OHAUS®

GT Series

ELECTRONIC BALANCES

Directions for Use and Maintenance

Please read this manual before you use your OHAUS Electronic Balance

MODELS
GT 210, GT 410, GT 480, GT 2100, GT 4100, GT 4800

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WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE, IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

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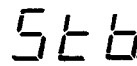
PREFACE

Your Ohaus® GT Electronic Balance is a precision instrument designed to be versatile, accurate, and easy to operate. Your balance will reward you with many trouble-free weighings if it is handled carefully and maintained properly.

Along with the basic weighing capability, the following features are already included inside your product:

- Selectable Integration 

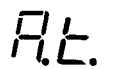
  Allows you to compensate for unstable weight readings due to excessive air currents or vibrations.

- Stability Level 

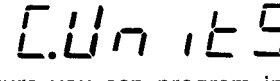
  You can determine when the stability indicator will light based upon a particular range.

- Select-A-Unit 

  Weighing units other than grams are available. This feature allows you to choose any of these units.

- Aut-O-Tracking 

  Drift due to time and temperature can practically be eliminated by using this feature.

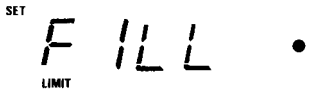
- Custom Units 

  Using this feature you can program into the balance three separate custom units of measure. By entering the factor which will convert from grams to your desired custom unit, you can weigh in practically any unit of measure.

- Check Weighing/Package Weight Control

By entering your target weight along with over and under limits you can use your balance to check and/or control package weight.

- FillGuide™

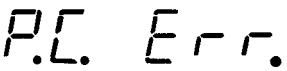


The displayed bar graph can be set to give rapid visual updates for filling applications. The FillGuide can be set to reflect any number from 1% of balance capacity to maximum capacity.

- Average Display Cycle 

In certain applications, for example: animal weighing, it may be desirable to average a certain set of readings and display that average. This feature allows you to do that.

- Parts Counting Error Level



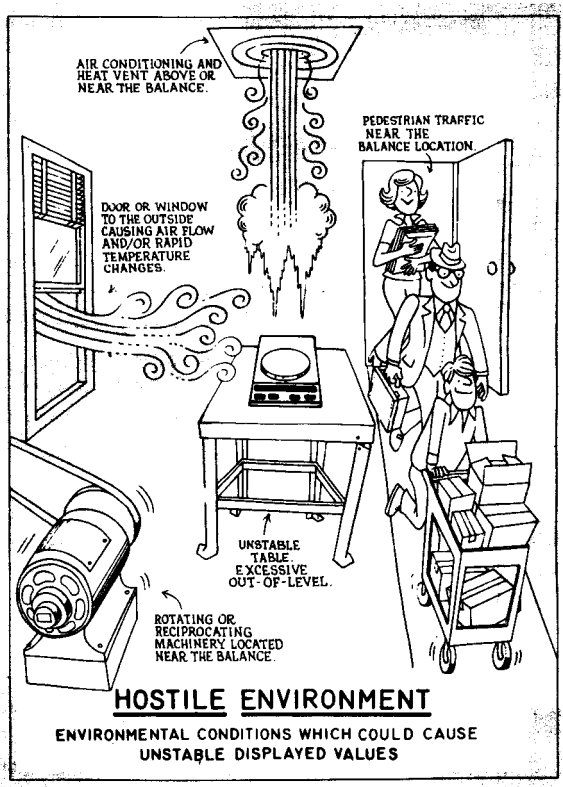
You can preselect the accuracy you require when counting parts. The balance will even tell you that more samples are needed to achieve your selected accuracy level.

To get the most out of your balance, PLEASE READ the INSTALLATION, SWITCH FUNCTION, and OPERATION sections of this manual. Once you familiarize yourself with your balance and its features, we are sure that you will find the small amount of time invested in reading the appropriate parts of this manual very worthwhile. Congratulations on your purchase and welcome to the Ohaus family of products. Remember, if you need any help, just let us know, but please READ THIS MANUAL FIRST.

INSTALLATION

- **ENVIRONMENT**

The balance should always be used in an environment which is free from excessive air currents, corrosives, vibration, temperature or humidity extremes. See "Hostile Environment" illustration.



HOSTILE ENVIRONMENT

ENVIRONMENTAL CONDITIONS WHICH COULD CAUSE UNSTABLE DISPLAYED VALUES

- **ASSEMBLY PROCEDURE**

1. Packed along with your BALANCE please find:
   A Platform
   A Platform Support
   A Power Cord
   This Instruction Manual
   Your Warranty Card
   Below Balance Weighing Hook
   Draft Shield with Models GT 210, GT 410, and GT 480
2. Carefully unpack the balance and other contents.

NOTE:

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

3. Place the balance on a reasonably level, stable work surface.
4. If a Draft Shield is supplied, remove the Stainless Steel Plate and install the Draft Shield, using the hardware furnished.
5. Install the platform support and the platform.
6. Level the balance by adjusting the two front leveling feet so that the spirit level at the rear of the balance is centered.

• 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.

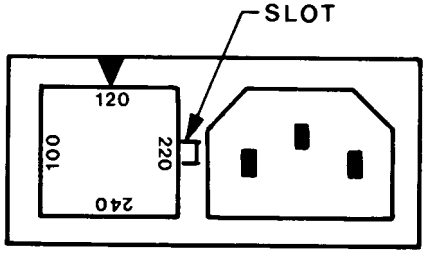
  DO NOT create a safety hazard by defeating the grounding feature.

• 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 lower righthand corner of the rear of the balance (when viewed from the rear).
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.

