 1 design.

Leveling the Moisture Analyzer

You can level the moisture analyzer using the leveling feet **(4)**. This is only necessary if you are testing samples of low viscosity which need to be at a uniform level in the disposable sample dish.

How to Operate the Moisture Analyzer

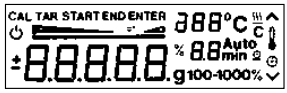
You can determine moisture content and dry weight with the MA 30 as soon as you have turned it on.

At the factory, we have adjusted the moisture analyzer so that you can begin determination immediately with the following parameters:

Temperature:	130°C (266°F)
Auto start:	Lower the hood
Drying time:	Automatic shutoff
Result (mode):	0–100% (moisture)
Data output: (during drying)	by pressing function key (manual mode)

The LCD shows special messages for your information throughout the moisture determination routine.

Turning the Moisture Analyzer On and Off



After the moisture analyzer has been plugged into a wall outlet, the standby symbol "⏻" will appear in the LCD when the moisture analyzer is turned off. This means it is ready to operate without requiring warmup.

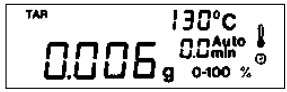
ON/OFF

Press the ON/OFF key to turn the moisture analyzer on or off.

Self-Test

After the unit is turned on, an automatic self-test of the electronic circuitry is run, during which all LCD segments will briefly appear.

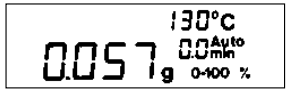
This self-test ends with a readout of the paramters set for moisture determination.



When TAR appears in the LCD, the unit is ready for operation, and you may begin your moisture determination/dry weight determination routine.

How to Determine the Moisture Content/ Dry Weight:

– Place the disposable sample dish on the dish retainer and press the **Enter** key. "TAR" will now go out in the LCD, and the weight readout 0.000 g will appear.



If a different readout appears, the unit must be retared:
– Press the **CF** key (TAR appears)
– Press the **Enter** key

– Now place your sample on the disposable dish, making sure that it is spread evenly.

– Lower the hood
The determination procedure will now start automatically. If you have selected the code for manual start, you must press the ENTER key to start the procedure.

The moisture determination routine can only begin after the moisture analyzer has been tared and a sample weight of >96 mg has been placed on the unit.

The start of the routine is indicated by an acoustic signal and the drying symbol "$\underline{\overset{\sim}{\sim}}$" in the LCD. During operation, the time and results corresponding to the mode you have selected will be continuously updated in the LCD.

The results in the different readout modes can be cycled in the display by pressing the **Mode** key:

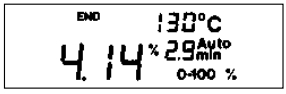
		Symbol on printout (for data output)
0–100%	= Moisture loss	L
100–0%	= Dry weight	R
0–1000%	= Ratio 1	LR
100–1000%	= Ratio 2	OR
	Weight	W

For more information, please see page 20
in addition.

In the fully automatic drying mode – timer setting = 0.0 min (factory setting) – the moisture determination procedure ends automatically when a significant weight loss is no longer detected.

You can interrupt the moisture or dry weight determination routine ahead of time by raising the hood or by pressing the **CF** key.

If the procedure is interrupted, a "B" will appear at the beginning of the last line in the printout.



The result will remain in the LCD until the **CF** key is pressed.
In addition, "END" will be displayed.

Once the **CF** key has been pressed, the moisture analyzer is ready for the next moisture determination routine.

How to Change Parameters

If you would like to change parameters to adapt the moisture analyzer to meet special requirements or to utilize the full performance capabilities of the unit, please read the following pages.

You can select the individual operating parameters either by briefly pressing a function key once, or by holding down a function key while simultaneously turning on the unit (when 2 keys are indicated on the diagrams).

With the **Mode** key, you can toggle among the readout modes of the computed results during a moisture determination routine. The result displayed has been calculated according to the equation assigned to the particular mode – see page 20.

The program parameters for **temperature**, **shutoff/time** and **print interval** can be changed by pressing the **CF** key (TAR will be displayed) and the **F1**, **F2** or ⊙ key, respectively.

