Ohaus Corporation
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PRECISION *Advanced*
Electronic Balances
GT Series

Instruction Manual

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.

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.

The exclamation point within the triangle is a warning sign alerting you of important instructions accompanying the product.

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INTRODUCTION

This manual covers Installation, Operation and Troubleshooting for the Ohaus Precision Advanced Series of Electronic balances, Models GT210, GT400, GT410, GT2100, GT4000, GT4100, and GT8000. Suffixes after the basic model number are: D = Moveable FineRange™, T=Tower Mount and V=Non Type Approved. Models with an E suffix = Type Approved with CE conformance and bear official markings (Max, Min, Class, etc.) on a serial number plate located on the side of the balance. To ensure proper operation of the balance, please read this manual completely.

DESCRIPTION

The Ohaus Precision Advanced GT Series balances are precision weighing instruments, designed to be versatile, accurate, easy to operate and will provide years of service with virtually no maintenance. The Precision Advanced series is constructed using a die-cast aluminum base finished with a durable corrosion resistant epoxy powder paint. It contains solid-state precision electronics PC boards, and a seven and a half, 0.45 inch digit, Vacuum Fluorescent display. Each balance operates through a series of menus which enhances operation. A built in lockswitch prevents preset settings from being changed. To prevent measurements from being affected by air currents, a Draft Shield is mounted to the balance and is standard with Models GT210, GT410 and GT410D.

FEATURES

Precision Advanced balances contain four main display menus which enable you to calibrate and configure the balance for specific operating requirements.

- **MENU** When 

switch is pressed and released with MENU displayed, allows entry into other menus.

- **CALIBRATION** Menu - Allows the balance to be calibrated by using either Span or Linearity calibration methods. A Test function is used to verify the last calibration.

- **USER** Menu - Allows the balance to be set for environmental conditions. Reset, averaging level, stability range, auto-zero and beep (sound) functions can be set.

- **SETUP** Menu - Allows the balance to be customized for specific weighing functions.

- **PRINT** Menu - Allows the selection of parameters under which the balance will interface to a computer or a printer.

Each of these menus contain selectable parameters which can be entered via the front panel switches. Storing of the parameters is accomplished by selecting ***End*** at the completion of all selections in a particular menu. For a detailed description of each feature, refer to the individual menus in this manual.

UNPACKING

Your Precision Advanced balance was shipped with the following items:

- Platform
- Platform Support
- Power Cord
- Below Balance Weighing Hook
- Draft Shield included with Models: GT210, GT410 and GT410D
- Instruction Manual
- Warranty Card
- In-Service Cover
- Sealing Kit (Type Approved/Legal for Trade)

It is recommended to save the carton and packing material for storing, transporting the balance or returning it for service.

INSTALLATION

Environment

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

DO NOT install the balance:

- Next to open windows or doors causing drafts or rapid temperature changes.
- Near air conditioning or heat vents.
- Near vibrating, rotating or reciprocating equipment.
- Near magnetic fields or equipment that generates magnetic fields.
- On an unlevel work surface.

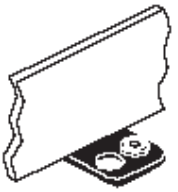
Below Balance Hook

A common application for this item is for determination of density or specific gravity. Mount the balance on a suitable surface which allows below balance weighing. If the below balance hook will be used, it may be installed in the bottom of the balance. Remove the protective plug at the bottom of the balance and screw the hook into the threaded hole in the Platform Support which is visible through the access hole in the bottom of the balance.

BELOW BALANCE HOOK

Leveling the Balance

The balance is equipped with a level indicator located at the rear of the balance and two adjustable leveling feet. The leveling feet are located under the front of the balance. Adjust the leveling feet until the bubble appears in the center circle of the indicator.



LEVEL INDICATOR

NOTE: A level indicator and leveling feet are not included on Models GT400, GT4000 and GT8000.