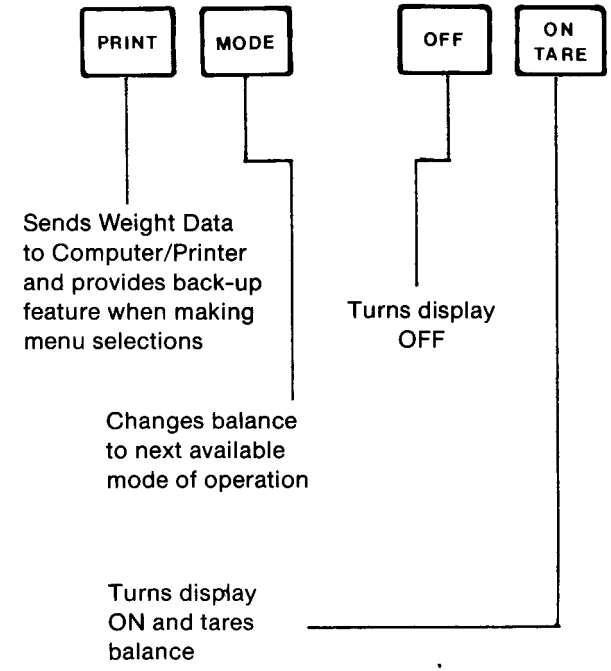


3. If your balance is NOT set for operation at the correct line voltage, remove the power cord and pry the fuseholder loose by inserting a small screwdriver blade in the slot. Remove the fuseholder and rotate it to the proper position with the correct line voltage lining up with the arrow. If necessary, 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. A red indicator light will illuminate (located in the lower left hand corner of the display) indicating that power has been applied to your balance.

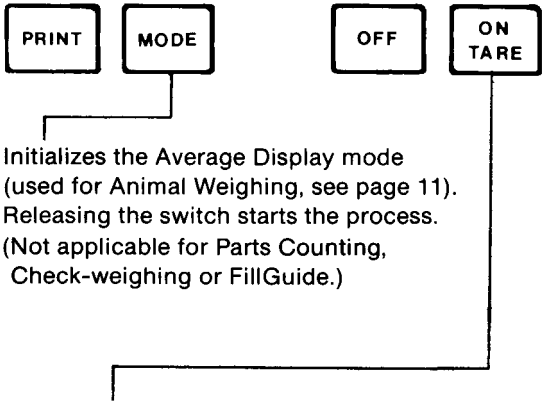
SWITCH FUNCTIONS

The pushbutton switches located on the front of the balance serve many functions. Please read the following information before pressing any of these switches.

- **MOMENTARY**
  Momentarily pressing any of these switches after the balance is turned on, results in the following:



- **PRESS AND HOLD**
  Pressing and holding either [MODE] or [ON TARE] after the balance is turned on, results in the following:



CALIBRATION Menu CAL MENU

Allows you to calibrate your balance, using either the Span or Linearity calibration method (See Calibration Menu, page 12).

SETUP Menu SEtUP MENU

Allows you to customize the functions of your balance for your particular weighing application (See Setup, page 14).

PRINT Menu Print MENU

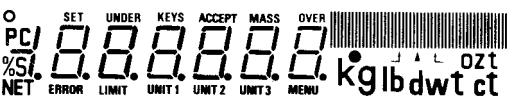
Allows you to select the parameters under which your balance will interface to a computer or a printer (See Print Menu, page 21).

RELEASING [ON TARE] WHEN ANY OF THE PRECEDING IS DISPLAYED WILL INITIALIZE THAT FEATURE.

OPERATION

- **GETTING STARTED**

With no load on the platform, press and release [ON TARE] . A three (3) second segment check will appear.



ONLY THE SEGMENTS APPLICABLE FOR SPECIFIC MODELS WILL BE DISPLAYED.

The display will blank (during taring the display blanks until stable weight readings are received) then show zero, along with the last selected weighing mode.

NOTE:

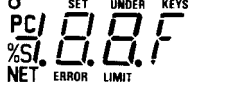
Before initially using the balance, the unit should be stabilized. A ninety (90) minute warm-up period is recommended. (Your balance need only be plugged in and not necessarily turned on to warm up. The internal circuits are powered whenever your balance is plugged in.)

- **WEIGHING**

If necessary, tare the balance by momentarily pressing [ON TARE] .

Place an object on the center of the platform. The balance will display the weight of the object (See Calibration Check, page 10).

When weight readings are stable, the stability indicator (located in the Upper left hand corner of the display) will light. See Illustration.



For balances with Moveable Fine Range, please note:

If the weight of the object on the platform exceeds the limit of the Moveable Fine Range, the balance will automatically change to the coarse range until either:

1. The load (excluding tare) is reduced to below the limit of the fine range.

- OR -

2. [ON TARE] is momentarily pressed, which tares the balance and reactivates the fine range. The

balance will not enter the fine range if the load on the platform is in excess of 80% of the capacity of the balance.

NOTE:

Underload and Overload conditions are indicated by Error Codes, ERR 9.6 and 9.9 respectively.

- **CALIBRATION CHECK**

Your 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.

NOTE:

Weights used for calibration must be adjusted to ANSI/ASTM Class 1 or NBS Class "S" tolerances.

If necessary zero the balance by momentarily pressing [ON TARE] .

Place a calibrated weight on the center of the platform.

If the displayed weight reading differs from the known weight (of the calibrated weight) by more than the specifications allow, it will be necessary to recalibrate the balance. For instructions, see Calibration Menu on page 8.