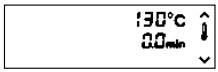
Then you can alter the parameters by pressing either the **F1** or the **F2** key.

To store the selected parameter(s), press the **Enter** key. To leave the parameter selection mode without changing parameters, press the **CF** key.

If you would like to store these parameters permanently in the non-volatile memory of the moisture analyzer, hold down the **Enter** key. At this point, the unit will automatically turn itself off. When it is turned on again, it will operate according to the parameters which you have previously selected and stored.

Setting the Temperature

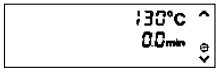
Select this mode with the **F1** key.



(F1) (F2) Temperatures between 40 and 160°C (104 and 320°F) can be selected. You can adjust the temperature setting in increments of five degrees; use the **F1** key to increase the temperature or the **F2** key to decrease it.

Setting the Time

Select this timer mode with the **F2** key.

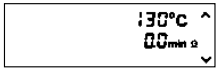


(F1) (F2) The drying time can be set between 0.0 and 99 min. To increase the time, use the **F1** key; to decrease the time, use the **F2** key. If you would like to increase the time by single digits, press the key briefly for each increment; by holding down the key, you can increase the time in increments of ten.

The moisture determination routine ends when the set time is up (for settings starting with 0.1 min.).
If you set the time to 0.0 min., the unit will turn itself off automatically.

Setting the Print Interval

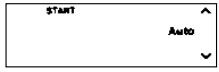
Select this mode with the ⊙ key.



(F1) (F2) Intermediate readings of the moisture determination routine can be output at intervals of 0.1 to 10 minutes. Use the **F1** key to increase the interval or the **F2** key to decrease it. If you would like to increase or decrease the interval by whole numbers, hold down the appropriate key.

If the interval is set at 0.0 min., the data will only be printed out when you press the ⊙ key.
At the beginning and end of a moisture determination routine, however, the printout heading and result will automatically be printed out.

Start Parameter



F1
F2

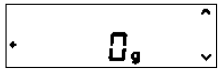
To select this parameter, turn on the moisture analyzer while simultaneously holding down the **MODE** key.

To change the setting, use the **F1** and **F2** keys.

F1: Start with **ENTER** (manual start)
F2: Start by lowering the hood (automatic start)

Convenience Feature for Weighing in Samples

Turn on the moisture analyzer while simultaneously holding down the **ENTER** key.



F1
F2

The target weight can be set between 0 and 25 g. To increase the target weight, press the **F1** key; to decrease the target weight, press the **F2** key. The target weight will increase or decrease in single-digit increments.

As a convenience feature, the LCD will show a bar graph to guide you if the target weight has been set at 1 g or more.
If the initial sample weight is between 85.8% and 114.4% of the preset value, the display will prompt you to start the moisture determination routine.

This convenience feature is not activated for "0 g" (factory setting).

More Information on the Moisture Analyzer

For more information about the Moisture Analyzer, please read the following pages.

Description of the Unit

The MA 30 Moisture Analyzer is equipped with a weighing system that has a 30-g capacity and a 1-mg resolution.
The glass panels on the front and sides of the moisture analyzer allow you to observe samples during moisture or dry weight determination routines.
Underneath the reflective panel on the inside of the hood are two tubular infrared heating elements, known as dark radiators. They provide for uniform heating of the sample.
The built-in resistance temperature sensor in the innermost chamber of the moisture analyzer transmits the actual temperature measured to the electronic components that regulate the temperature.
A mechanical contact determines whether or not the hood is closed to ensure that a routine cannot start when the hood is open. This contact also recognizes if the hood has been raised during a moisture determination routine. In this case, it will interrupt the routine.

The LCD has symbols and three separate fields for displaying the actual weight or computed result, the time and the temperature. In addition, it has a linear range indicator as a convenience feature for weighing in samples.
The LCD will guide you as you enter the program parameters before drying begins. During a moisture analysis routine, the momentary result is indicated in the various modes or the actual weight is displayed. Depending on the set parameters, additional information (such as temperature, time elapsed, time still required, selected display mode, momentary result, analog display of the residue) will appear in the LCD.

