Instruction Manual
MB35 Moisture Analyzer

Manual de instrucciones
Analizador de humedad MB35

Guide d'utilisateur
Analyseur d'humidité MB35

Bedienungsanleitung
MB35 Feuchtebestimmer

Analizzatore di umidità MB35
Manuale di istruzioni

Contents

1. Introduction

Thank you for deciding to purchase a MB35 Halogen Moisture Analyzer from Ohaus. Behind your instrument stands OHAUS, a leading manufacturer of precision Moisture Analyzers, Balances, Scales and Indicators. An Aftermarket Department with trained instrument technicians is dedicated to provide you with the fastest service possible in the event your instrument requires servicing.

1.1 Safety Precautions

Your Moisture Analyzer employs state of the art technology and meets the latest demands regarding instrument safety. Improper operation can endanger personnel and can cause property damage. For safe and dependable operation, please comply with the following instructions:

— The Moisture Analyzer is used for determination of the moisture in samples. Please use the instrument exclusively for this purpose. Any other type of use can endanger personnel and damage the instrument or other property.

— The Moisture Analyzer must not be operated in a hazardous environment and only under ambient conditions specified in these instructions.

— The Moisture Analyzer may be operated only by trained personnel who are familiar with the properties of the samples used and with the handling of the instrument.

— Your Moisture Analyzer is supplied with a 3-pin power cable with an equipment grounding conductor is prohibited.

The Halogen Moisture Analyzer works with heat!

— Ensure sufficient free space around the instrument to avoid heat accumulation and overheating (approximately 1 m free space above the instrument).

— Never place flammable materials on, below or next to the instrument as the area around the dryer unit warms up.

— Exercise caution when removing the sample. The sample itself, the sample chamber and any sample containers may still be very hot.

— During operation, you should never open the dryer unit as the ring-shaped heating element or completely.

1.1 Safety Precautions (Cont.)

Certain samples require special care!
With certain types of samples, there is a possibility of danger to personnel or damage to property through:

Fire or explosion:

— Flammable or explosive substances;

— Substances containing solvents;

— Substances which release flammable or explosive vapors when heated. With such samples, work at a drying temperature that is low enough to prevent the formation of flames or an explosion and wear protective goggles. Should there be any uncertainty regarding the flammability of a sample, always work with a small sample (maximum. 1 gram). In such cases, **never leave the instrument unattended!** In cases of doubt, perform a careful risk analysis.

Poisoning, burning:

— Substances which contain toxic or caustic components. Such substances may be dried only in a fume hood.

Corrosion:

— Substances which release corrosive vapors when heated (e.g. acids). In the case of such substances, we advise you to work with small amounts of samples as the vapor can condense on cooler housing parts and cause corrosion. Please note that the user always takes responsibility and assumes liability for damage caused by use of the types of samples mentioned above!

— Never make any modifications or constructional alterations to the instrument and use only original spare parts and optional equipment from Ohaus Corporation.

— Your Moisture Analyzer is a rugged, precision instrument – but you should still treat it carefully; it will then provide you with many years of trouble-free operation.

— Please comply with all notes and instructions in these operating instructions. Keep the instructions in a safe place where they are immediately at hand if any points are unclear.

APPLICATION DISCLAIMER:

— Moisture determination applications must be optimized and validated by the user according to local regulations. Application specific data provided by Ohaus is provided for reference purposes only. Ohaus waives all liability for applications based on this data.

2. Installation

This section contains unpacking and installation instructions for your new Moisture Analyzer .

2.1 Unpacking and Checking Equipment

Open the package and remove the instrument and the accessories. Check the completeness of the delivery.

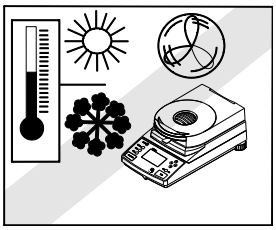
The following accessories are part of the standard equipment of your new Moisture Analyzer.

— 1 Box, Aluminum sample pans
— 1 Pan support
— 1 Specimen sample (circular, absorbent cellulose disk)
— 1 Draft shield element
— 1 Heat shield
— 1 Power cable
— 1 Set of operating instructions
— 1 Warranty card

Remove packing material from the instrument. Check the instrument for transport damage. Immediately inform your Ohaus dealer if you have complaints or parts are missing. Store all parts of the packaging. This packaging guarantees the best possible protection for the transport of your instrument.

2.2 Selecting the Location

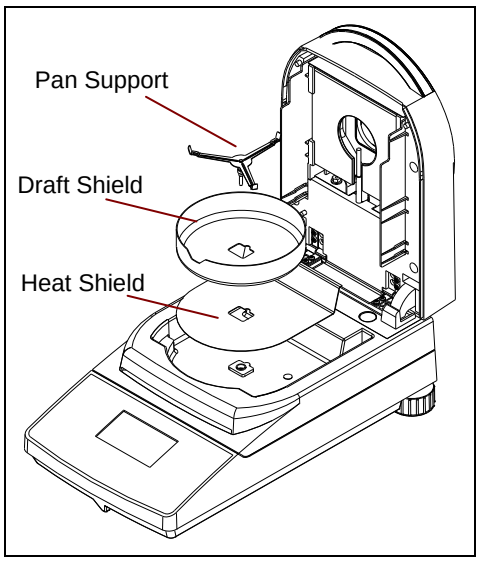
The Moisture Analyzer should always be used in an environment which is free from excessive air currents, corrosives, vibration, and temperature or humidity extremes. These factors will affect displayed weight readings.