Power Requirements

WARNING

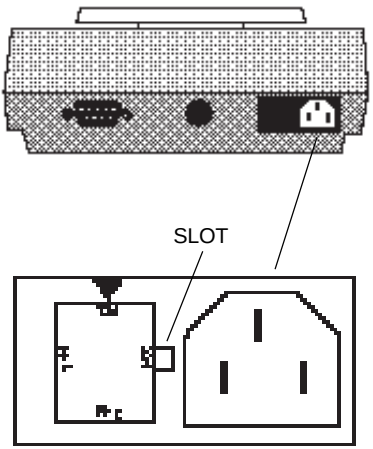
- **To avoid shock hazards, always be certain that the power cord is disconnected BEFORE removing the balance cover.**
- **Even though the balance may have been switched OFF, high voltage is present inside the balance as long as the power cord is connected.**
- **A power cord has been furnished with the balance. DO NOT use any other 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 fuse holder in the lower right-hand corner of the balance (when viewed from the rear).

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



3. If you wish to change the line voltage setting, remove the power cord and pry the fuse holder loose by inserting a small screwdriver blade in the slot. Remove the fuse holder and rotate it to the proper position with the correct line voltage lining up with the arrow. If neccessary, install the correct fuse for the required line voltage. (See Replacement Parts List for fuse rating).

4. Insert the fuse holder.

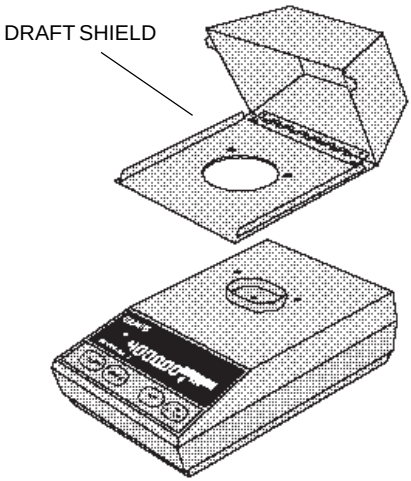
Draft Shield (Models GT210, GT410 and GT 410D)

To install the Draft Shield:

1. Remove the two existing screws and washers located on top of the balance.

2. Position the Draft Shield on top of the balance as shown.

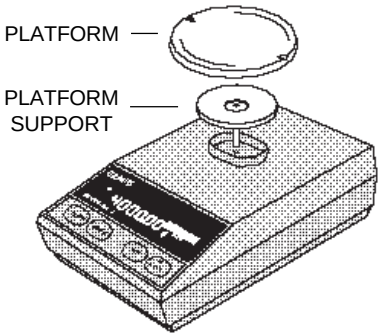
3. Insert the two screws, with washers (supplied with the Draft Shield) though the holes in the Draft Shield into the balance. Tighten both screws securely.



Platform and Platform Support

Insert the Platform Support into the hole in the weighing mechanism as shown in the illustration.

Place the Platform on the Platform Support making sure the Platform is properly centered.



Model GT8000T Tower Assembly Installation

Remove the four (4) flat head screws from the mounting holes at the lower left (when viewing the rear of the balance), and set them aside. Install the Tower Assembly on the mounting holes using the screws. The Tower Display unit may be tilted to the desired viewing angle. If the viewing angle is not going to be changed, tighten the Hex Socket set screw at the lower left (when viewing the rear of the Display Unit). The increased tension will prevent the Display Unit from accidentally tilting.

RS232 INTERFACE

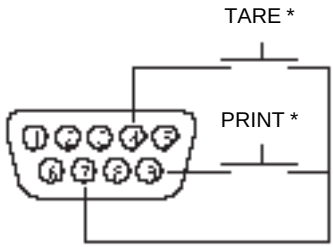
Precision Advanced balances are equipped with a bi-directional RS232 compatible interface for communication with printers and computers. When the balance is connected directly to a printer, displayed data can be output at any time by simply pressing PRINT, or by using the Auto Print feature.

Connecting the balance to a computer enables you to operate the balance from the computer, as well as receive data such as displayed weight, weighing mode, stability status, etc.

The following sections describe the hardware and software provided with the balance.

Hardware

On the rear of the balance, a 9-pin sub-miniature “D” connector is provided for interfacing to other devices. The pinout and pin connections are shown in the adjacent illustration.



