OHAUS®

GA Series

ELECTRONIC BALANCE

Directions for Use and Maintenance

Please read this manual before you use your OHAUS® Electronic Balance

MODEL GA 200-D

WARNING: IN COMPLIANCE WITH CLASS A REQUIREMENTS IN BOTH PART 15 OF FCC RULES AND THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DOC. THIS EQUIPMENT DOES NOT EXCEED THE LIMITS FOR RADIO NOISE EMISSIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA MAY CAUSE UNACCEPTABLE INTERFERENCE TO RADIO AND TV RECEPTION REQUIRING THE OPERATOR TO TAKE WHATEVER STEPS ARE NECESSARY TO CORRECT THE INTERFERENCE.

LE PRÉSENT APPAREIL NUMÉRIQUE N'EMET PAS DE BRUITS RADIOÉLECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMÉRIQUES DE CLASSE A PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOÉLECTRIQUE EDICTÉ PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

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MODEL GA 200-D

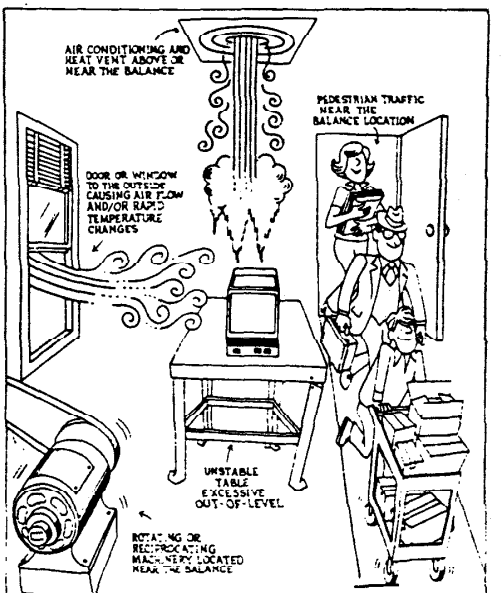
PREFACE

Your OHAUS® Electronic Balance is a precision instrument that is designed to be versatile, accurate and easy to operate. The balance will reward you with many trouble-free weighings if it is handled carefully and maintained properly. This manual specifies the proper procedures for setting up, calibrating and maintaining your balance. Before operating, please read the set up and calibration instructions.

SET UP

- **ENVIRONMENT**

  The balance should always be used in an environment which is free from excessive air currents, corrosives, vibration, drafts and/or temperature/humidity extremes. See "HOSTILE ENVIRONMENT" illustration.



HOSTILE ENVIRONMENT

ENVIRONMENTAL CONDITIONS WHICH COULD CAUSE UNSTABLE DISPLAYED VALUES

• ASSEMBLY PROCEDURE

1. Carefully unpack the balance.

   NOTE: It is recommended that you save the packing material. It will be of value when storing and/or transporting your balance.

2. Place the balance on a reasonably level, stable work surface.

3. Level the balance using the two leveling screws located under the rear of the balance. A level inside the weighing chamber is provided to indicate when the balance is level.

4. Install the Shield Plate, Pan and Protective Ring, in that order, from the Weighing Chamber floor.

• POWER REQUIREMENTS

WARNING:

- To avoid shock hazards, always be certain that the power cord is disconnected **BEFORE** removing the balance cover.
- Even though the balance may have been "switched OFF," high voltage is present inside the balance as long as the power cord is connected.
- A power cord has been furnished with the balance. **DO NOT** use any type of power cord other than the one furnished.

  DO NOT create a safety hazard by defeating the grounding feature.

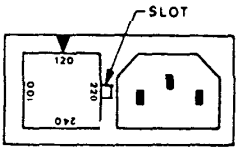
• VOLTAGE SETTING

The balance can be damaged if operated at an incorrect line voltage.

If, for any reason the balance HAS NOT been set to operate at your particular line voltage, it may be checked in the following manner:

1. Locate the fuseholder in the rear of the balance.

2. There is an arrow imprinted above the fuseholder, and the voltage (100, 120, 220 or 240) below the arrow indicates the line voltage. See illustration.