You can set parameters and control the moisture determination routine using the keys on the covered panel. For more information, please see the "Brief Instructions" at the end of this instruction manual. The touch-activated keys are covered by an overlay for protection. A light touch is all it takes to activate a key function. In the majority of the cases, you will hear an acoustic signal each time you press a key.

Data Interface

The moisture analyzer features an RS 232C-S/V.24 interface for outputting data on the moisture content or the dry weight of a sample. For technical specifications, please see the section entitled "Interface for Data Output."

At the interface port, you can connect either a printer (Sartorius YDP ...) for recording operating parameters and results, or a computer for evaluation.

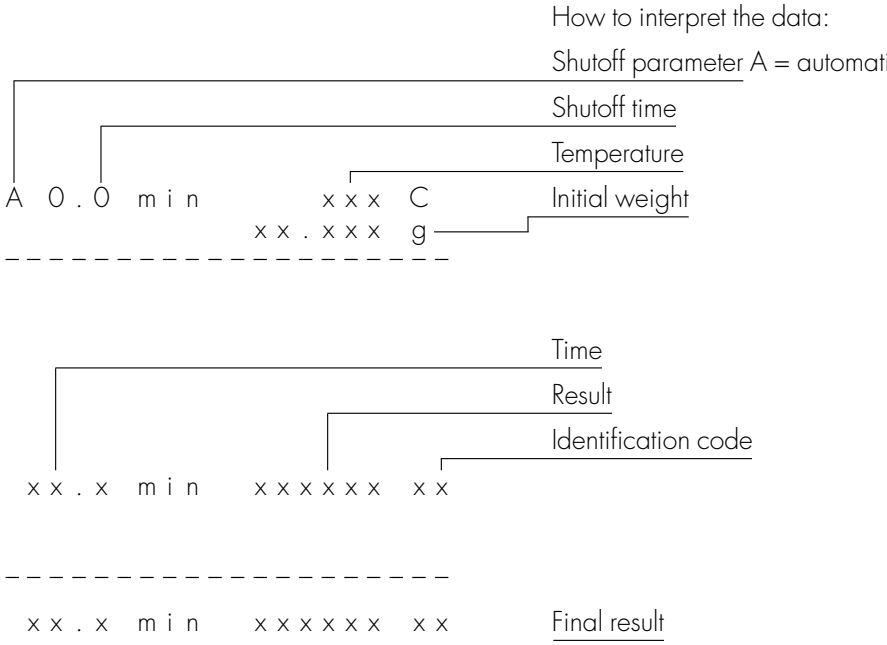
At the start of a moisture analysis routine, data for the drying program are automatically output at the interface.

At the end of a moisture analysis routine, the final result is output. If the routine is interrupted (by raising the hood, for example), a "B" will appear in the last line of the printout.

Intermediate results will be output during a routine either automatically at set intervals or when you press the "⊙" key.

Each line of the printout has 20 chararacters.

Printouts



The "A" in the first line stands for "automatic shutoff."

Identification codes on the printout

L = Moisture loss
R = Dry weight (residue or solids)
LR = Ratio 1
OR = Ratio 2
W = Weight

For more information, please see page 20.

Determination of Moisture or Dry Weight

Both procedures are identical.

For moisture determination, the amount of moisture lost is displayed in % as the result. The residual weight in % is displayed as the result for determination of the dry weight.

Since moisture is analyzed more often than dry weight, only moisture determination is discussed in the following.

Exact and reproducible moisture determination, combined with gentle heating of samples, places high demands on the moisture analyzer and the procedure itself.
The duration of a routine and the selected temperature setting are decisive factors in determining the result. However, the result also depends on the type of sample and the way it is prepared .

The MA 30 gives you a high degree of flexibility in selecting the parameters for moisture determination which best accommodate your sample.

Time and temperature are variables of the moisture determination procedure.

You can ensure reproducible results if you maintain the determined, optimal values for the sample amount, time (automatic mode), and temperature during a moisture analysis routine.

The preparation of samples also has a decisive influence on the result and should always be done carefully. For more information, please see the "Brief Instructions" on the last page of this instruction manual.