DO NOT install the Moisture Analyzer next to:

- Open windows or doors or vents causing drafts or rapid temperature changes.
- Near vibrating, rotating or reciprocating equipment.

2.3 Installing the Heat Shield, Draft Shield and Pan Support



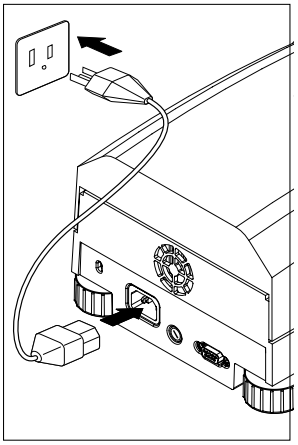
Install the heat shield, draft shield and pan support as shown. Turn the pan support until it engages In the locked position.

2.4 Connecting to a Power Supply

Check to ensure the voltage identification label on the Moisture Analyzer matches your local line voltage.

The halogen dryer unit is designed to operate at a specific line voltage (120 V ac or 240 V ac).

CAUTION:
Connection to line voltages that are above or below the rated voltage can cause improper operation or damage to the unit.



Connect power cord as shown. The MB35 is operational when power is applied. The display remains off until the On/Off button is pressed.

Allow the Moisture Analyzer to warm up for at least 30 minutes to stabilize when turned on.

WARNING:
If the power cable supplied is not long enough, use only a **proper 3-pin extension cable with an equipment grounding connector.**

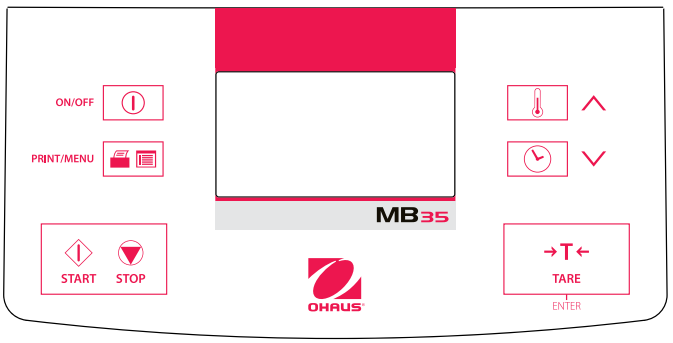
2.5 Operating Controls

The MB35 Moisture Analyzer controls are grouped as operating buttons and function buttons with three modes of operation.

EDIT MODE – User is changing a parameter, no test running.

RUN MODE – Unit is running a test.

RESULT MODE – Final result.



OPERATING BUTTONS

ON/OFF	Turns display On or Off.
PRINT/MENU	Press to enter ANALYZER SETUP screen. (**Edit** mode) Print Test Result (if COM parameters are set and PRINT is on).
→T← TARE ENTER	Accepts selection. (**Edit** mode) Sends Print command. (**Run** mode) Performs Tare function. (Pressing during the test has no effect.)

FUNCTION BUTTONS

EDIT MODE ONLY

100°	10:00
CLEAR PAN PRESS TARE	0.000g *

Initial press of button highlights temperature numerals. Additional presses increases temperature setting in 5 degree increments.

EDIT MODE ONLY

100°	10:00
CLEAR PAN PRESS TARE	0.000g *

Initial press of button highlights shut-off selection. Additional presses step through options, AUTO or TIMED (minutes/seconds).

EDIT MODE ONLY

ANALYZER SETUP

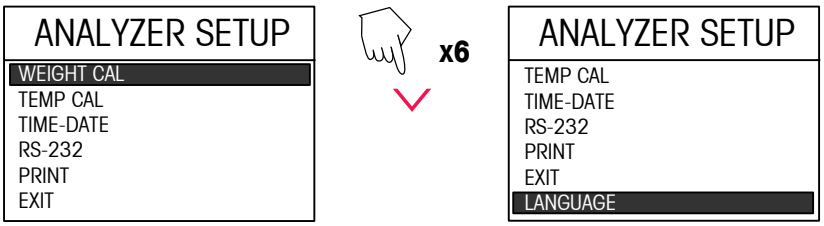
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

In a non-run mode, initial press of button brings up the ANALYZER SETUP screen.