- **PARTS COUNTING PROCEDURE**

Your Ohaus GT Electronic Balance comes equipped to perform Parts Counting functions. Your balance is also equipped with a Parts Counting Error Level checking feature which will check the initial sample piece weight against your selected acceptable Error Level. The check is performed on the initial sample weight and assumes uniform weight among the individual sample pieces.

To enable the Parts Counting and/or the Parts Counting Error Level Checking, see the SETUP Menu, page 14. Follow the instructions to initialize the SEL Menu for Parts Counting. Then follow the instructions to initialize the P.C. Err Menu to set the parts counting error level limit.

To use the Parts Counting feature:

1. Repeatedly press [MODE] until CON is displayed.
2. Place a parts container on the platform and press [ON TARE], after which Add 5 will be displayed.

NOTE:

To select an initial sample size other than 5, repeatedly press [ON TARE] for 10, 20, 30, 40, 50 or 100 piece initial sample sizes.

3. Place the number of pieces indicated in the container and press [MODE] . The balance will calculate the piece weight and then the current number of parts will be displayed.

NOTE:

If a Parts Counting Error Level limit has been selected and the weight of the sample pieces fails to meet that limit, the balance will then indicate the required number of additional pieces to meet that limit. If this occurs, simply add the indicated number of pieces and press [MODE] again.

4. Add parts to the container and the number of parts will be displayed.
5. To display the net weight of these parts, press [MODE] . Pressing the switch again returns you to Parts Counting.
6. To select a new initial sample or exit the Parts Counting Mode, press and hold [MODE] until CON is displayed, then release. To exit, momentarily press [MODE] . To select a new sample size, repeat the above procedure from Step 2.
7. Press [MODE] to exit parts counting and enter the next available weighing range.

- **AVERAGE DISPLAY CYCLE PROCEDURE**

Using this feature, you can obtain an averaged display of a selected number of normal display readings. While the balance is displaying the average, (for approximately eight seconds) the stability indicator will flash rapidly. You have the option of choosing 10, 20, 50, 100 or 200 readings to be averaged.

To select the number of weight readings to be averaged, see the Setup Menu on page 8. Follow the instructions to initialize the A.d. - Average Display Cycle Menu to set the desired number of readings.

To use the Average Display Cycle feature:

1. Press and hold [MODE] until 5tArt displayed.
2. Releasing [MODE] begins the averaging cycle.

NOTE:

The cycle can be terminated (and normal weighing resumed) by momentarily pressing either [MODE] or [ON TARE] .

CALIBRATION MENU

MENU

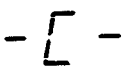
If you have determined that your balance needs to be calibrated, proceed as follows:

- **SPAN CALIBRATION**

1. Remove all weight from the platform.
2. Initialize the Calibration Menu by pressing and holding [ON TARE] until CAL is displayed, then release immediately.

will then be displayed, indicating that no weight should be on the platform.

3. Momentarily press [ON TARE] . The display will blank, then show



momentarily before showing C followed by the value of the Calibration weight to be placed on the platform.

NOTE:
Weights adjusted to ANSI/ASTM Class 1 or NBS Class S are required. Using weight of a lower tolerance may induce inaccuracies into your weight readings.

4. Place the required Calibration weight on the platform.
5. Momentarily press [ON TARE] and DO NOT remove the calibration weight until the balance displays a weight reading.
6. Your balance should now be calibrated.

- **LINEARITY CALIBRATION**

Span calibration as previously described will satisfy most of your calibration needs. However you can perform a Linearity calibration on your balance if you so desire. When performing Linearity calibration, the balance will request a second calibration weight to be placed on the platform.

To perform Linearity calibration, proceed as follows:

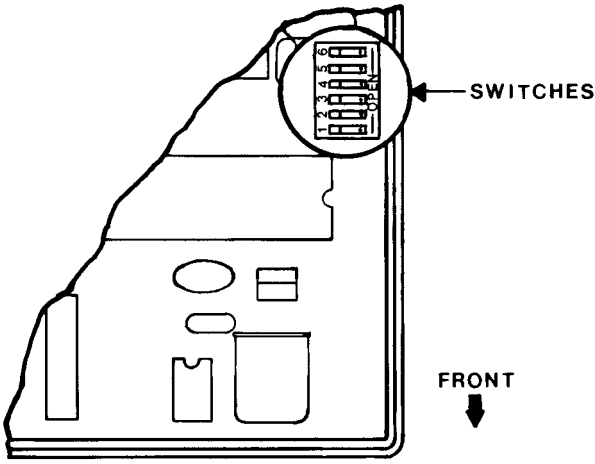
1. Unplug your balance.

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.

2. Remove the platform and the platform support.
3. Remove the two (2) cover screws and lift the cover off the base.
4. Locate the MAIN PRINTED CIRCUIT BOARD (PCB), and the set of six (6) switches. See illustration.



5. Set switch number 4 to the open position.
6. Reinstall the parts removed during steps 2 & 3.
7. Perform the calibration procedure as described previously, with the only difference being that after the value of the first calibration weight has been accepted, the balance will request the second weight. Place the weight on the center of the platform (stack the weights if two are required) and press [ON TARE].

SET UP MENU SEtUP

This menu allows you to customize the operating parameters of your balance. Once in the SET UP mode, after releasing [ON TARE], the first parameter (AL) will be displayed. To select another operating parameter, press [MODE] repeatedly until the desired parameter is displayed. To back up to the previous parameter, press [PRINT].

The chart below directs you to the page where detailed descriptions of available set up parameters are given.

