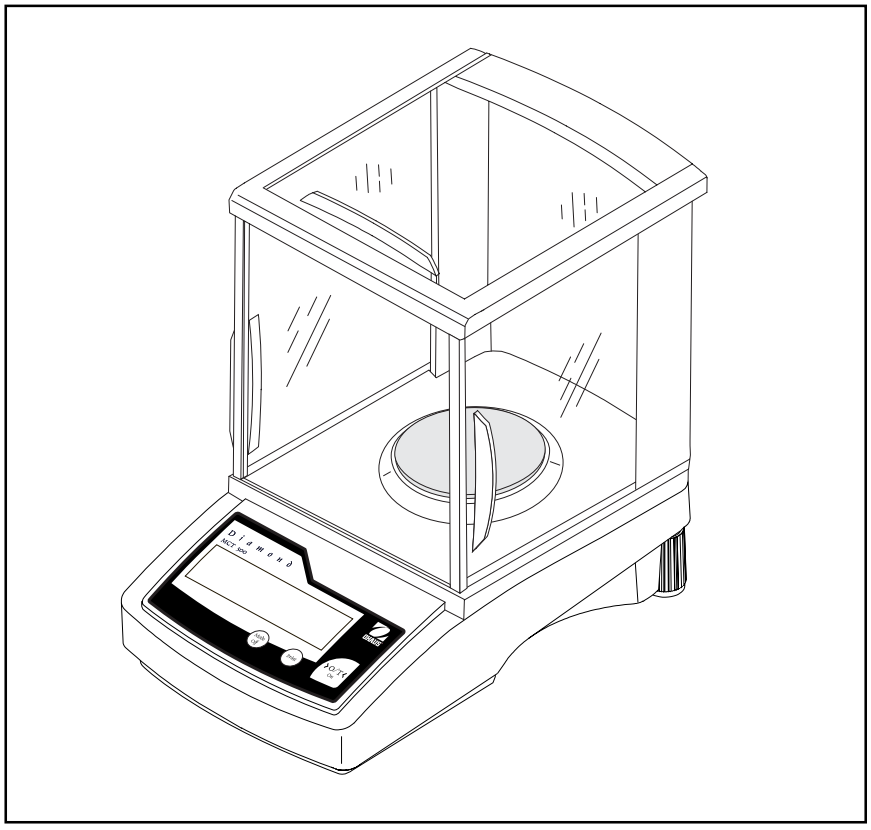
Ohaus Corporation
19A Chapin Road
P.O. Box 2033
Pine Brook, NJ 07058-2033, USA

Instruction Manual

Diamond Analytical Carat Balance



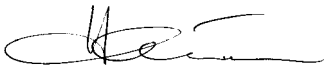
Ohaus Corporation, 19A Chapin Road, P.O. Box 2033, Pine Brook, NJ, 07058-2033, USA

Declaration of Conformity We, Ohaus Corporation, declare under our sole responsibility that the balance models listed below marked with “CE” - are in conformity with the directives and standards mentioned.

Balance model (s) JD500

Marked with:	**EC Directive** (Including applicable amendments)	**Standard**
CE	**73/23/EC** Electrical equipment for use within specified voltage limits	**EN61010-1:1993 + A2: 1995** Safety requirements for Electrical Equipment for Measurement, Control Laboratory Use, Part 1: General Requirements
C US	**89/336/EC** Electromagnetic compatibility	**EN55011:1991 (class B)** EMC Emissions, residential, commercial and light industry. **EN50082-2:1995 + A1:1998 (minimal requirements)** EMC Immunity: Minimum test requirements. **EN61000-3-2:1995 + A1:1998 + A2: 1998; EN61000-3-3:1995** EMC Part 3 (for equipment rated input current < or=16A) Limits- Section 2: Limits for harmonic current emissions Limits- section 3: Limitation of voltage fluctuations and flicker in low voltage supply systems
	Last two digits of the year in which the CE marking was affixed: **99**	
	Additional Standards	
	CAN/CSA-C22.2 No. 1010.1-92; UL Std. No. 3101-1 Safety requirements for Electrical Equip. for measurement, Control and Laboratory Use, Part 1; General Requirements	
FCC	**FCC, Part 15, class A** Emission	
	AS/NZS2064-1/2 AS/NZS4252.1 Emission and Immunity	

ISO 9001 Registration for Ohaus Corporation**.** Ohaus Corporation, USA, was examined and evaluated in 1994 by the Bureau Veritas Quality International, BVQI, and was awarded ISO 9001 registration. This certifies that Ohaus Corporation, USA, has a quality system that conforms with the international standards for quality management and quality assurance (ISO 9000 series). Repeat audits are carried out by BVQI at intervals to check that the quality system is operated in the proper manner.