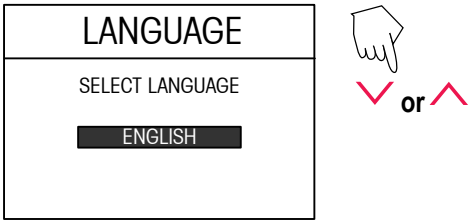
3. Moisture Analyzer Setup

3.1 Language Setting

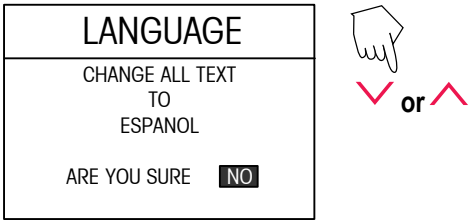
1. START



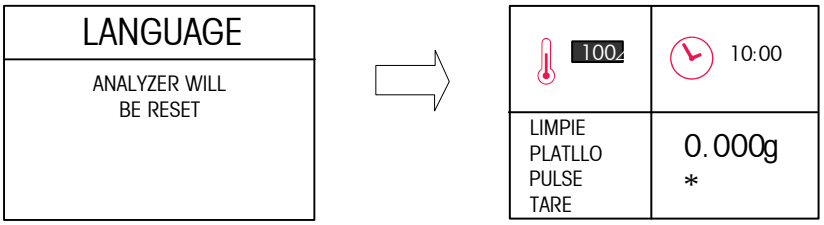
2. SELECT



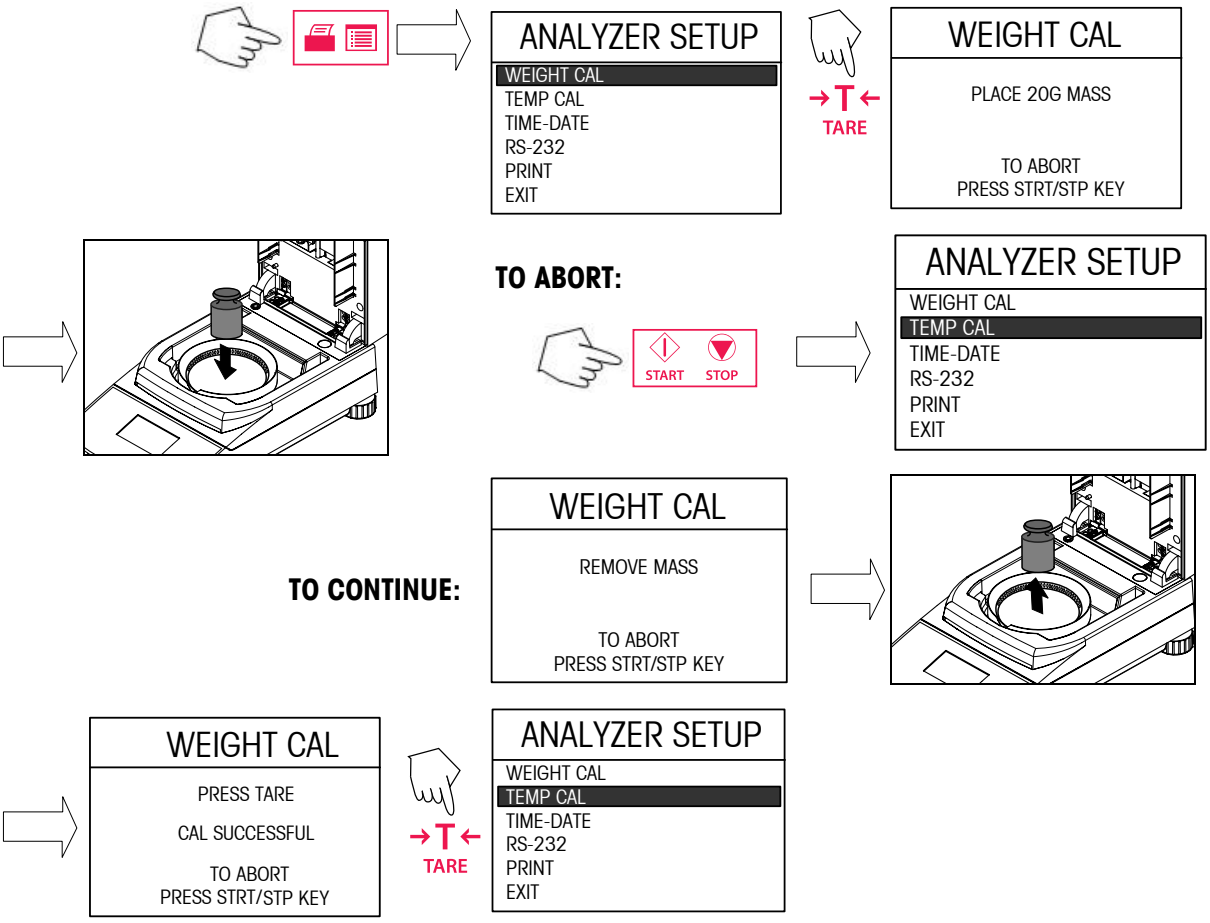
3. ACCEPT



4. FINAL

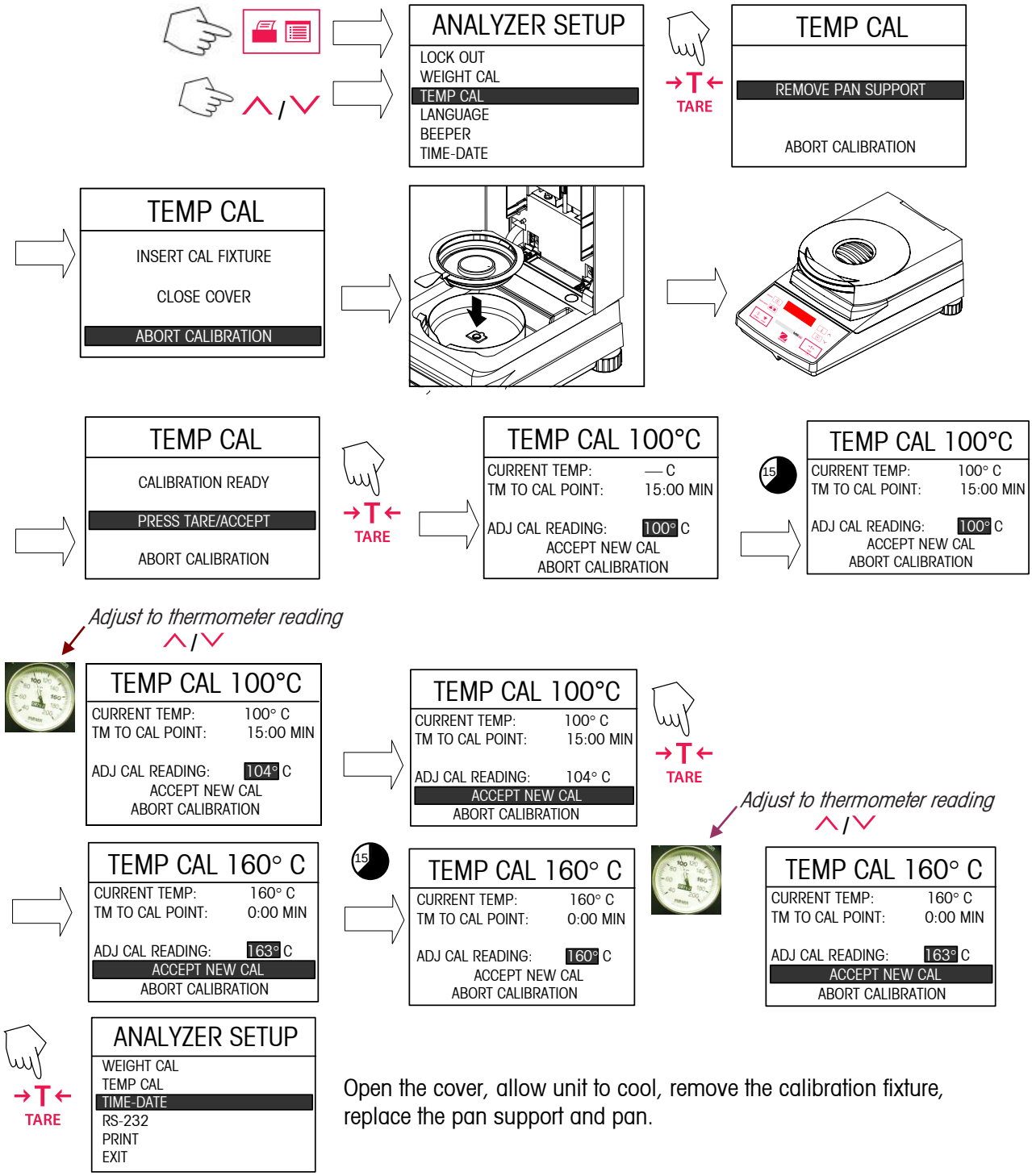


3.2 Weight Calibration



3.3 Temperature Calibration

Note: Temperature Calibration Kit is required.



Open the cover, allow unit to cool, remove the calibration fixture, replace the pan support and pan.

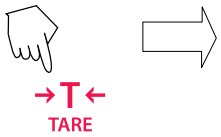
3.4 Time and Date Setting

1. TO START

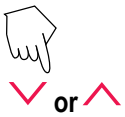
ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

2. SET FORMAT



TIME - DATE	
FORMAT:	MM/DD/YR
SET DATE:	07/10/01
TIME FMT:	12HR
SET TIME:	11:30 AM



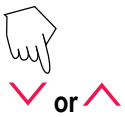
TIME - DATE	
FORMAT:	DD.MM.YR
SET DATE:	10.07.01
TIME FMT:	12HR
SET TIME:	11:30 AM

3. Exit without saving Only when setting data.

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

4. SET DATE

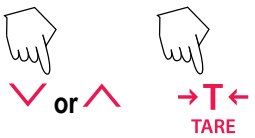
TIME - DATE	
FORMAT:	MM/DD/YR
SET DATE:	07/10/01
TIME FMT:	12HR
SET TIME:	11:30 AM