Display Shows	Description	See Page
AL.	Selectable Integration	14
Stb.	Stability Level	15
SEL	Select-A-Unit	15
At.	Aut-O-Tracking	16
C.Un itS	Custom Units	16
In it	Check Weighing	18
• FILL	FillGuide	19
Ad	Average Display Cycle	20
P.C. Err.	Parts Counting Error Level	20
End	Exit from Set Up Menu	14

Once the desired Set Up parameter mode is displayed press [ON TARE] to initialize the available menu items.

To exit the Set Up Menu, index through using [MODE] until End is displayed. Press [ON TARE] to exit.

• SELECTABLE INTEGRATION AL.

At times vibration, or the effects of excessive air currents (see Hostile Environment illustration) will cause unstable weight readings. This feature (selectable integration) allows you to compensate for your particular weighing environment.

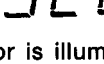
Four integration (i.e.: averaging) levels are available with each successive level integrating twice

as much data as the previous level. The lowest level results in the fastest response (with more susceptibility to instability). The highest level results in a slower response time (with maximum stability).

Once the A.L. menu has been initialized, the following integration levels may be displayed by repeatedly pressing [MODE] :

Display	Integration Description	Response Time
AL 0	Minimum	Maximum
AL 1	Reduced	Increased
AL 2	Normal	Normal
AL 3	Maximum	Reduced

By pressing [ON TARE] , you will select the displayed integration level and then return to the Set Up Menu.

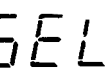
- **STABILITY LEVEL** 

The stability indicator is illuminated when the balance determines that a number of displayed weight readings are within a selectable range of each other. If the weight readings are outside of the selected range, the stability indicator will not light, indicating an unstable condition.

Once the STB (Stability Level) menu has been initialized the following Stability levels can be displayed by repeatedly pressing [MODE] :

Display	Stability Level
0	Reduced
1	Normal
2	Increased

By pressing [ON TARE] , you will select the Stability level currently displayed, and then return to the Set Up Menu.

- **SELECT-A-UNIT** 

This feature allows you to determine which available weighing units are accessible during normal weighing operations.

Once the SEL menu has been initialized, pressing [ON TARE] will index through the following weighing modes. As each weighing mode is displayed, either ON or OFF will also be displayed.

The available indicating weighing modes are:

Mode Indicator	Weighing Mode
g	Grams
dwt	Pennyweight
ct	Carats
oz	Ounces, avoirdupois
ozt	Ounces, troy
lb	Pounds, avoirdupois
t	Taels (Hong Kong)
pc	Parts Counting
UNIT 1	Custom Units 1
UNIT 2	Custom Units 2
UNIT 3	Custom Units 3
UNDER, ACCEPT, OVER	Check Weighing
•	FillGuide

By pressing [MODE] , you will be able to select whether the displayed weighing unit is ON (and able to be used), or OFF and not accessible during normal weighing operations. After the last weighing mode has been displayed, SEL will be displayed again. This indicates that you have returned to the Set Up Menu.

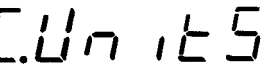
• AUT-O-TRACKING 

The Aut-O-Tracking feature (when enabled) will minimize the effects of displayed weight drift due to temperature changes, zero-shift, creep, etc.

Once the Aut-O-Tracking feature has been initialized, it may be turned ON or OFF by pressing [MODE] .

Display	Status
On	Aut-O-Tracking enabled
Off	Aut-O-Tracking disabled

By pressing [ON TARE] , you will select the status currently displayed, and then return to the Set Up Menu.

• CUSTOM UNITS 

Using this feature, you can define up to three separate custom weighing units. By entering the conversion factor (to convert from grams to another unit of measure) in scientific notation, you will be able to display weight readings in the desired custom unit.

1. After the Custom Units menu has been initialized, dEF InE will appear.
   UNIT1 UNIT2 UNIT3

   Pressing [MODE] indexes between the UNITS 1, 2, 3 and End.

   To define a particular custom unit or end the custom unit menu, press [ON TARE] when your choice is displayed.

1. When defining a custom unit you will first need to enter the conversion factor in scientific notation.

Pressing	Result
[MODE]	Changes the flashing digit(s) of the mantissa.
[ON TARE]	Enters that selection and moves to the next digit.
[MODE]	Changes the flashing digits.

[ON TARE]
- Selects the flashing displayed digits
- Indexes to the next digit
- After the selection of the last digit, indexes to the current exponent.

[PRINT] Will back up to the previously set digit.

2. Once the conversion factor has been entered, the current exponent will be displayed. By pressing [MODE] you can display any one of nine exponent values. They are:

   Available Exponents (i.e.: 10^{x})

   E 4, E 3, E 2, E 1, E 0, E -1, E -2, E -3, E -4

   Pressing [ON TARE] selects the displayed exponent.

- After the exponent has been selected, the last step will be to select the least significant digit (LSD). By selecting a LSD of 1, the balance will calculate the conversion factor based upon the selected mantissa and exponent. The number of displayed places to the right of the decimal will automatically be adjusted to the resolution of the balance.

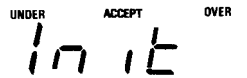
By pressing [MODE], you can index through the following available least significant digits:

Display	Description
L.S.D. 100	Truncates 2 decimal places
L.S.D. 10	Truncates 1 decimal place
L.S.D. 5	Display advances by 5s
L.S.D. 2	Display advances by 2s
L.S.D. 1	Display advances by 1s - Normal Setting
L.S.D. .5	* Display advances by 5s with an extra decimal place shown
L.S.D. .2	* Display advances by 2s with an extra decimal place shown
L.S.D. .1	* Display advances by 1s with an extra decimal place shown

* (less stability and repeatability)

By pressing [ON TARE], you will select the displayed L.S.D. and return to the SET UP Menu.