Heat Control and Temperature Regulation

The moisture analyzer features two infrared dark radiators (tubular heating elements) which provide the heat for moisture determination. Each heating element generates 180 watts of power (when the moisture analyzer is operated at the nominal voltage rating).

During a moisture determination routine, the temperature is monitored by a temperature sensor. A microprocessor evaluates and regulates the heat generated.

At the beginning of moisture determination, the chamber is fully heated until the set temperature is reached. The heat intensity is monitored and readjusted to keep the temperature constant at the nominal setting.

The power supplied to the heating elements is interrupted when the hood is raised.

Duration of a Moisture Determination Routine

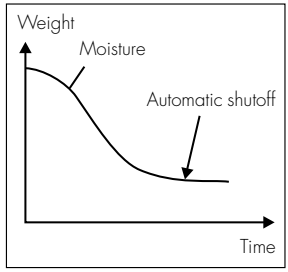
– With a preset time in the timer mode

  As soon as the preset time is up, the moisture analyzer will automatically shut off. In this timer mode, you can constantly monitor the time left on the LCD.

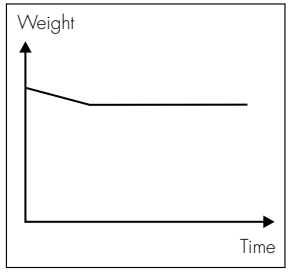
– In the fully automatic mode

  In this mode, the MA 30 recognizes when a considerable weight change is no longer expected and automatically ends the moisture determination routine.

As drying progresses, the moisture loss per unit of time continuously decreases and reaches zero as soon as the sample no longer contains moisture. The fully automatic shutoff function uses this as a basis to determine when the unit should shut off.



The fully automatic mode can be used when the weight loss during drying yields a curve that can be easily evaluated (such as the curve shown on the left).



If the readout remains constant for a short time after a slight decrease in weight (as is the case with plastic granules), the automatic mode will not shut off.

In this case, select the timer mode to have a moisture determination routine stop at a preset time.

Moisture Determination Results

Results can be displayed either in **units of weight (g)** or as **percentages.**

You can select the following calculated options using the **MODE** key:

$$\text{Moisture (\%)} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Initial weight}} \times 100$$

$$\text{Dry weight (\%) (residue)} = \frac{\text{Final weight}}{\text{Initial weight}} \times 100$$

$$\text{Ratio 1 (\%)*)} = \frac{\text{Initial weight} - \text{Final weight}}{\text{Final weight}} \times 100$$

$$\text{Ratio 2 (\%)*)} = \frac{\text{Initial weight}}{\text{Final weight}} \times 100$$

Weight = in grams

*) refers to dry weight

Seal of Approval from the German Agricultural Association ("DLG")

In 1990, the MA 30 Electronic Moisture Analyzer was tested by the German Agricultural Association ("DLG") and received the seal of approval "DLG-anerkannt" for its performance as a grain moisture analyzer.
The test number is 89–189.
The test results have been published in the DLG machine test report, number 4002.[1])
The following statement is included in the test report:

Suitability

"The Sartorius MA 30 grain moisture analyzer can be used to determine the moisture content of grain, beans, peas, ground corn (both dried and fresh), whole-grain rape seeds and sunflower seeds in the moisture content range which is significant for drying and storage. On account of its method of analysis (drying of the sample and simultaneous determination of the weight loss), the MA 30 is also a suitable instrument for determining the moisture content of other agricultural and non-agricultural products."