Repeat to complete date.

5. SET FMT

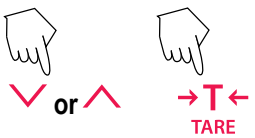
TIME - DATE	
FORMAT:	MM/DD/YR
SET DATE:	07/10/01
TIME FMT:	12HR
SET TIME:	11:30 AM



Select 12HR or 24HR.

6. SET TIME

TIME - DATE	
FORMAT:	MM/DD/YR
SET DATE:	07/10/01
TIME FMT:	12HR
SET TIME:	11:30 AM



Repeat for minutes and am/pm.

7. ACCEPT AND LEAVE

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

3.5 RS232 Settings

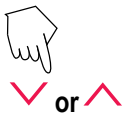
1. TO START

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

2. SET BAUD RATE

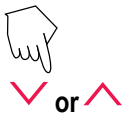
RS232
BAUD RATE: 9600
PARITY: NONE
DATA BITS: 8
STOP BITS: 1
HANDSHAKE: NONE



Default is 9600.

3. SET PARITY

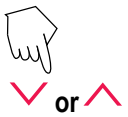
RS232
BAUD RATE: 9600
PARITY: NONE
DATA BITS: 8
STOP BITS: 1
HANDSHAKE: NONE



Default is NONE.

4. SET DATA BITS

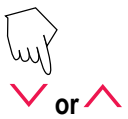
RS232
BAUD RATE: 9600
PARITY: NONE
DATA BITS: 8
STOP BITS: 1
HANDSHAKE: NONE



Default is 8.

5. SET STOP BITS

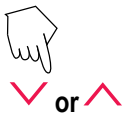
RS232
BAUD RATE: 9600
PARITY: NONE
DATA BITS: 8
STOP BITS: 1
HANDSHAKE: NONE



Default is 1.