The balance will not output any data 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.

Output Formats

Data output can be initiated in one of three ways: 1) By pressing PRINT; 2) Using the Auto Print feature; 3) Sending a print command (“P”) from a computer.

The output format is illustrated in the RS232 command table which follows.

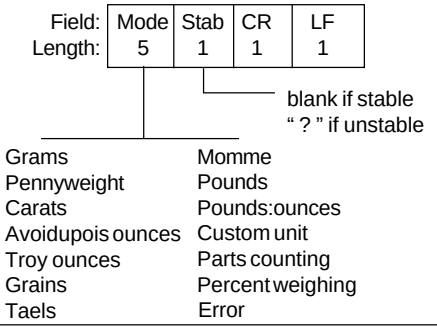
1	5VDC (5 mA max.)
2	Data Out (TXD)
3	Data In (RXD)
4*	Tare (External signal)
5	Clear To Send (CTS)
6	Data Terminal Ready (DTR)
7	Ground
8	Request To Send (RTS)
9*	Print (External signal)

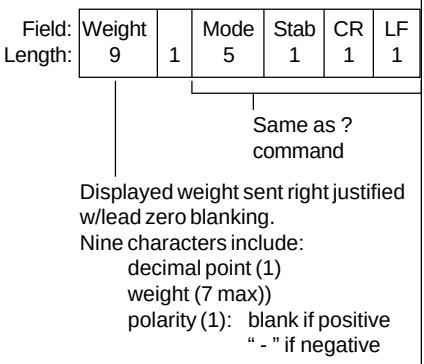
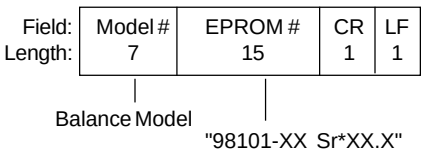
* External PRINT and/or TARE switches may be installed as shown in the diagram. Momentary contact switches must be used.

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 line feed (CRLF). For example, a tare command should appear as shown in the adjacent diagram. Data output by the balance is always terminated with a carriage return - line feed (CRLF).

RS232 COMMAND TABLE

Command Character	Description
?	Print current mode 
nnnA	Set Auto Print feature to "nnn" (see table). nnn = 0 Turns feature OFF nnn = S Output on stability nnn = C Output is continuous nnn = 1-256 Sets Auto Print Interval
C	Begin span calibration
xD	Set 1 second print delay (set x = 0 for OFF, or x = 1 for ON)
E	Exit parts counting or percent weighing
xI	Set Averaging Level to "x", where x = 0 to 3 (see table). 0 = minimum level 1 = 2 = 3 = maximum level
L	Begin linearity calibration
M	Same effect as pressing mode button
xM	Places balance in mode "x", where x = 1 to 13 (see table). If unit or mode is not already enabled, command will be ignored. 1 = grams 2 = pennyweight 3 = carats 4 = avoidupois ounces 5 = troy ounces 6 = grains 7 = taels 8 = momme 9 = pounds 10 = pounds:ounces 11 = custom unit 12 = parts counting 13 = percent weighing