- **CHECKWEIGHING/ PACKAGE WEIGHT CONTROL**



This feature may be used for checkweighing or package weight control in any one of the available weighing units. When in use, the display will show the relationship between the load on the platform, and the selected target weight. The bar graph will visibly display where the weight of the load falls in relationship to the under, acceptable, and over limits. The balance also displays UNDER, ACCEPT and OVER messages as appropriate.

After the INIT (Checkweighing/Package Weight Control) menu has been initialized, "Use X" (with X being the currently selected weighing units) will be displayed.

For Example: 

g or dwt, etc.

Pressing	Result
[MODE]	Indexes through all the available weighing units
[ON TARE]	Selects the displayed weighing unit.

Once the weighing unit has been selected, the UNDER, ACCEPT and OVER weight limits must be set.

For example: 

Pressing	Result
MODE	Changes the flashing digit(s).
ON TARE	• Selects the displayed flashing digit(s). • Indexes to the next digit. • After the selection of the last digit, indexes to the next limit to be set, or the SET UP menu.
PRINT	Will back up to the previously set digit.

- **FILLGUIDE** SET FILL LIMIT •

During normal weighing operations the bar graph displays the relationship between the load on the platform and the capacity of the balance. In the "Fill" MODE, this bar graph can be set to any number from 1% of capacity to maximum balance capacity. The FillGuide feature can be used in any one of the available weighing units.

After the FILL menu has been initialized, "Use X" (with X being the currently selected weighing unit) will be displayed.

For Example: USE g or dwt, etc.

Pressing	Result
MODE	Indexes through all the available weighing units
ON TARE	Selects the displayed weighing unit.

Once the weighing unit has been selected, the fill limit must be set.

For example: SET 0045.00 • g
LIMIT
FLASHING

Pressing	Result
MODE	Changes the flashing digit(s).
ON TARE	• Selects the displayed flashing digit(s).

- Indexes to the next digit, allowing it to be changed ([MODE]) or selected ([ON TARE]).
- After setting the last digit, will return to the SET UP menu.

[PRINT] Will back up to the previously set digit.

• AVERAGE DISPLAY CYCLE 

This feature allows you to average a selected number of displayed weight readings. You can choose to average any one of 10, 20, 50, 100, or 200 readings as described on page 9.

Once the A.d. menu has been initialized, the current selected average sample will be displayed for approximately eight (8) seconds.

Pressing	Result
[MODE]	Indexes the display reading upward
[PRINT]	Indexes the display reading downward
[ON TARE]	Selects the displayed value and indexes you to the A.P. selection.

The A.P. (auto-print) feature may be turned either ON or OFF. Selecting A.P. ON will shorten the flashing Stability Indicator (as described on page 11) cycle time to approximately 3 seconds.

[MODE]	Turns A.P. ON or OFF.
[ON TARE]	Selects the displayed value and returns to the SET UP menu.

• PARTS COUNTING ERROR LEVELS

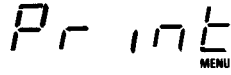
To minimize errors in parts counting due to piece weight variations, you may select an acceptable error level ranging from 0.1% to 5.0%. When in use this feature will automatically calculate and prompt you as to the additional parts that need to be added to your initial sample to insure parts counting accuracy within your specified limit.

Once the P.C. Err menu has been initialized, the following error percentage levels can be displayed by repeatedly pressing [MODE] :

Display	Description
P.C.E. 0	0.1% Acceptable Error Level
P.C.E. 1	0.25% Acceptable Error Level
P.C.E. 2	0.5% Acceptable Error Level
P.C.E. 3	1.0% Acceptable Error Level
P.C.E. 4	2.5% Acceptable Error Level
P.C.E. 5	5.0% Acceptable Error Level
P.C.E. 6	Disables this feature

Pressing [ON TARE] , selects the error percentage level currently displayed, and return to the SET UP menu.

PRINT MENU



This menu allows you to customize the computer/ printer interface operating parameters of your balance.

Once in the Print menu, after releasing [ON TARE], the first parameter (Auto) will be displayed. To select another parameter, press [MODE] repeatedly until the desired parameter is displayed.

The following operating parameters can be customized:

Display Shows	Description	See Page
Auto	Auto print Feature	22
StAbLE	Enable/Disable stable data only printing	22
r5-232	Used to set Interface Parameters	22
End	Exits the Print Menu	21

Once the desired Print menu parameter is displayed, press [ON TARE] to initialize the available menu items.

By pressing [ON TARE] when End is displayed, you will exit the Print menu, enter the changes made (if any), and return to the weighing MODE.

- **AUTO** Auto

The auto print feature (when turned on) allows you to automatically send data from your balance

through an interface at intervals ranging from continuous to every 254 seconds. This feature can also be turned OFF.

Once the auto print menu has been initialized, the current auto print setting will be displayed. The following settings are available:

Display	Description
A.P. OFF	Auto Print feature off
CONT	Data being sent continuously
A.P. 1 - A.P. 254	Data to be sent every X seconds (with X being 1-254 seconds)

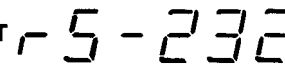
Pressing	Result
MODE	Increments the display.
PRINT	Decrements the display.
ON TARE	Selects the displayed setting and returns to the Print Menu.

- **STABLE DATA ONLY** 

This feature (when turned on), allows you to send data through the interface only when the stability indicator is lit.

Once the Stable menu has been initialized, the current setting will be displayed.

Pressing	Result
MODE	Changes the setting.
ON TARE	Selects the setting and returns to the Print Menu.