Values for the temperature, the moisture range and the measuring accuracy used during the DLG test for the various samples are listed in the Applications Table on the next page. These values are taken from the table included in the DLG test report. In addition, the time recommended for grinding a sample is indicated. Moisture analysis was performed for all samples under following conditions:

- fully automatic mode; automatic shutoff at the end of analysis
- initial sample weight: 4.8–5.2 g
- drying temperature: 140°C
- drying time: 15 min.
- start of the moisture determination routine with <ENTER> (manual start)

[1]) Published by: Deutsche Landwirtschafts-Gesellschaft e.V. (DLG) [German Agricultural Association], Department of Agricultural Technology – Testing Laboratory –, Zimmerweg 16 (DLG Building) D-60325 Frankfurt am Main, Germany

Applications Table for the Sartorius MA 30 Grain Moisture Analyzer

Sample	Temp. °C	Moisture range tested by the "DLG" in %	Measuring accuracy	Grinding time in sec.
Winter barley	140	12–20	good	20
Summer barley	140	12–20	good	20
Winter rye	140	12–20	good	20
Winter wheat	140	12–20	good	20
Oats	140	12–20	satisfactory	20
Corn dry fresh	140	12–18 30–35	good good	30 30
Peas	135	12–16	good-satis.	30
Beans	135	12–16	good-satis.	30
Winter rape seed	120	6–14	good	–
Sunflower seeds	120	6–13	good	–

How to Prepare a Sample

Grind the sample immediately preceding the moisture determination routine.

For this purpose, the German Agricultural Association ("DLG") recommends the shredder manufactured by BRAUN.

You can order the shredder from our list of accessories under order number YMA 02.

How to Grind/Shred a Sample:

Remove approx. 10–15 g from the sample to be analyzed.
Remove any foreign matter or deformed grains from the sample. Now grind your sample using a suitable grain grinder/shredder, such as the Sartorius YMA 02 shredder, for the length of time indicated in the table on page 22.

Preparation for Moisture Analysis

Place approx. 5 g of the sample on an aluminum sample dish.
Be sure to distribute the sample evenly on the sample dish.

Before the initial moisture determination routine, allow the MA 30 to warm up as follows:
– Raise the hood
– Tare the MA 30 without a sample dish on the MA 30
– Place a sample dish on the MA 30
– Lower the hood
– Press the <ENTER> key
During the warmup phase, you can prepare your sample.
After approx. 5 minutes have elapsed, you can stop the warmup phase by raising the hood on the MA 30.

The MA 30 is now ready to perform a moisture determination routine.

If you plan to analyze several samples directly following the first moisture determination routine, you do not need to warm up the MA 30 prior to each of these analyses.

Calibration

During calibration, the sensitivity of the built-in weighing system is adjusted to an accurate weight.

For calibration you will need an accurate 30 g calibration weight (order no. YSS 43).

Procedure

– Turn off the unit.
– Keep the F1 key pressed while you turn the unit back on.
– While all segments of the display are indicated, simultaneously keep both the F2 and print keys pressed until a number and "C" are displayed.
– If the disposable dish is on the retainer, remove it.
– Press F1.
– As soon as 30.000 and "CAL" are displayed, place the 30-g calibration weight on the dish retainer.

Once the calibration weight is stored, the unit will shut off automatically. This indicates the end of the calibration procedure.

Interface for Data Output

If you would like to record your results with the data printer (YDP02-0DV1), connect the printer to the data interface port. Special settings are not required.

General Specifications

Type of interface	Serial point-to-point connection
Operation	Asynchronous, simplex
Standard	V24-V28, RS 232 C-S
Handshake lines	Clear to Send (CTS) Data Terminal Ready (DTR)
Interface initialization	External (print key) or automatic print command
Character coding	7-bit ASCII
Transmission rate	1,200 baud
Parity	Odd
Synchronization	1 start bit, 1 stop bit
Data output format	22 characters: 21st and 22nd characters: CR and LF

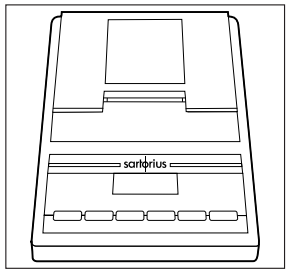
Print Command

Data are output each time the processor recognizes a software command.

Interfacing Devices with the Moisture Analyzer (RS Interface)

Make sure that the interface port is electrically connected to the protective grounding conductor of the moisture analyzer housing. The cabling supplied as accessory components is shielded and electrically connected on both ends to the cases of the connectors. This electrical connection may result in interference caused by cables scraping the floor or by transient currents if you have grounded the housing or connected the protective grounding conductor for line power. If necessary, connect an equipotential bonding conductor to the moisture analyzer.