3. If the balance is **NOT** set for operation at the correct line voltage, pry the fuseholder loose by inserting a small screwdriver blade in the slot. Remove the fuseholder and rotate it to the proper position with the correct line voltage lining up with the arrow. If necessary, install the correct fuse for the required line voltage. (See Replacement Parts List for fuse rating.)
4. Insert the fuseholder.
5. Connect the power cord.
6. Balance should warm up for at least one hour.

• CALIBRATION

The balance has been calibrated before shipment, but the calibration should be checked and, if necessary, reset before the balance is used.

Calibration could have been influenced by such factors as:

- Variations of the earth's gravitational field at different latitudes of the world.
- Handling during shipment.
- Changes in work location.

If after placing a calibrated weight on the pan it becomes evident that the balance needs to be calibrated again, the balance can be calibrated by using the Automatic Calibration feature, with an internal calibration weight, or by using the External Calibration feature with an external calibration weight.

Automatic Calibration

NOTE: The balance must be set for the range that is being Calibrated.

To use this feature proceed as follows:

A. FOR "SEMIMICRO RANGE." (Low)

1. Press the ON/OFF Switch and allow the balance to warm up, with no weight on the pan, for at least one hour.
2. Press the RE-ZERO Switch to obtain a stable reading of zero.

3. Rotate the Calibration Lever to "CAL 40" position. The display will show "C" indicating that calibration is now in process.

   NOTES:

   - If "CE" is displayed, it indicates a Calibration Error exists. Turn the Calibration Lever back to "WEIGHING" position, press ON-REZERO Switch, and repeat Step 3.

   - If "CE" continues to be displayed, a higher Selectable Integration level may be needed. See Selectable Integration for details.

4. When the display shows "CC", the calibration is complete. Turn the Calibration Lever to "WEIGHING" position, and the balance will automatically return to the weighing mode.

   NOTE: Calibration may also be accomplished by using an external calibration weight. For details see External Calibration.

B. FOR "MAKRO" RANGE. (High)

   Steps 1 and 2 are the same as for the "SEMIMICRO" range.

3. Press the RANGE Switch.
4. Rotate the Calibration Lever to "CAL 200" position.

   The display will show "C", indicating that Calibration is now in progress.
   Remainder of the sequence is the same as for "SEMIMICRO" range.

External Calibration

1. There is a plugged hole on the right side of the balance (when viewed from the front). Remove the hole plug.
2. Press the ON/OFF Switch and allow the balance to warm up with no weight on the pan, for at least one hour.
3. Select the "Weighing Range" by depressing the RANGE KEY.
4. Press the RE-ZERO Switch to obtain a stable reading of zero.
5. Insert a pointed object, such as a small screwdriver, into the access hole and press the activator spring of the switch. "C" will be displayed, as will the busy symbol.

6. Place either a 40 g or a 200 g Calibration weight, as applicable, on the pan and wait for the letter "C" to flash 3 times before either 40.00000 g or 200.0000 g, as applicable, is displayed. There will also be an audible signal to alert the user that the external Calibration is complete.
7. Remove the calibration weight and zero will be displayed.
8. Return the plug to the access hole. The balance is now in the weighing mode and has been externally calibrated.

NOTE: Both Weighing Ranges must be Calibrated independent of each other.

OPERATION

- **WEIGHING**

1. Press the ON/OFF Switch and the display will show the following for approximately three seconds:

This indicates that all display segments are operating properly. The balance will then do a self diagnostic check. If all functions are operating properly the balance will then display zero.

NOTE: The busy light ("0" located on the lower left side of the display) will appear. Pressing the RE-ZERO Switch (after turning the balance "ON") will cause the busy light to go out. A built-in beeper indicates that the RE-ZERO Switch has been pressed. If the busy light appears during normal use of the balance, this indicates that the microprocessor is busy and will not accept any commands until the light extinguishes.

2. TARE the balance by pressing the RE-ZERO Switch and selecting the appropriate range.
3. Place an unknown mass on the center of the pan. The weight will be displayed.
4. Press the ON/OFF Switch to turn off the balance.

NOTE: Overload will be indicated by "H" being displayed and Underload by "L" being displayed. If "H" is displayed in the "SEMI-MICRO" range, depress the RANGE Switch to change to the "MAKRO" range.

TARING

NOTE: In all cases where the operation of taring is mentioned, it is accomplished by pressing the RE-ZERO Switch.