Ted Xia
President
Ohaus Corporation, Pine Brook, NJ USA

FCC NOTE**:** THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A 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.

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE INTERFERENCE-CAUSING EQUIPMENT STANDARD ENTITLED “DIGITAL APPARATUS”, ICES-003 OF THE DEPARTMENT OF COMMUNICATIONS CANADA.

CET APPAREIL NUMERIQUE RESPECTE LES LIMITES DE BRUITS RADIOELECTRIQUES APPLICABLES AUX APPAREILS NUMERIQUES DE CLASSE A PRESCRITES DANS LA NORME SUR LE MATERIEL BROUILLEUR: “APPAREILS NUMERIQUES”, NMB-003 EDICTEE PAR LE MINISTRE DES COMMUNICATIONS.

Unauthorized changes or modifications to this equipment are not permitted.

TABLE OF CONTENTS

DESCRIPTION

Your Ohaus Analytical balance is a precision weighing instrument, designed to provide years of service. Simple three button operation allows for the selection of units, calibration and printing parameters. A standard RS232 interface permits communication to an external printer or computer. Power is supplied through an AC adapter.

UNPACKING

All balances are shipped with the following components:

- Weighing Platform
- Instruction manual
- Power adapter

Carefully unpack the balance, verify that all items are on hand. Save the packing material for transporting the balance.

INSTALLATION

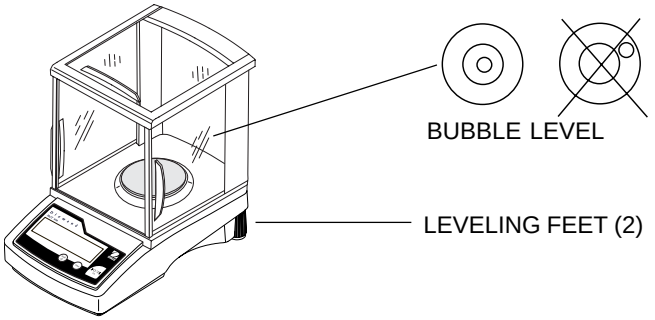
For best performance, the balance should be used in a clean, stable environment. Do not use the balance in environments with excessive drafts, near magnetic fields or equipment that generates magnetic fields, rapid temperature changes, vibrations or corrosive vapors.

Setting Up and Leveling the Balance

For exact horizontal positioning, the balance is equipped with a level indicator and two leveling feet located at the rear of the balance.

Position the balance in the intended operating location. Adjust the leveling feet at the rear of the balance until the air bubble in the indicator is centered.

NOTE: The instrument should be leveled each time its location is changed.



Pan Installation

Slide open the door and insert the platform in the balance. The balance is now ready for operation.

INSTALLATION (Cont.)

Connecting Power

NOTICE:
The socket/outlet must be installed near the equipment and shall be easily accessible.

Connect the AC Adapter cord to the connector located at the rear of the balance and to a suitable power source.

Weigh Below Hook

For below balance weighing applications (eg. density determination), a weigh below hook is installed at the bottom of the balance and is part of the balance. To use, remove the protective plug cover located at the bottom of the balance. The balance should then be supported on an elevated level surface which allows access to the weigh below hook. The balance should be releveled. Measurements are made by the use of a fine wire attached to the internal weigh below hook.

CAUTION:

Do not attempt to remove the weigh below hook from the balance as the balance may be damaged.

Security Bracket

A security bracket is provided at the rear of the balance which allows the balance to be secured by the optional cable and lock accessory.

TURNING THE BALANCE ON

Press **O/T ON.** All segments will appear briefly followed by a software revision number. Allow 20 minutes warm-up time.

TURNING THE BALANCE OFF

To turn the balance OFF, press and hold **MODE OFF** until the display indicates ***OFF***, then release.