Accessories (Options)



Data printer with date/time and statistics functions	YDP03-0CE

Calibration weight, 10 g (3 are needed)	670404
Calibration weight, 30 g	YSS 43
Sample pan retainer + 40 rectangular disposable sample pans	YWP 01 MA
Shredder for preparing samples	YMA 02
BalanceReader software for data acqisition with a PC	YAK 10 PC-0002
Applications diskette	YAD01 MA-0001 (German) YAD01 MA-0002 (English)
Carrying case	YSB02MA

Expendables

80 round disposable sample dishes	6965542
40 rectangular disposable sample pans	6965627
80 glass fiber filters	6906940

Specifications

Model		MA 30
Measuring method		Heating by infrared rays, determination of weight loss
Sample weight	g	max. 30, typical 5–10
Readability (moisture content)	%	0.01
Measuring accuracy (depends on sample)	%	0.05 (with an initial sample weight of approx. 5–10 g)
Measuring range		wheat: – 10% to 30% moisture content rye: – 10% to 30% moisture content
Temperature range	°C °F	+40 – +160 104–320
Temperature increments	°C °F	5 41
Permissible ambient temperature range	°C °F	+10...+40 50...104
Sample dish	mm in.	Ø 90 Ø 3.5
Housing dimensions (WxDxH)	mm in.	217x283x165 8.5x11.1x6.5
Net weight	kg lbs.	approx. 5.5 approx. 12.1
Power requirements (voltage+frequency)		115 or 230 V (selectable); 50–60 Hz
Allowable voltage fluctuation		–20%...+15%
Power consumption	VA	max. 400
Interface		RS 232 C-S/V24-V28; 7 data bits; (ASCII); 1,200 baud; odd parity

Troubleshooting Guide

Problem...	Causes...	Remedy
No segments appear in the display **(9)**	– No power available – The power cord is not plugged in	– Check the power supply – Plug in the power cord
"L" appears in the LCD	– The dish retainer **(2)** is not in place	– Insert the dish retainer
"H" appears in the LCD	– Sample exceeds the capacity of the moisture analyzer	– Reduce the initial sample weight
The weight result changes constantly or the LCD does not light up	– Unstable ambient conditions – The sample dish or the dish retainer is touching the protective disk plate **(3)**	– Set up the moisture analyzer in another area – Position the sample dish or dish retainer correctly, making sure that they do not touch the protective disk plate **(3)**

Care and Maintenance

Cleaning

Please do not use any aggressive cleaning agents (solvents or similar agents). Instead, use a piece of cloth wet with a mild detergent to clean the moisture analyzer.
Make sure that no liquid enters the moisture analyzer housing. After cleaning, wipe down the moisture analyzer with a soft, dry and lint-free piece of cloth.

Safety Inspection

If there is any indication that safe operation of the moisture analyzer is no longer warranted, turn off the power and unplug the unit from the wall outlet immediately. Lock the moisture analyzer in a secure place to ensure that it cannot be used for the time being.

In this case, notify your nearest Sartorius Service Center or the International Technical Support Group based in Goettingen, Germany. Only Sartorius service technicians who are authorized by Sartorius and have the proper manuals are allowed to perform maintenance and repairwork on the moisture analyzer.

Safe operation of the moisture analyzer is no longer ensured when
– there is visible damage to the moisture analyzer
– the moisture analyzer no longer functions properly
– the moisture analyzer has been stored for relatively long periods under unfavorable conditions
– the moisture analyzer has been exposed to rough handling during shipment.

We recommend that the moisture analyzer be inspected according to the following checklist by a qualified Sartorius service technician:

– Resistance at the protective grounding conductor <0.1 ohm measured at a current of 25 A from a power source of <12 V
– Leakage current <0.5 mA measured by a properly calibrated multimeter
– Insulation resistance >2 megohms measured with a constant voltage of at least 500 V at a 500 kohm load.

The duration and number of measurements should be determined by a qualified Sartorius service technician according to the particular ambient and operational conditions. However, such inspection must be done at least once a year.