6. SET HANDSHAKE

RS232
BAUD RATE: 9600
PARITY: NONE
DATA BITS: 8
STOP BITS: 1
HANDSHAKE: NONE



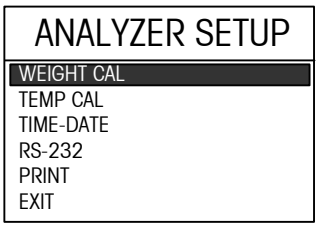
Default is NONE.

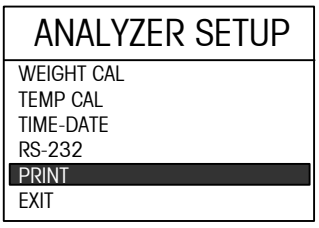
7. ACCEPT & LEAVE

ANALYZER SETUP
WEIGHT CAL
TEMP CAL
TIME-DATE
RS-232
PRINT
EXIT

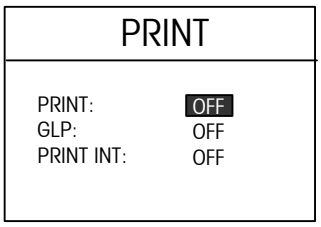
3.6 Setting Print and GLP Printing On or Off

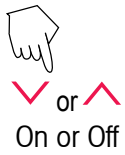
1. To Start:



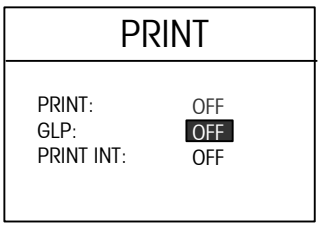


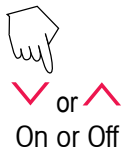
2. Set Print:



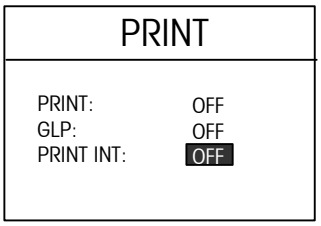


3. Set GLP:

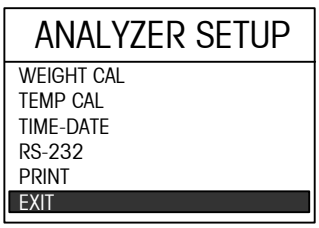


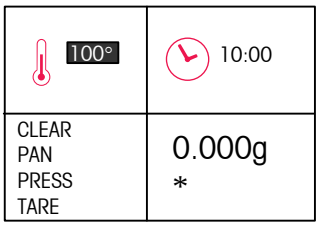


4. Set Print Interval:



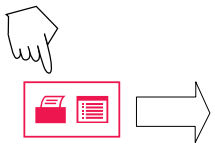
5. To Save:

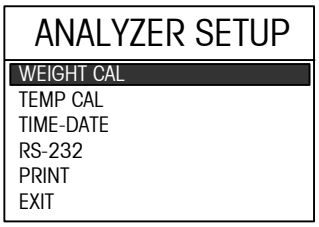


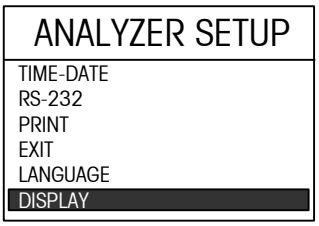


3.7 Adjusting Display Contrast and Brightness

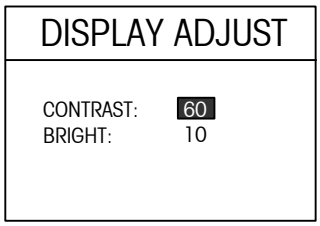
1. To Start:

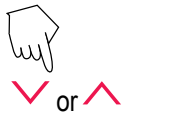






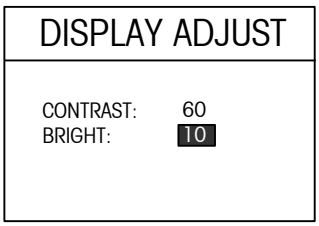
2. Set Contrast:

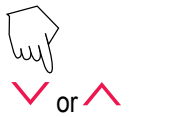




Adjust Contrast

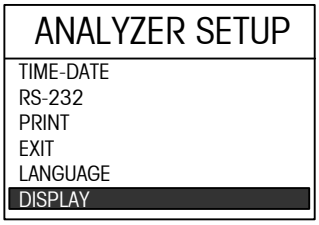
3. Set Brightness:



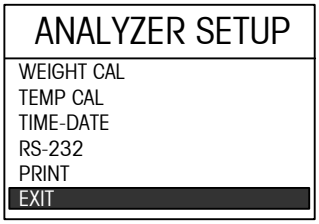


Adjust Brightness

4. Accept & Leave:



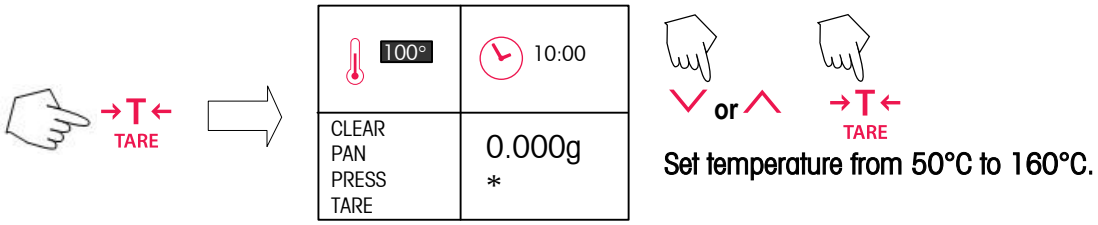
5. To Save:



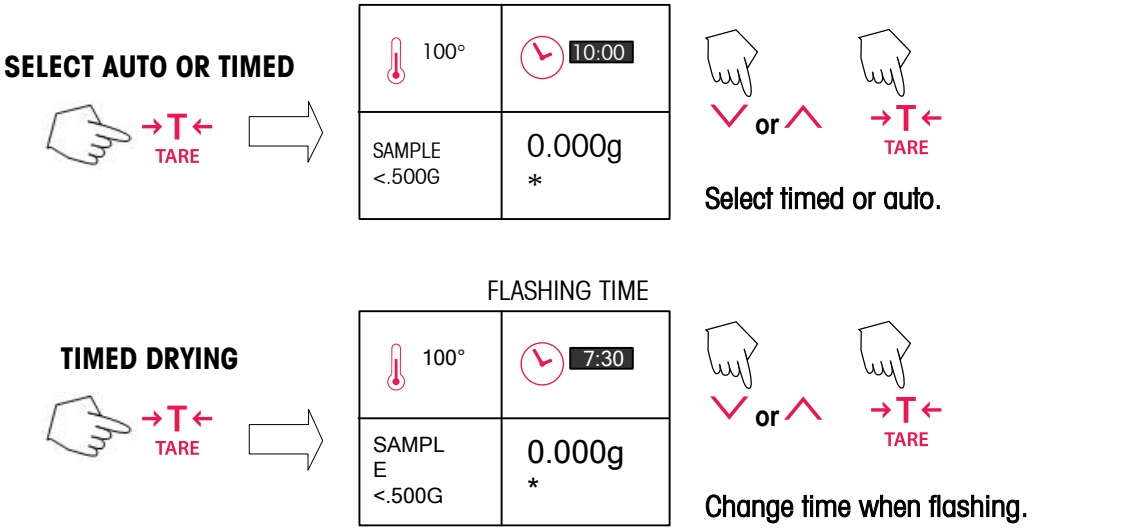
4. Operating Your Moisture Analyzer

Once the Moisture Analyzer parameters have been set, moisture determinations can be made very simply. There are three simple steps to perform:
1. Setting the drying temperature, 2. Setting the drying time, and 3. Preparing the sample.

4.1 Setting the Drying Temperature:



4.2 Setting the Drying Time:



4.3 Sample Preparation

Please keep in mind the importance of preparing your sample, the distribution of the sample on the weighing pan, the type of sample and the temperature range. Remember, the greater the number of uniform samples tested, the greater the accuracy of the results. Careful sample preparation is important for best results. At a minimum, follow these steps.

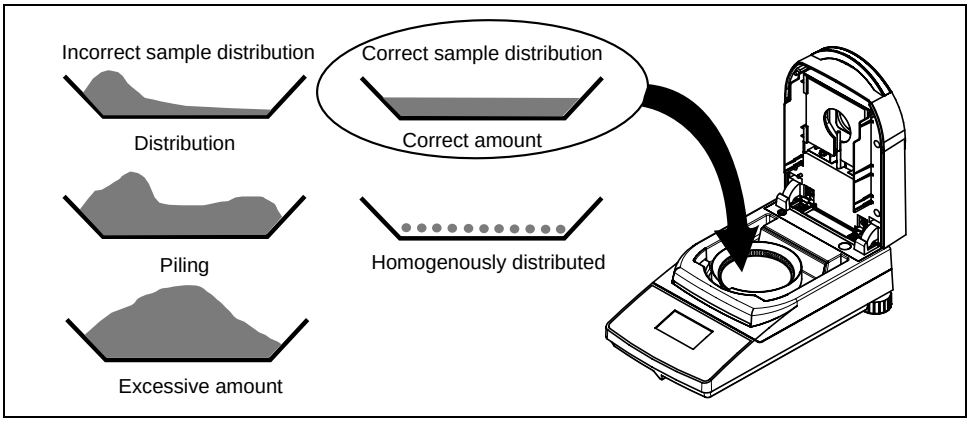
- Results of substances which form crusts (e.g. glucose syrup) or pasty substances (e.g. butter) can be considerably improved by mixing with quartz sand.

- For pasty, fat containing and melting substances, use of a glass fiber filter is advantageous to increase the surface area of the sample.

- The use of a glass fiber filter can be useful for temperature-sensitive and skin forming substances. In this case, the sample to be dried is covered by the filter and thus receives a "new surface".

4.3 Sample Preparation (Cont).

Clear the pan, press the Tare button.



4.4 Running the Test

130°	05:00
SAMPLE <.500G	0.000g *

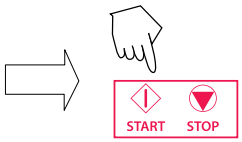
Initial display.

130°	05:00
CLOSE COVER	0.000g *

Place sample on pan.
(See above for correct sample distribution)

130°	05:00
TEST READY PRESS START	1.300g *

Start process.



130°	05:00
130°C 02:45	29.60% * 0.915G

Sample during drying process.

100°	05:00
TEST OVER... 05:00	29.60% * 0.915G

Test end.