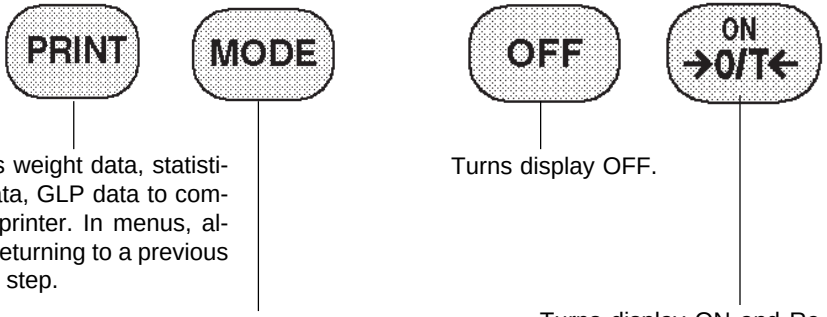
Command Character	Description
P	Print display data When "numeric only" display data is selected for output in the RS232 menu, the Mode field is not output. 
xS	Set stable data only printing (set x = 0 for OFF, or x = 1 for ON).
T	Same effect as pressing rezero button
V	Print EPROM version 
xZ	Set Auto Zero to "x", where x = 0 to 3 (see table). 0 = OFF 1 = .5 d 2 = 1 d 3 = 3 d
x%	Downloads reference weight "x" for percent mode. "x" must be in grams. Command is ignored if percent mode is disabled. If percent mode is enabled, balance will automatically switch to percent mode display.
x#	Downloads average piece weight "x" for parts counting mode. "x" must be in grams. Command is ignored if parts counting mode is disabled. If parts counting is enabled, balance will automatically switch to parts count display.
Esc L	Prints listing of Setup and Print menu settings.
Esc R	Resets Setup and Print menus to factory defaults. CAUTION: This will reset RS232 configuration.
Esc S	Save current settings.

OPERATION

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.

Pressing any of these switches after the balance is turned on results in the following:



Sends weight data, statistical data, GLP data to computer/printer. In menus, allows returning to a previous menu step.

Selects weighing units functions or options. In menus, changes to next step or value.

Turns display OFF.

Turns display ON and Re-Zeros/Tares the balance. In menus, accepts chosen parameter.

When the balance is first turned on and it completes its checks, and is calibrated, it can be used to weigh or tare materials without setting the menus.

There are many features and functions in the GT Balance, and if you do not address all of the features, the balance has built-in default settings shown on each menu page.

Before using the balance, carefully review the Symbols Used for Operation of the Balance shown on page 15, Navigating the Menus on page 16 and Operational Guide/ Index on page 17.

Please read the entire manual as there are many features which can be enabled. The balance is shipped from the factory ready to operate with default settings as shown in the menus.

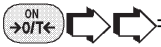
The balance is a high precision instrument and will give you years of service if kept clean and handled carefully. If you have any problems operating the instrument or require additional information, please feel free to contact our Product Service Department at (800) 526-0659.

Symbols Used for Operation of the Balance

This instruction manual uses certain symbols to explain various operational procedures and actions that occur. Examples of the symbols used are shown as follows:

Pushbutton Switches:

= **NORMAL PRESS AND RELEASE**



= **MULTIPLE PRESS**

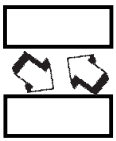
= **PRESS AND HOLD FOR DESIRED DISPLAY**

Display Area:


DISPLAY AREA - AS A RESULT OF USER ACTION


DISPLAY AREA - AUTO CHANGE OCCURS

DISPLAY AREA -SWITCHES BACK AND FORTH



Navigating the Menus

There are **four menus** used in the balance:

CALIBRATION	USER	SETUP	PRINT

To enter the menus, the (ON →0/T←) button is pressed and held until MENU is displayed. When released, CAL is displayed which is the Calibration menu.

When in the menus, repeated pressing of (MODE) advances through the menus. CALIBRATION | USER | SETUP | PRINT | END $_{MENU}$

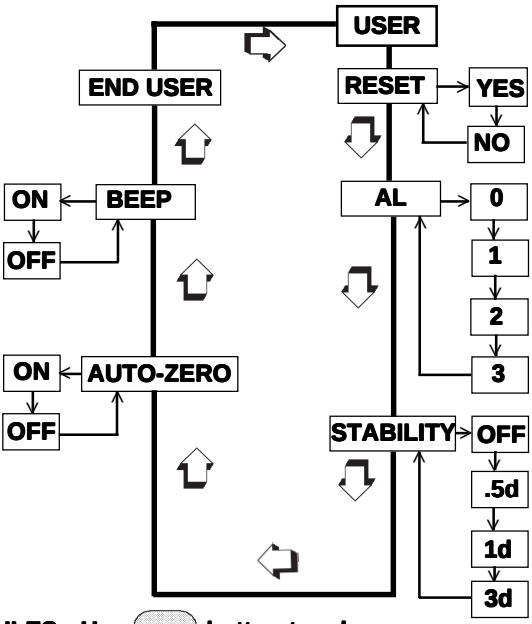
Each menu contains selections (submenus) which can be set for specific operations. The (MODE) button is used to advance though the submenu selections.