CE Marking

CE

The CE marking affixed to the equipment indicates that the equipment meets the requirements of the following Directive(s) issued by the Council of the European Union:

89/336/EEC "Electromagnetic compatibility (EMC)"

Applicable European Standards:

Limitation of emissions:	EN 50081-1	Residential, commercial and light industry
	EN 50081-2	Industrial environment
Defined immunity to interference:	EN 50082-1	Residential, commercial and light industry
	EN 50082-2	Industrial environment

Important Note:

The operator shall be responsible for any modifications to Sartorius equipment and for any connections of cables or equipment not supplied by Sartorius and must check and, if necessary, correct these modifications and connections. On request, Sartorius will provide information on the minimum operating specifications (in accordance with the Standards listed above for defined immunity to interference).

73/23/EU	"Electrical equipment designed for use within certain voltage limits"

Applicable European Standards:

EN 60950	Safety of information technology equipment including electrical business equipment
EN 61010	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements

If you use electrical equipment in installations and under ambient conditions requiring higher safety standards, you must comply with the provisions as specified in the applicable regulations for installation in your country.

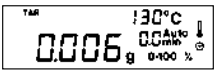
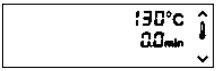
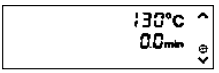
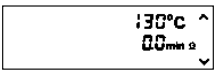
Brief Instructions for the Sartorius MA 30

How to Run a Routine

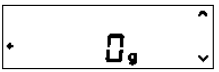
Turn on unit	ON/OFF
Select display mode	MODE
Lift hood and position disposable dish	
Zero the display	ENTER
Add sample to dish; lower hood	
Routine starts automatically or when you press	ENTER
When "END" is displayed, read off result	
To start a new routine, press	CF

How to Change the Parameters

After you press:

CF	when display shows			
F1	**temperature**		F1 higher F2 lower	+ ENTER
F2	**shutoff time** 0.0 min: auto		F1 increase F2 decrease	+ ENTER
⊙	**print interval**		F1 longer F2 shorter	+ ENTER

Weighing-in and start functions
when you turn on the unit keeping one of the keys below pressed:

MODE	**start**		F1 with ENTER F2 Auto(matic)	+ ENTER
ENTER	**convenience feature** for weighing-in 0 g = off		F1 increase F2 decrease	+ ENTER

How to Store the Parameters

No changes; parameters remain stored	CF
Store changes only temporarily (until unit is unplugged)	ENTER
Store changes permanently (until next overwriting procedure)	keep ENTER pressed until unit shuts off

MA 30 Applications Chart

Sample	Target value (g)	Temp. (°C)	Meas. time (min)	Result (%)
Cream for making cheese	3.0	75	14.1	12.39 R
Margarine	2.5	80	14.0	56.70 L
Tea extract		80	2–3	3.16 L
Camomile extract	3.0	100	3–4	40.0 L
Coarsely ground sunflower seeds	3.0	95	5–6	12.63 L
Seasoning paste	5–8	100	5–6	10.7 L
Oil-bearing seeds	8.0	100	10–12	14.7 L
Waffle mix	5–8	95	6–9	14.5 L
Shredded sugar beets	10.0	105	10–15	75.0 L
Castor powder	10.0	120	5.0	10.0 L
Malt	4.0	80	4–8	4.7 L
Mushroom paste	15.0	90	20–25	93.6 L
Aged salami	3.0	100	15.0	26.08 L
Fresh salami	3.0	110	12.0	29.11 L
Sausage filling	3.0	100	10.0	55.83 L
Wheat flour	3.0	110	5–7	14.25 L
Noodle dough (moist)	5.0	130	10.0	25.28 L
Lysine calcium (amino acid derivative)	5.0	105	7.0	29.97 L
Cream of tomato soup flavoring	5.0	80	10.0	6.4 L
Beef boullion	5.0	105	4–6	4.95 L
Coffee flavoring	5.0	80	5–7	3.63 L
Soybean meal	5.0	105	7–9	9.2 L
High-molecular-weight starches				
HES 1741	5.0	105	5.0	3.88 L
HES 1743	5.0	105	5.0	3.57 L
HES 1745	5.0	90	5.0	3.91 L
HES 1749	5.0	90	5.0	3.59 L
Maltodextrose MD01	5.0	105	5.0	4.77 L
Wheat flakes	5.0	105	7–11	12.1 L
Vegetable soup	10.0	80	8.0	5.59 L
Corn starch	5.0	105	5–7	12.25 L
Ragomil (cocoa + granulated sugar)	5.0	80	3–4	3.01 L
Dried parsley (air-dried)	5.0	105	5.0	7.35 L
Edible starch	5.0	95	13.8	47.77 L
Butter	2.0	130	4.5	15.45 L
Marc (residue) of spent malt	6.0	120	25.0	79.41 L
Cottage cheese	3.0	110	12.7	81.19 L