4.5 RS232 Command Table

Output Formats

Data output can be initiated in one of three ways:

1. By pressing the **Print** button;
2. Using the Print Interval feature;
3. Sending a print command ("P") from a computer.

RS232 Commands

All communication is accomplished using standard ASCII format. Only the characters shown in the following table are acknowledged by the Moisture Analyzer. Invalid command response "ES" error indicates the Moisture Analyzer has not recognized the command. Commands sent to the Moisture Analyzer must be terminated with a Line Feed or carriage return-line line feed (CRLF). Data output by the Moisture Analyzer is always terminated with a carriage return-line feed (CRLF).

RS232 COMMAND TABLE

Command Character	Description
V	Print SR Version
ESC V	Print S/N (unit ID)
?	Print current mode.
TIME	Print Current Time
DATE	Print Current Date
P	Print elapsed time and present reading

RS232 Pin out

The following table illustrates the pin-out connections on the RS232 connector.

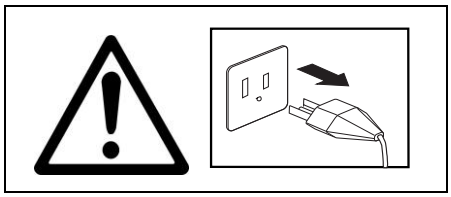
1		N/C
2	<–	Date Out (TXD)
3	–>	Date Out (RXD)
4&6		Pins 4 and 6 are connected together.
5		Ground
7	–>	Clear to send (CTS)
8	<–	Request to send (RTS)
9		N/C

5. Care and Maintenance

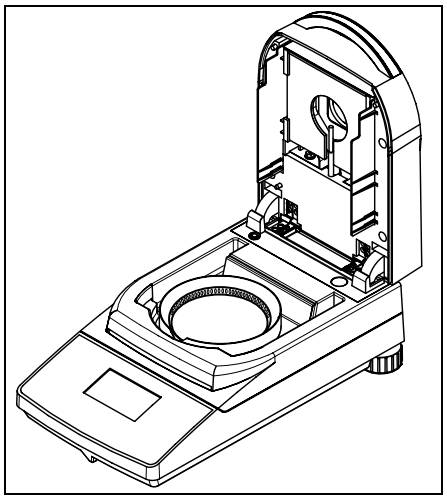
In this section, you will learn how to keep your Moisture Analyzer in good condition and how to replace expendable parts.

5.1 Cleaning Interior/Exterior Components

To continue to obtain precise measurements, it is advisable to clean the interior components at regular intervals. Please note the following instructions for cleaning your instrument.

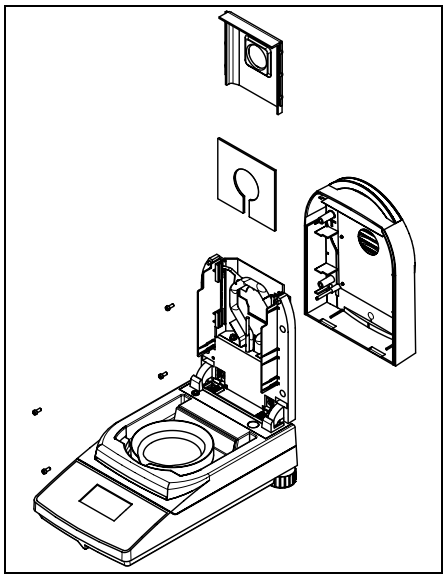


Disconnect the instrument from the power supply before cleaning.



Cleaning Temperature Sensor and Protective Glass

Check the protective glass and the temperature sensor for debris which could impede the operation. If the glass appears dirty, clean the surface facing the compartment using a commercial glass cleaner. If the sensor is dirty, clean using a mild cleaning agent.



Removing Glass for Cleaning

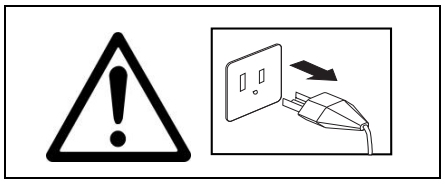
If the inside of the glass is dirty, open the cover and remove the four cover screws as shown.

Remove the glass holder and glass from the cover and clean with a commercial glass cleaner on both sides.

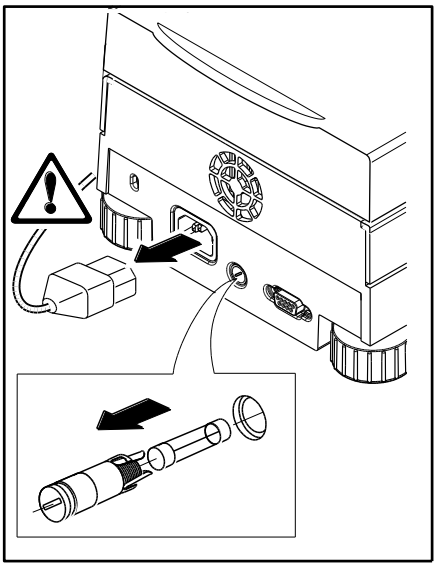
Reassemble after cleaning.

5.2 Replacing Power Line Fuse

If the instrument display fails to light after switching it on, check the power outlet first. If power is available, and the instrument fails to operate, the power fuse may be open (blown).



Disconnect the instrument from the power supply before cleaning.