- **RS-232 DATA FORMAT** 

Your balance is equipped with a bi-directional RS-232 compatible interface.

You are able to vary the RS-232 data format specifications using this feature. These specifications are as follows:

1. Baud Rate	110, 300, 1200, 2400, 4800, 9600
2. Parity	Even, Odd, None
3. Data Bits	7 or 8
4. Stop Bits	1 or 2 (Note: 1 only for 8 bit data frames with parity)

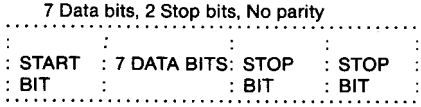
Once the RS-232 menu has been initialized, br xxxx (with xxxx being the preset Baud rate) will be displayed.

Pressing	Result
MODE	Increases the baud rate
PRINT	Decreases the baud rate
ON TARE	Selects the displayed baud rate

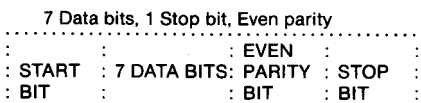
After selecting the displayed baud rate, Fr.x (with x being a number between 0 and 8) will be displayed. This display indicates the existing Data frame selection. The following Data Frames are available:

Serial Data Frame Selections

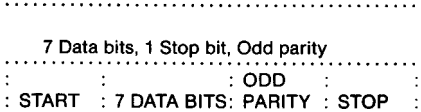
Data Frame	Description
Fr. 0	7 Data bits, 2 Stop bits, No parity



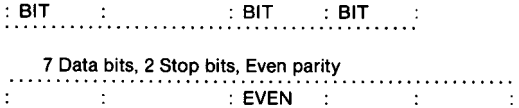
Fr. 1	7 Data bits, 1 Stop bit, Even parity



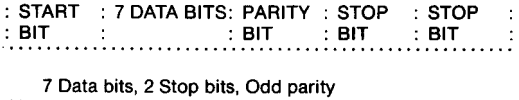
Fr. 2	7 Data bits, 1 Stop bit, Odd parity



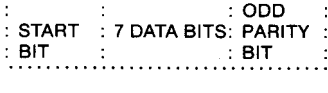
Fr. 3	7 Data bits, 2 Stop bits, Even parity



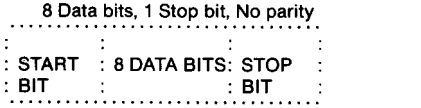
Fr. 4	7 Data bits, 2 Stop bits, Odd parity



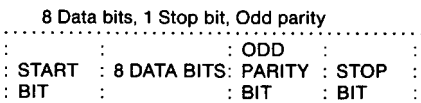
Fr. 5	8 Data bits, 1 Stop bit, No parity



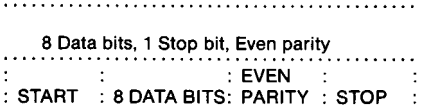
Fr. 6	8 Data bits, 1 Stop bit, Odd parity



Fr. 7	8 Data bits, 1 Stop bit, Even parity



Fr. 8	8 Data bits, 2 Stop bits, No parity



Pressing	Result
MODE	Displays the next Data Frame.
PRINT	Displays the previous Data Frame.
ON TAPE	Selects the displayed Data Frame and returns to the Print Menu.

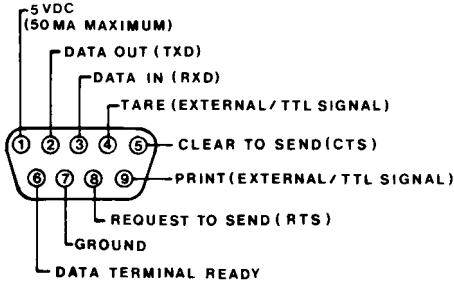
RS-232 INTERFACE

- **HARDWARE**

Your balance is equipped with a bi-directional RS-232 compatible interface. You can interface your balance to other equipment by means of the 9 pin subminiature "D" connector on the rear of the balance.

> WARNING:
> Be sure to unplug your balance before installing the interface cable.

The pinout and pin description is shown below:



REAR OF BALANCE

The balance will not output any information under any circumstances unless pin 5 (CTS) is held in an ON state (+3 to +15 VDC). Interfaces not utilizing the CTS handshake may tie pin 5 to pin 6 to defeat it.

NOTE:

This interface does not strictly adhere to the official RS-232 standard (particularly in the connector used). However, it is compatible with what has become commonplace in the microcomputer industry.

- **SOFTWARE**

All command inputs must be terminated by a carriage return. All other control characters and spaces are ignored by the balance. Invalid commands are ignored.

COMMAND	DESCRIPTION
1. "?"	PRINT MODE

The balance responds by sending back the current MODE and stability:

Field	/ mode /	stability /	address /	Cr /	Lf /
Length	5	1	2	1	1

Total # of characters transmitted 10

The 5 character mode field is comprised of the current units abbreviation left justified with appended blanks where appropriate. The ad-

dress field is a two character field containing the balance's current interface address. (Since balance addressing is not supported at this time, these characters are always blanks.)

NOTE:

In the package weight control MODE, the balance will transmit an additional 5 character field after the address consisting of the current package weigh state, i.e. "UNDER", "OVER", or "ACCPT". This will bring the total number of characters transmitted to 15.

2. "T" TARE

This command has the same effect as pressing the ON/TARE switch on the front panel. No data is output.

3. "M" MODE

This command has the same effect as pressing the MODE switch on the front panel. No data is output.

4. "P" PRINT DISPLAY DATA

The balance responds by sending the weight information followed by the mode and stability data.