The (ON →0/T←) button enters or accepts the submenu selection and returns to the beginning of the submenu selection.

The (PRINT) button is used to backup in the submenu if a change is desired.

The following sample illustrates the **USER menu** and submenu items

---



NOTE:

Each menu is constructed in the form of a loop. Advancing from one submenu item to the next by using the (MODE) button will eventually return to the beginning of the menu. .

RULES: Use (MODE) button to advance.

Use (ON →0/T←) button to enter or accept submenu.

Use (PRINT) button to backup.

After selections are made, always exit menus through END $_{MENU}$ to store settings.

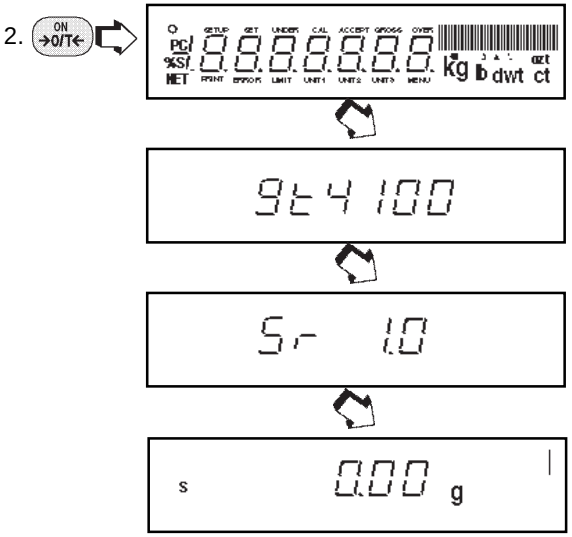
Operational Guide/Index

The Operational Guide/Index lists the pages for all balance operations and options. After settings are made, exit menus to save settings.

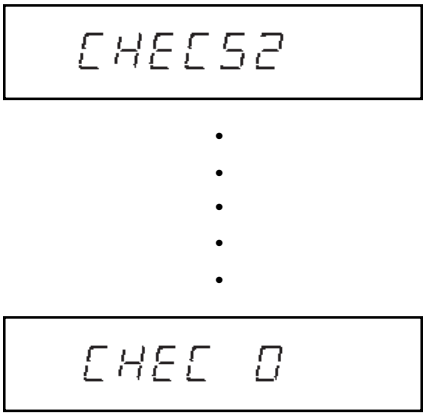
FUNCTION	TO OPERATE (See pages)	SETUP (See pages)
1. Turning the Balance ON	18	----
2. Weighing (grams)	20	----
3. Zero/Taring	20	----
4. Auto Tare	20	----
5. List	28	59, 68
6. Printing Data	27 to 32	61 to 68
7. Menu Lockout	34	----
8. Calibration	36 to 39	----
9. Percent Weighing	21	46, 67
10. Parts Counting	22	46, 51, 67
11. Check weighing	23	46, 52, 53, 67
12. Animal Weighing	24	46, 54
13. Fill Guide	25	46, 54, 67
14. High Point	26	46
15. Custom Units	50	49
16. Changing Units	----	45
17. Statistics	----	45
18. Net/Gross Weighing	----	48
19. Legal for Trade	----	45
20. GLP	----	51, 63
21. Time	----	56, 66
22. Date	----	57, 67
23. Lockswitch	----	58
24. Averaging Level	----	40
25. Stability	----	41
26. Auto Zero	----	41
27. Beep Function	----	42
28. Reset User	----	40
29. Reset Setup	----	44
30. Reset Print	----	61
31. Communications	----	61 to 63

Turning the Balance ON

1. With no load on the platform, connect the power cord to a suitable power source. The balance signals one long beep to indicate power has been applied.

2. 

NOTE: The display check countdown appears only in the first 60 seconds after plugging it in and only if the balance is turned on and only when the balance has been previously set with Type Approved/Legal for Trade set on.