1. Press the RE-ZERO Switch to obtain a reading of zero.
2. Place an empty container on the center of the pan. Its weight will be displayed.
3. Press the RE-ZERO Switch and ZERO will be displayed again. The "container weight" will be automatically subtracted from further weighings. As objects are placed in the container, only the weight of those objects will be displayed.
4. When the container and its contents are removed from the pan, the total "TARED" weight will be displayed as a negative value.

BATCHING (OR COMPOUNDING)

This procedure is actually repetitive taring. You may repeat the above procedure for each component until the capacity of the balance is reached.

CHECKWEIGHING

1. Place a known weight on the pan to serve as a reference.
2. Press the RE-ZERO Switch to obtain a zero reading.
3. Remove the known weight from the pan, and its weight will be displayed as a negative value.
4. Place the other weight to be checked against the known weight on the pan.
5. If it is underweight, the difference will be displayed as a negative value. If it exceeds the known weight, the difference will be displayed as a positive value.

• OPERATING PARAMETERS

INTRODUCTION

Ohaus GA Series balances are designed so that the balance performance may be changed to fit specific applications. An explanation of the various features along with the specific OPERATING PARAMETER of each feature is listed below. Each feature has been given a specific number which will be used during the Selection Procedure.

SELECTABLE INTEGRATION

— Feature Number 110

Allows the user to select any one of four integration levels. Higher integration levels are of help when the balance, or object being weighed, are subject to excessive vibrations, air currents, etc. The levels are as follows:

111 - Low Integration Level
112 - Normal Integration Level (Initial Setting)
113 - Strong Integration Level
114 - Maximum Integration Level

STABILITY RANGE

— Feature Number 120

Allows the selection of any one of nine different stability levels to suit a specific need. The selection of a specific stability range will determine when the stability indicator (g) is displayed (indicating a stable reading) and goes off (indicating unstable reading). As can be seen from the following chart, the balance can be programmed to indicate stability from ±0.000025g to ±0.0064g.

121 - ±0.000025g
122 - ±0.00005g
123 - ±0.0001g (Initial Setting)
124 - ±0.0002g
125 - ±0.0004g
126 - ±0.0008g
127 - ±0.0016g
128 - ±0.0032g
129 - ±0.0064g

DISPLAY DECIMAL PARAMETERS

— Feature Number 130

Enables the user to select the display decimal parameter required for a specific need.

131 - Last decimal ON at all times (Initial Setting)
132 - Last decimal OFF at all times
133 - Last decimal ON at Stability
134 - All decimals ON at Stability

TARE FUNCTION

— Feature Number 140

The parameters under which the balance will accept a "TARE" command are as follows:

141 - TARE at anytime
142 - TARE only when readings are stable (Initial Setting)

AUTOMATIC ZEROING

— Feature Number 150

Will eliminate any small amounts of drift due to vibrations or gradual temperature changes.

151 - Automatic Zeroing ON (Initial Setting)
152 - Automatic Zeroing OFF

As indicated in the Operating Parameters explanation, the balance is shipped with Operating Parameters preset. To select Operating Parameters proceed as follows:

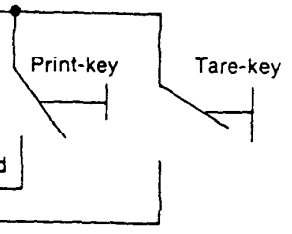
RS 232 INTERFACE CAPABILITIES.

(for Models so equipped.)

If your Model is equipped with a bi-directional RS-232 compatible interface, it can be interfaced to other equipment by means of the subminiature 25 pin receptacle located on the back of the balance.

The pinout and pin descriptions are as follows:

Pin 1: ground (protective ground)
Pin 2: Data output (T X D)
Pin 3: Data input (R X D)
Pin 4: external ground
Pin 5: Clear to send-input (CTS)
Pin 6: connected
Pin 7: connected
Pin 8:
Pin 9: connected
Pin 10: connected
Pin 11: connected
Pin 12: connected
Pin 13: connected
Pin 14: signal ground
Pin 15:
Pin 16:
Pin 17: connected
Pin 18: connected
Pin 19: connected
Pin 20: Data terminal ready-output (DTR)
Pin 21: connected
Pin 22: connected
Pin 23: connected
Pin 24: connected
Pin 25: connected



GENERAL DESCRIPTION

Interface Initiation: External Print command, automatic.