Sample	Target value (g)	Temp. (°C)	Meas. time (min)	Result (%)
Cigarette tobacco	1.5	55	30.0	15.0 L
Raw tobacco	2.0	55	30.0	24.61 L
Cellulose pulp	5–8	1 00	6–8	60–80 L
Cardboard, 0.5 mm	5.0	105	6.3	6.81 L
Lithium tablets/pellets	10.0	110	5.0	2.52 L
Powder for tablets	5.0	80	12.5	3.29 L
Eutragit (coating for tablets)	5.0	105	4–7	29.97 L
Cleaning fluid for contact lenses	10.0	50	20.0	0.1 L
Cosmetic gel	1–2	105	7.7	6.23 R
Protein hydrolysate	5.0	80	3–6	4.79 L
Potassium hydrogen phosphate, dibasic form	5.0	125	5–8	3.69 L
Sodium caseînate	5.0	75	6–8	5.07 L
NaCl	5.0	105	8.0	0.06 L
Dishwashing liquid	3.0	130	8.0	19.09 R
Liquid soap	3.0	120	8.0	16.94 R
Detergent for washing cars	1.5	110	11.0	15.46 R
Liquid scouring agent	5.0	120	8.0	70.0 L
Tensides	5–6	100	4–6	34.0 L
Plaster	10.0	160	30.0	26.87 L
Plaster	9.0	105	60	24.02 L
Calcium carbonate suspension	5.0	140	10–15	21.97 L
Fermented sludge	5.0	105	20.0	2.05 R
Sludge (filter cake)	10.0	120	20.0	41.0 R
Quartz sand	10.0	160	6–7	4.8 L
Water-based paints	7–9	105	5.0	4.6 L
Ink ribbons (inked)	2–3	100	4–5	4–8 L
Paint (colored)	1.5	90	9.0	40.8 L
Wood shavings, sawdust	5.0	140	15–20	70.0 L
Wood sizing	2.0	110	11.0	51.83 L
Sizing	4.0	120	6–7	33–48 L
Solution of vulcanizing agents	4.0	105	6–7	59.0 L
Adhesive	5.0	90	8–10	28.0 R
Basic ingredients for wood adhesive	3.0	150	5.0	60.12 R
Mineral oxide	5–8	120	3–5	10.0 L
Titanium dioxide	10.0	105	3–4	0.46 L

How to Prepare and Apply Samples

To homogenize

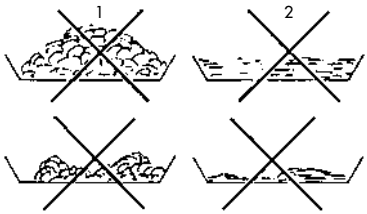
– solid samples: grind/use a pestle to crush
– liquid samples: stir

Spread your sample evenly on the dish:

for liquid/pasty samples →
use glass fiber filters

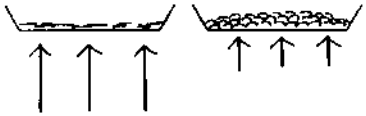
Avoid the following pitfalls:

→ Non-uniform heating
→ Non-reproducible values



Samples with low specific weights

→ lifted by warm air
Initial sample weight > select 5 g



For samples with unknown properties

→ Use the fully automatic mode for the 1st analysis

Analysis temperature

< denaturing temperature