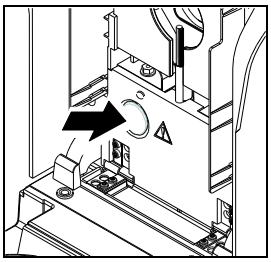
Using a screwdriver, turn the fuse holder to the left (counterclockwise) and remove the fuse.

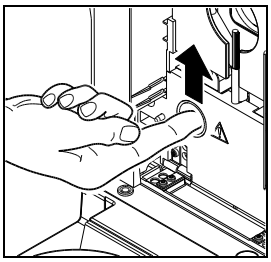
Check the condition of the fuse. Replace blown fuse by those of the same type with the same rated value (5 x 20 mm, T6.3H 250 V).

NOTE: If the fuse is good and power is available at the outlet, the cord or instrument may be defective. Try a new cord. If this does not work, the instrument should be sent back for servicing.

The use of a fuse of a different type or with a different value, or bridging or shunting the fuse is not allowed and can possibly cause a hazard to your safety and lead to instrument damage!

5.3 Resetting the dryer thermal overload device





NOTE: This procedure only applies to units that contain an access hole to the thermal overload protection device. See illustrations.

If the dryer has overheated and the thermal overload protection device has responded, it can be reset as follows:

Disconnect the unit from the power supply.

Lift the top cover straight up and remove the access hole cover from the access hole using a flat head screwdriver.

Reset the overload device with your finger.
Replace the access hole cover and reconnect unit to power supply.

5.4 Accessories

Description	Ohaus Part No.
Span Calibration Mass 20 g ASTM Class 1 Tolerance	80780022
Security Locking Cable	80850043
RS232 Interface Cable, 9 pin serial extension - PC to MB45	80500525
RS232 Interface Cable, MB35 to printer (25 pin) SF42	80500571
Data Printer	SF42
Sample Pans 90mm diameter	80850086
Glass Fiber Pads	80850087
Pan, Re-usable - 90mm (set of three)	80850088
In-use Cover	80850085
Temperature Calibration Kit	11113857
Pan Handler	11113873

5.5 Specifications

Model MB35	
Capacity	35g
Readability	0.001g, 0.01%
Temp. Settings	50°C to 160°C (5° increments)
Drying Programs	Standard
Switch-off Criteria	Timed, Auto
Heat Source	Halogen
Calibration	External calibration mass-20g
Dimensions (DxWxH) (cm)	35.5 x 19 x 15.2
Pan Size	90 mm. diameter
Weight (kg)	4.5
Shipping Weight (kg)	6.4

Admissible ambient conditions	
Indoor use only	
Altitude:	Up to 2000m
Temperature range:	5 ºC to 40 ºC
Atmospheric humidity:	Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C.
Warm-up time:	At least 60 minutes after connecting the instrument to the power supply; when switched on from standby-mode, the instrument is ready for operation immediately.
Voltage fluctuations:	Mains supply voltage fluctuations up to –15% +10% of the nominal range
Over voltage category:	II
Pollution degree:	2
Power load:	Max. 450 W during drying process
Current consumption:	4 A or 2 A, according to the heating element
Power supply voltage:	100 V – 120 V or 200 V – 240 V, 50/60 Hz (the voltage is given by the heating element)
Power line fuse:	1 piece, 5 x 20 mm, T6,3 H 250 V

6.0 Compliance

Compliance to the following standards is indicated by the corresponding mark on the product.

Marking	Standard
CE	This product conforms to the EMC directive 2004/108/EC, the Low Voltage Directive 2006/95/EC. The complete Declaration of Conformity is available online at www.ohaus.com.
	AS/NZS4251.1, AS/NZS4252.1
C US	CAN/CSA C22.2 No. 61010-1-04, UL Std No. 61010A-1

FCC Note

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada Note

This Class B digital apparatus complies with Canadian ICES-003.

ISO 9001 Registration

In 1994, Ohaus Corporation, USA, was awarded a certificate of registration to ISO 9001 by Bureau Veritus Quality International (BVQI), confirming that the Ohaus quality management system is compliant with the ISO 9001 standard's requirements. On May 21, 2009, Ohaus Corporation, USA, was re-registered to the ISO 9001:2008 standard.

Disposal

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

The Batteries Directive 2006/66/EC introduces new requirements from September 2008 on removability of batteries from waste equipment in EU Member States. To comply with this Directive, this device has been designed for safe removal of the batteries at end-of-life by a waste treatment facility.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

If you have any questions, please contact the responsible authority or the distributor from which you purchased this device.

Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

For disposal instructions in Europe, refer to www.ohaus.com, choose your country then search for WEEE.

Thank you for your contribution to environmental protection.

LIMITED WARRANTY

Ohaus products are warranted against defects in materials and workmanship from the date of delivery through the duration of the warranty period. During the warranty period Ohaus will repair, or, at its option, replace any component(s) that proves to be defective at no charge, provided that the product is returned, freight prepaid, to Ohaus.

This warranty does not apply if the product has been damaged by accident or misuse, exposed to radioactive or corrosive materials, has foreign material penetrating to the inside of the product, or as a result of service or modification by other than Ohaus. In lieu of a properly returned warranty registration card, the warranty period shall begin on the date of shipment to the authorized dealer. No other express or implied warranty is given by Ohaus Corporation. Ohaus Corporation shall not be liable for any consequential damages.

As warranty legislation differs from state to state and country to country, please contact Ohaus or your local Ohaus dealer for further details.