WEIGHING

1. If it is necessary to rezero the display, momentarily press **O/T ON**.

2. Place item(s) to be weighed on the pan and read the weight on the display. The stability indicator * appears when the reading is stable.

TARING

When weighing items that must be held in a container, taring subtracts the container's weight from the total weight on the pan. Remember, the weight of the container and the material it holds must not exceed the capacity of the balance.

1. With an empty container on the pan, press **O/T ON** to zero the display.

2. As material is added to the container, the net weight is displayed. Tared weight remains in balance memory until **O/T ON** is pressed again.

3. If the container is no longer used and is removed from the balance, the display indicates a negative weight which was the container's weight. Press **O/T ON** to zero the display.

MENU DESCRIPTION

The User Menu permits you to activate weighing units, select printing parameters, perform Linearity calibration and set tone settings. Each menu item is covered in a separate procedure in this manual.

To enter the menu, start with the balance OFF, press and hold **O/T ON** until ***MENU*** is displayed, then release it.

MENU

- UNITS - g, ct, ozt, GN, dwt, Hong Kong Taels, Singapore Taels, Taiwan Taels, set each to ON or OFF.
- LIN - Performs linearity calibration. (See calibration in later section)
- SYS - Permits setting tone ON or OFF with each keystroke.
- PRINT - Permits setting communication parameters.
- MENU - Exit menu and return to weighing mode.

END

ACTIVATING UNITS

1. With the balance OFF, press and hold **O/T ON** until ***MENU*** is displayed, then release, ***UNITS*** is displayed.

2. Press **O/T ON,** ***On g*** is displayed. To turn this unit of measure ON or OFF, press **MODE OFF** to select on or off condition.

3. To advance to the next weighing unit, press **O/T ON**, then press **MODE OFF** to select ON or OFF**.** You must continue until ***END*** appears.

4. When ***END*** is displayed, press **O/T ON** to store unit selections.

5. To exit the menu, repeatedly press **MODE OFF** until ***MENU END*** is displayed, then press **O/T ON**. Balance returns to a weighing mode.

PRINT MENU

The Print menu is used to configure and customize the RS232 interface parameters for your requirements. The following table shows the sequence in which submenus appear on the Print Menu. Factory settings are in bold.

PRINT MENU TABLE

Baud Rate	Specifies baud rate of either 600, 1200, **2400**, 4800, or 9600.
Data Bits	Specifies number of data bits, **7** or 8.
Parity Bit	Specifies parity type, Odd, Even, or **None**.
Stop Bits	Specifies the number of stop bits, 1 or **2.**
Auto Print	Prints stable data when display changes 5 counts. OFF is default.
Stable Data	Enables/disables printing stable data only feature. OFF is default.
End	Used to exit the Print menu and store your selections.

SETTING PRINT MENU FUNCTIONS

This procedure permits you to set one or all of the RS232 communication parameters. Each parameter can be entered and set individually.

ENTERING THE PRINT MENU

1. Start with the balance OFF. Press **O/T ON** until ***MENU*** is displayed.

2. Press **MODE OFF** until ***Print*** is displayed.

3. With ***Print*** displayed, press **O/T ON** until ***Reset*** is displayed. You may now select to change any of the parameters in Reset, Baud Rate, Parity Data Bits, Stop Bits, Stable Data, Auto Print, or End which saves all settings.

4. By repeately pressing **MODE OFF**, you can enter any one of the above print menu items. See following procedures.

SETTING PRINT MENU FUNCTIONS (CONT.)

ENTERING THE PRINT MENU (Cont.)

Setting Baud Rate

Press **O/T ON**, until ***bd 2400*** is displayed. Using the **MODE OFF** button, you can select baud rates of 600, 1200, **2400**, 4800 or 9600. Once you have selected the proper baud rate for your system, press **O/T ON**, the display advances to ***PAR no*** (parity).

Setting Parity

Repeatedly press **MODE OFF**, to select either **no**, odd or E for even. Once the desired parameter is selected, press **O/T ON**, the display advances to ***DATA 7.***

Setting Data

Pressing the **MODE OFF** button allows the selection of **DATA 7** or DATA 8. Once the desired parameter is selected, press **O/T ON**, the display advances to ***STOP 2.***

Setting Stop Bit

Pressing **MODE OFF,** you can select **STOP** 1 or **2.** Press **O/T ON,** the display advances to ***STBL ON***.