Transfer Rates: 150, 300, 600, 1200, 2400, 4800, 9600 Baud.

Character Coding: 7 bit ASCII.

Parity: Mark, Space, Odd, Even.

Synchronization: 1 Start bit, 1 Stop bit.

Data Output Format:
15 Characters
1st character = plus/minus
(Standard Balance) prefix or space
15th character = line feed

Character Format: - 1 Start bit
7 ASCII bits
1 parity bit
1 Stop bit

OUTPUT

C211 External print command without stability
C212 External print command at stability
C213 Automatic/Synch. with display/without stability
C214 Automatic/Synch. with display/at stability

BAUD RATE

C221 150
C222 300
C223 600
C224 1200
C225 2400
C226 4800
C227 9600

PARITY BIT

C231 Mark Parity
C232 Space Parity
C233 Odd Parity
C234 Even Parity

SPECIAL INFORMATION:

C411 Program Lock "OFF"
C412 Program Lock "ON"
CO "END" OF PROGRAMMING

RS 232 INTERFACE (Software)

NOTE: All Command Inputs (to the balance) MUST be prefixed by an Escape Character and terminated by a Carriage Return and Line Feed.

RS 232 Commands include PRINT and TARE.

COMMAND DESCRIPTIONS

* ESC P - Print Command
The balance responds by sending the

Weight Information as described below:

Field	pol	space	weight	space	units	space	Cr	Lf
Length	1	1	8	1	1	1	1	1

pol +, -, blank for ϕ reading

Weight - The eight character weight field contains the current display weight left justified with leading zero blanking and a decimal point.

UNITS - g (grams) or blank if **not** stable.

NOTE: The above output can also be initiated via the Automatic Print feature. See Data Output Command.

* ESC T - Tare Command Tares balance

* ESC = Escape Key

SELECTION PROCEDURE

1. With the balance OFF, remove the small protective cap on the back rear panel, located in the upper portion.
2. Viewing the rear of the balance, insert a small pointed object (such as a small screwdriver) through the access hole and slide the switch to the **LEFT** position.
3. Depress both the ON/OFF and the RE-ZERO Switches at the same time, which will turn the balance ON.
4. The balance will display "CO" and numbers 1 through 4 will begin to cycle consecutively.

   NOTE: If "LO" appears, the switch positioned in procedure 2 (above) is not in the correct position.

5. When "C1" is displayed, depress the RE-ZERO Switch.
6. The balance will then display "C10" and numbers 1 through 5 will then be displayed to the right of "C1." Select the feature to be changed by depressing the RE-ZERO Switch when the desired feature number is displayed.

   Example: To access the SELECTABLE INTEGRATION feature, depress RE-ZERO Switch when "C11" is displayed.

7. Once the particular feature is selected, the number of different Operating Parameters will be displayed in the next position to the right.

   Example: Selectable integration "C11Q." Numbers 1 through 4 will cycle in the space to the right of "C11."

8. Choose the specific Operating Parameter when that corresponding number is displayed.

   Example: If a strong integration level is desired, depress the RE-ZERO Switch when "113" is displayed.

9. Once an operating parameter is selected the Δ sign will light up. The balance will automatically shift back one place to enable another feature to be selected. Numbers 0 through 4 will then begin to cycle again to the right of "C1."
10. At this point any of the desired features can be changed by repeating Steps 7 and 8.
11. To return the balance to the normal operating mode, or to avoid changing an operating parameter, press the RE-ZERO Switch whenever "0" is displayed as the numbers cycle through.
12. By pressing the RE-ZERO Switch when the display shows "C0," the balance will return to the normal operating mode.
13. Slide the switch mentioned in Step 2 to the right.
14. Replace the protective cap.
15. The balance may now be used in accordance with the selected Operating Parameters.

    NOTES:

    (1) To change OPERATING PARAMETERS again, repeat the procedure from Step 1.

    (2) To check the selected OPERATING PARAMETERS, with the switch (mentioned in Step 2) in the UP position, repeat the procedure from Step 9. "L" (indicating locked) will appear instead of "C" (indicating choose). None of the OPERATING PARAMETERS can be changed, but all can be accessed and checked by repeating the above procedure. The Δ will appear as each selected Operating Parameter is displayed.