Field	/pol	/weight /	/mode	/stability/	address/	Cr/	Lf/
Length	1	8 1	5	1	2	1	1

Total # of characters transmitted 20

The single character polarity field contains a blank or a minus sign. The eight character weight field contains the current display weight right justified with lead zero blanking and a decimal point. The mode, stability and address field are described under the PRINT MODE command.

NOTE:

In the package weight control MODE, the balance will transmit an additional 5 character field after the address consisting of the current package weigh state, i.e. "UNDER", "OVER", or "ACCEPT". This will bring the total number of characters transmitted to 25.

5. "E" EXTENDED MODE

This command is the same as an extended press of the MODE switch on the front panel. In parts counting, it will return the balance to the "Con" state. In any other mode except the filling or package weight control modes, it will initiate an Averaged Display cycle.

6. "C" CALIBRATE
   This command will place the balance in the Span Calibration state regardless of internal switch settings. See Span Cal for further details.

7. "L" LINEARIZE
   This command will place the balance in the Linearity calibration state regardless of internal switch settings. See Linearity Calibration for further details.

r5-232 SPECIAL OUTPUT FIELD

If the balance is in an error condition, any request for output will yield the error field described below.

Field	/ "ERROR"	/stability/	address/	Cr/	Lf/
Length	5	1	2	1	1

Total # of characters transmitted 10

INTERNAL SWITCHES

Located inside the balance on the Main PC Board (see illustration page 27), there are six rocker switches. The function of these switches are as follows:

Switch Number	Position	Description
1	OPEN	- Enables CAL Menu access from the Front Panel
	CLOSED	- Disables CAL Menu access from the Front Panel (Balance can still be calibrated via RS-232 Port)
2	OPEN	- Enables the Set Up Menu access from the Front Panel
	CLOSED	- Disables the Set Up Menu access from the Front Panel
3		No Function
4	OPEN	- Enables Linearity Calibration
	CLOSED	- Enables Span Calibration
5	OPEN	- No Function
	CLOSED	- Will delete address information from RS-232 Data Output and change the numeric field from 8 characters to 7 in cases where the first character would be blank. This is necessary to use a GT balance with the GP-200 Printer.

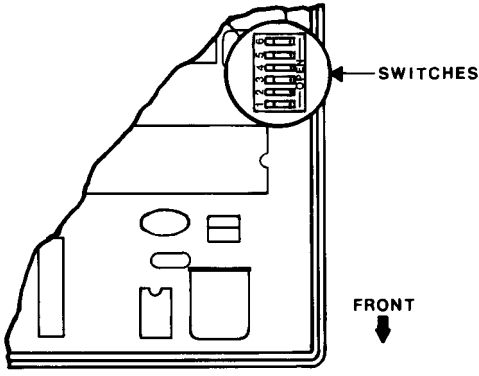
6	OPEN	- No delay in transmitting data
	CLOSED	- Adds 1 second delay before transmitting data through the RS-232 Port when "P" or "?" commands are received. (Print Switch and Auto Print features are not affected)

To access these internal switches, proceed as follows:

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.

1. Unplug your balance.
2. Remove the platform and the platform support.
3. Remove the two (2) cover screws and lift the cover off the base.
4. Locate the MAIN PRINTED CIRCUIT BOARD (PCB), and the set of six (6) switches. (See illustration)



CARE AND MAINTENANCE

To keep your balance operating properly, the cover, housing and removable platform 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 display window. If necessary a damp cloth with a mild, non-abrasive detergent may be used. Be careful not to scratch the display window and do not allow any liquid to flow inside the balance. Wipe the balance dry with a soft cloth.

ACCESSORIES AND REPLACEMENT PARTS

Accessory		Ohaus Part Number
	Span Calibration Weights	
2 kg	(GT 2100, GT 4100, GT 4800)	49026-01
200 g	(GT 210, GT 410, GT 480)	49025-01
	Linearity Calibration Weights	
4 kg	(GT 4100, GT 4800)	49046-01
2 kg	(GT 2100, GT 4100, GT 4800)	49026-01
1 kg	(GT 2100)	49016-01
400 g	(GT 410, GT 480)	49045-01
200 g	(GT 210, GT 410, GT 480)	49025-01
100 g	(GT 210)	49015-01
Security Lock and Cable Kit		76288-00
Animal Subject Box Kit	For Models GT2100, GT 4100 and GT 4800	76290-01
Animal Subject Box		76431-00
Animal Subject Box Cover		3052-00
Glass Draft Shield		76510-01
For Models GT210, GT 410 and GT 480		
Below Balance Hook		76790-00
	Scoops	
Aluminum - 1-1/2" x 2" x 7/16"		5076-00
Aluminum - 2-1/4" x 3" x 3/4"		5077-00
Footed Polypropylene		1011-20
Footed Stainless Steel		1078-03

Replacement Parts	Ohaus Part Number
In-Service Cover Kit	76901-00
In-Service Cover Plate	76815-01
Power Cord, 120 V U.S.	6569-00
Fuses 110/120 V .315 AT	90167-45
220/240 V .160 AT	90167-42

TROUBLESHOOTING

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

Symptom	Probable Causes(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 ERROR MESSAGE	1. Platform missing from balance.	Replace platform.
	2. Balance capacity exceeded.	Reduce the amount of weight to less than range capacity.
	3. Balance calibrated incorrectly.	Calibrate balance using correct weights and proper procedures.
UNSTABLE WEIGHT READINGS	1. Hostile environment.	Protect balance from environment.
	2. Platform movement obstructed.	Inspect and correct.