Setting Print Modes

The balance offers a choice of manually printing only stable or all data **(STBL ON/OFF)** at any time by pressing the **PRINT** button or printing stable readings automatically **(AUTO ON/OFF)**. The default setting for automatic stable readings is **OFF.** Only one of these may be set on at a time.

Stable Data On or Off

When ***STBL ON*** is displayed, press **MODE OFF** to select **ON** or OFF, then press **O/T ON** , ***AUTO OFF*** is displayed.

Auto Print On or Off

With **Auto Print ON,** the balance automatically prints stable data when the display changes by at least five counts. Press **MODE OFF** and select ON or **OFF**, then press **O/T ON,** ***END*** is displayed. To save settings, press **O/T ON**, ***MENU END*** is displayed. Press **O/T ON** to return to weigh mode.

CALIBRATION

Your Ohaus Balance was calibrated before shipment, however, calibration can be affected by changes in location, temperature, or rough handling. Your balance can be calibrated in two ways: Span calibration or Linearity calibration. Span calibration resets the balance's weighing range using two weight values: zero and a weight value at or near the balance's capacity. Linearity calibration minimizes deviation between actual and displayed weights within the balance's weighing range. Three weight values are used: zero, a weight value within the balance's weighing range and a weight value at or near the balance's specified capacity.

CALIBRATION MASSES

Before beginning calibration, make sure masses are available. If you begin calibration and realize calibration masses are not available, exit the procedure by pressing and holding **MODE OFF** until balance returns to weigh mode. The balance will retain previously stored calibration data. Calibration should be performed as necessary to ensure accurate weighing. Masses required to perform the procedures are listed in the following table.

CALIBRATION MASSES

LINEARITY MASSES	SPAN ONLY MASS
50g/100	100g
Masses must meet or exceed ASTM Class 1 Tolerance. Calibration masses are available as accessories.	

SPAN CALIBRATION

1. With the balance turned ON, press and hold **O/T ON** until ***CAL*** is displayed.

2. Release **O/T ON** , ***-C-*** is momentarily displayed followed by the value of the calibration mass which is to be placed on the pan.

Do not disturb the balance when *-C-* is displayed.
Incorrect calibration may result.

3. Place the indicated span calibration mass on the pan.

4. Press **O/T ON**, ***-C-*** is momentarily displayed, then the weight of the mass on the pan is displayed.

5. Remove the calibration mass from the pan. The balance is now calibrated and returns to the weighing mode.

LINEARITY CALIBRATION

1. With the balance OFF, press and hold **O/T ON** until ***MENU*** is displayed, then release it and ***UNITS*** is displayed. Press **MODE OFF, *LIN*** is displayed.

2. Press **O/T ON**, ***-C-*** is displayed followed by the value of the first mass which must be placed on the pan.

3. Place the required mass on the pan and momentarily press **O/T ON, *-C-*** is displayed followed by the value of the next mass to be placed on the pan.

   Do not disturb the balance while *-C-* is displayed.

4. Place the second required mass on the pan and momentarily press **O/T ON, *-C-*** is displayed. When the weight on the pan is displayed with the stability indicator, the balance is calibrated and returns to the weighing mode.

5. Remove the calibration masses from the pan.

PRINTING

To print the balance display results, press **PRINT** until ***-P-*** is displayed then release.

RS232 INTERFACE

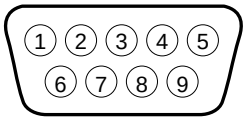
When the balance is connected directly to a printer, displayed data can be output at any time by using the Auto Print feature.

Connecting the balance to a computer enables you to operate the balance from the computer, as well as receive data such as displayed weight and weighing mode. The following sections describe the hardware and output signal formats provided with the balance.

HARDWARE

On the rear of the balance, a 9-pin subminiature "D" connector is provided for interfacing to other devices. The pinout and pin connections are shown in the table and illustration.