- **BELOW THE BALANCE WEIGHING**

To use this feature, carefully remove the protective cap located under the balance (directly beneath the weighing platform). The built-in hook will then be exposed. By suspending an object from this hook, weighings can be made up to the balance capacity. All other balance features will also be in operation.

CARE AND MAINTENANCE

To keep your balance operating properly, the cover, housing and removable pan should be kept clean and free from foreign materials.

DISCONNECT THE POWER CORD before cleaning. DO NOT USE CHEMICALS OF ANY KIND on the cover, because they may damage the balance. If necessary a damp cloth with a mild, non-abrasive detergent may be used. Be careful not to scratch the balance and do not allow any liquid to flow inside the balance. Wipe the balance dry with a soft cloth.

ACCESSORIES AND REPLACEMENT PARTS

Scoops

Aluminum — 1-1/2" × 2" × 7/16"	5076-00
Aluminum — 2-1/4" × 3" × 3/4"	5077-00

CABLE KITS

to interface Model GA 200-D

Blunt End	90644-01
To IBM - PC	90644-02
To Apple II e	90644-03
To Epson HX - 20	90644-04
To Apple II c	90644-05

REPLACEMENT PARTS

Power Cord, Domestic	100/120 V	6569-00
Power Cord	220 V	76212-00
Power Cord	240 V	76448-00

Fuses

100/120 V	.160 AT
200/240 V	.080 AT

TROUBLESHOOTING

Before assuming that your OHAUS GA Series Electronic Balance is faulty, check through the following troubleshooting list. These simple, corrective actions may eliminate a call to your Service Representative.

Symptom	Probable Cause(s)	Remedy
DISPLAY WILL NOT LIGHT	1. Power cord not connected.	Connect cord.
	2. Fuse blown.	Unplug the balance. Check the voltage setting and replace fuse with one of the proper size. If fuse still fails, contact Service Representative.
BALANCE DISPLAYS H or L SIGNAL	1. Pan missing from balance.	Replace pan.
	2. Balance capacity exceeded.	Reduce the amount of weight to less than range capacity. Change Range
	3. Balance calibrated incorrectly.	Calibrate balance using correct weights and proper procedure.
UN-STABLE WEIGHT READINGS	1. Hostile environment.	Protect balance from environment. Increase integration level
	2. Pan movement obstructed.	Inspect and correct.

SERVICE INFORMATION

If your electronic balance needs maintenance and/or repair, you can be assured of the best and fastest service available by calling the Ohaus Product Service Department for return information. A Product Service Specialist will be able to provide advice on packing, shipping instruction, local service availability, turnaround time, etc. Failure to call may cause delays.

For Electronic Balance Service assistance, please call Ohaus Corporation toll-free at 1-800-526-0659.

Service hours are 8:00 a.m. to 4:00 p.m. EST.

In New Jersey call 201-377-9000.

PERFORMANCE SPECIFICATIONS

Weighing Range	40 g/200 g
Readability	0.01 mg/0.1 mg
Taring (by subtraction)	40 g/200 g
Precision (std. dev.)	≤± 0.02 mg/0.1 mg
Linearity	≤± 0.03 mg/0.2 mg
Stabilization Time	5/3 seconds
Variable Integration	Selectable
Data Output - RS232	Optional
Pan Size	3.5" diameter
Below Balance Weighing	Standard
Calibration Weight (g)	Built-In
Weighing Chamber	6" x 7.4" x 10.2"
Dimensions (w × h × d)	8.1" x12.1" x 17.5"
Power Supply	100, 120, 220,240 VAC 50/60 HZ
Weight (net)	29 lb.
Operating Temp. Range	10° - 40 ° C

WARRANTY

ELECTRONIC BALANCE LIMITED WARRANTY

This OHAUS® Electronic Balance is warranted against defects in materials and workmanship for one (1) year from date of delivery. During the warranty period Ohaus will repair, or, at its option, replace at no charge components that prove to be defective, provided that the balance is returned to a Service Center authorized by Ohaus.

This warranty does not apply if the balance has been damaged by accident or misuse, improper packaging during return shipment, exposed to radioactive or corrosive materials, or as a result of service or modification by other than a Service Center authorized by Ohaus. In lieu of a properly returned warranty registration, 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.

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OHAUS CORPORATION

P/N 77095-00 R 390