Error Messages

0.0 Bad EEPROM Data. Linearity Calibration is a must.

0.2 Parts Counting Error Level. Too many pieces must be added to insure desired error level.

2.0 Custom Units constant too large

2.1 Combination of exponent and LSD places decimal point off display. Choose new LSD (larger).

2.2 Package Weight Control targets not in logical order. i.e. under < target < over. Enter new values.

3.0 Calibration data out of spec. Probably not using correct calibration weights.

9.0 Hardware error detected in system RAM.

9.6 Underload.

9.7 Display exceeds 1,999,999 counts.

9.8 Movable Fine Range has placed decimal point off display.

9.9 Balance Capacity exceeded.

SPECIFICATIONS

		GT 210	GT 410	GT 480 High Range	GT 480 Low Range	GT 2100	GT 4100	GT 4800 High Range	GT 4800 Low Range
Capacity	g	210	410	400	80	2100	4100	4000	800
	oz avd	7	14	14	2.8	70	140	140	28
	oz t	6	13	13	2.6	65	130	130	26
	lb avd	0.44	0.88	0.88	0.176	4.40	8.80	8.80	1.76
	c	1000	1999	2000	400	10000	19999	20000	4000
	dwt	130	260	260	52	1300	2600	2600	520
	t	5	10	10	2	50	105	100	20
Readability	g	0.001	0.001	0.01	0.001	0.01	0.01	0.1	0.01
	oz avd	0.0001	0.0001	0.001	0.0001	0.001	0.001	0.01	0.001
	oz t	0.0001	0.0001	0.001	0.0001	0.001	0.001	0.01	0.001
	lb avd	0.000002	0.000002	0.00002	0.000002	0.00002	0.00002	0.0002	0.00002
	c	0.005	0.005	0.05	0.005	0.05	0.05	0.5	0.05
	dwt	0.001	0.001	0.01	0.001	0.01	0.01	0.1	0.01
	t	0.0001	0.0001	0.001	0.0001	0.001	0.001	0.01	0.001

Taring Range (By Subtraction) [g]	210	410	400	320	2100	4100	4000	3200
Taring Time	1 Sec							
Stabilization Time Avg Level - 0 (fast)	2 Sec							
Precision (Std Dev) [g]	0.001	0.001	0.005	0.001	0.01	0.01	0.05	0.01
Maximum Parts Count	To maximum capacity of balance							
Minimum Part Count Sample for < 1% error (g)	0.01	0.1	0.1	0.1	1	1	1	1
Platform Diameter	4.9	4.9	4.9"	4.9"	6.65"	6.65"	6.65"	6.65"
Weight - Net/Gross	11/17 lb.							
Dimensions (w × h × d)	7.50" × 3.75" × 12.75"							
Operating Temperature Range	10 - 40 ° C							
Power	100, 120, 220, 240 VAC, 50/60 Hz. 20 watts							

REFERENCE CONVERSION FACTORS

1 g = .0352740 oz 1 g = .0321508 oz t 1 g = .00220462 Lb 1 g = 5.00000 c 1 g = .643015 dwt 1 g = .0267112 tael

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 instructions, local service availability, turnaround time, etc. Failure to call may cause delays.

For electronic balance service assistance in the United States, 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.

Outside the United States, contact your nearest Ohaus dealer.

WARRANTY

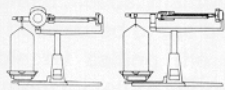
ELECTRONIC BALANCE LIMITED WARRANTY

During the warranty period, this Ohaus Electronic balance is warranted against defects in materials and workmanship. Ohaus will repair, or, at our option, replace at no charge components that prove to be defective, provided that the balance is returned to Ohaus Corporation or a service center authorized by Ohaus.

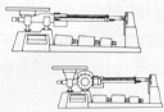
This warranty does not apply if the balance has been damaged by accident or misuse, improper packaging during return shipment, exposed to radioactive or corrosive materials or as a result of service or modification by other than a service center authorized by Ohaus. In lieu of a properly returned warranty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

OHAUS® Balances

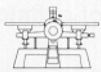
Dial-O-Gram 310/Cent-O-Gram 311 Balance: versatile 10 mg readability with fast, easy dial balancing for economy. The **Cent-O-Gram** Balance uses no dial.



Triple Beam Balance **Series 700/ Dial-O-Gram Series 1600** Balance. Top loading convenience in the most popular combination of capacity and sensitivity, plus fast weighing with the dial models.

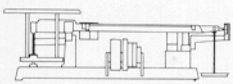


The classic even-arm, two-pan balance: the **Harvard Trip** Balance with sliding poise. The Ohaus **Dial-O-Gram 2000** Balance uses a dial.

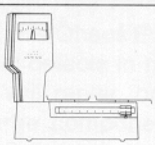


For quick moisture determination on most material: the Ohaus **Model MB 301**

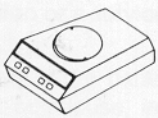
For heavy-duty weighing under abusive conditions: the Ohaus **Heavy Duty Solution** Balance.



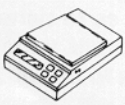
Manual checkweighing. Specifically designed for rugged performance in harsh environments. Mechanical simplicity and durability. The Ohaus **Check-O-Gram** Balance. USDA approved.



Fast, direct reading digital convenience with high reliability at economical prices. Available in grams only, gram/ounce, gram/carat/pennyweight and parts counting models. Easily interfaced with computers, printers and calculators. Ohaus **Electronic** Balances.



The newest most economical electronic of them all. The Ohaus **Port-O-Gram Electronic** Balances. Battery powered for portability. Available in ounce, gram, pennyweight and parts counting models.



Lowest cost electronic balances, featuring battery operation and ABS plastic construction. Ohaus **Lume-O-Gram** Balances.

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