1	N/C
2	Data Out (TXD)
3	Data In (RXD)
4	N/C
5	Connected to pin 8.
6	N/C
7	Ground
8	Connected to pin 5.
9*	N/C



RS232 INTERFACE

RS232 COMMANDS

All communication is accomplished using standard ASCII format. Only the characters shown in the following table are acknowledged by the balance. Any other commands, control characters or spaces are ignored. Commands sent to the balance must be terminated with a carriage return (CR) or carriage return-line feed (CRLF). For example, a tare command should appear as shown in the diagram. Data output by the balance is always terminated with a carriage return - line feed (CRLF).

TARE COMMAND

Field:	T	CR	LF
Length:	1	1	1

RS232 COMMAND DATA TABLE

Command Character	Description
P	Print command
T	Tare command
?	Displays current mode
XS	X=0 (zero) Stable off
XS	X=S Stable on (default setting in balance)
XS	X=A Auto print on stabilty

NOTE: Print commands entered through the computer are temporary. When the balance is turned off, it will return to balance menu settings when turned on again.

OUTPUT FORMATS

Data output can be initiated in one of two ways: 1) Using the Auto Print feature; 2) Sending a print command (“P”) from a computer.

CARE AND MAINTENANCE

To keep the balance operating properly, keep the housing and platform clean. If necessary, a cloth dampened with a mild detergent may be used. Check under the sub platform for debris and remove. Keep calibration masses in a safe dry place.

TROUBLESHOOTING

ERROR CODES

When a problem occurs using the balance, the display will indicated an error code. Review the listed codes and follow instructions to correct the problem.

Err 2.0 Stability error. Check if balance is located near vibrating equipment or if air currents are affecting it.

Err 3.0 Calibration error (wrong mass). Incorrect or no calibration mass used when performing calibration procedure. Error will flash momentarily, then balance will use previous calibration data. Recalibrate correctly.

Err 4 Invalid data checksum in type or adjust data. Return balance for servicing.

Err 8.4 Over or under load. Sample being weighed exceeds the capacity of the balance. If error occurs when the sample is within the balance capacity, balance may be incorrectly calibrated. An underload such as the pan off of the balance could also display Err8.4. Recalibrate the balance.

Err 9 Internal data error. Return balance for servicing.

Err 9.8 Invalid checksum in calibration or setup data. The balance may need recalibration, particularly linearity calibration. If the error persists after recalibration, the balance must be serviced.

TROUBLESHOOTING TABLE

SYMPTOM	PROBABLE CAUSE	REMEDY
No Display.	Power Adapter not connected.	Connect AC Adapter.
Incorrect weight reading.	Balance out of calibration.	Calibrate the balance.
	Balance was not rezeroed before weighing.	Press **TARE ON** with no weight on the pan, then weigh item.
Calibration procedure does not work.	Incorrect calibration masses being used.	Use correct masses.
Unable to display weight in a particular weighing unit.	Weighing unit not activated in menu.	Use Units menu to set desired units ON (see menu).
Balance won't store selections made in menu.	END selection was not used to exit menu.	You must use END to exit each menu and save selections.

ACCESSORIES

	Part No.
50g Calibration Mass	49054-11
100g Calibration Mass	49015-11
Security Device	76288-01
Impact Printer	SF42
RS232 Interface Cable, to SF42 printer	80500570

SPECIFICATIONS

ITEM NUMBER	JD500
MAX CAPACITY (ct)	500
READABILITY d (mct)	1
WEIGHING UNITS	grams, carats, oz t, grains, taels (3)
REPEATABILITY (STD DEV) (mct)	1
LINEARITY UP (mct)	1
STABILIZATION TIME (s)	4
TARE RANGE	Full Capacity by Subtraction
OPERATING HUMIDITY RANGE	10-85% non-condensing
PLATFORM SIZE (in/cm)	3.5/9
DIMENSIONS (WxHxD)(in/cm)	8.5x12.3x13.5/21.7x31x34.3

Admissible ambient conditions

	Use only in closed rooms
Temperature range:	50°F to 86°F / 10°C to 30°C
Atmospheric humidity:	80% rh @ to 30°C
Voltage fluctuations:	-15% +10%
Installation category:	II
Pollution degree:	2
Power supply voltage:	8-14V ac, 50/60Hz, 6VA or 9.5-20V dc, 6W
Power Adapter:	AP3405 120V, 60Hz 10W
	AP3405E 230V, 50Hz 80mA
	AP3405B 240V, 50Hz 80mA

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.

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