Display Indications

The following table describes each of the display indicators.

DISPLAY INDICATORS

g	grams	lb	pounds
dwt	pennyweight	UNIT 3	custom unit/volume
ct	carats	NET	net indicator
oz	ounces	PCS	parts counting
ozt	troy ounces	%	percent weighing
UNIT 1	grains	S	stability indicator
t	taels	GROSS	gross (total) indicator
UNIT 2	mommes	▼	fill guide
▲	auto tare	○	center of zero
±	check weighing limits		

Stabilization

Before initially using the balance, allow time for it to adjust to its new environment. The balance only requires to be plugged in to warm up. Recommended warm up period is twenty (20) minutes. The internal circuits of the balance are powered whenever it is plugged into a power source.

Moveable FineRange™ (Models GT410D and GT4100D)

Models GT410D and GT4100D both contain a Moveable FineRange™ feature. When the weight of the object on the platform exceeds the capacity limit of the Moveable FineRange™, the balance will automatically change to the coarse range until either:

1. The load is reduced to below the capacity limit of the fine range.
2. ON →0/T← tares the balance and recalls the fine range. Taring procedure can be done repeatedly until capacity of the balance is reached.

Weighing

NOTE: The GT Series balances are shipped with grams only enabled and is labeled in this manner. When the balance is to be used with other Type Approved/Legal for Trade units of measure, the desired unit must be enabled and the appropriate label from the card supplied must be attached to the balance

1. ON →0/T← to rezero the display.

2. Place the object(s) or material to be weighed on the platform.

3. Wait for the stability indicator to appear before reading the weight.

NOTE: The capacity guide (bars) indicates the percentage of the current weight to the balance capacity. The example above illustrates a 4000 gram weight, (balance full capacity 4100 grams).

Zero/Tare

When weighing material or objects that must be held in a container, taring stores the container weight in the balance's memory, separate from the weight of the material in the container.

1. Place an empty container on the platform. Its weight is displayed.

NOTE: The container must weigh at least 100 times the readability of the balance (ie, GT4K x 0.1 or 10 grams).

2. ON →0/T←, the display blanks until stable weight readings are received, then indicates zero. The container's weight is stored in memory.
3. Add material to the container. As material is added, its net weight is displayed.
4. Removing the container and material from the platform will cause the balance to display the container's weight as a negative number.
5. ON →0/T← resets the balance to zero.

Auto Tare

Auto Tare is ***enabled only*** when Auto Tare is selected under the Setup menu. Refer to page 42. Auto Tare is used in an application where taring is done automatically without touching any controls on the balance. This is indicated by a small arrow in the display. When this option is set on, each time an object is first placed on the balance platform, it is automatically tared and two short beeps will sound. When a second object is placed on the platform along with the first object such as a container, only the net weight is displayed. The container weight is not shown. After removal of all material from the platform, the next object placed on the platform is auto tared. The default setting is off.

NOTE: Auto Tare is disabled for LFT.

Percent Weighing

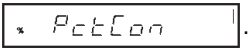
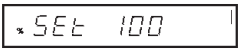
Percent Weighing is ***enabled only*** when the Percent Function is selected under the Setup menu. Refer to page 40. Percent weighing permits you to place a reference load on the balance, then view other loads as a percentage of the reference. The load you place on the platform as a reference may be displayed as any percentage you select from 5% to 100% (in 1% increments). One hundred percent does not necessarily have to represent the reference load. Subsequent loads, displayed as a percentage of the reference are limited only by the capacity of the balance. The default setting is Reference 100%.

EXAMPLE

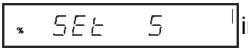
A 10g reference load is set for 20%:

- A subsequent load of 100 g will be displayed as 200%.
- A subsequent load of 200 g will be displayed as 400%.

To perform percent weighing when in a weighing mode, use the following procedure:

1. ON →0/T←  .
2. Place an empty container on the pan (if one will be used).
3. ON →0/T←  . This is the current reference percentage.

NOTE: The reference percentage can be changed to any value from 5 to 100.

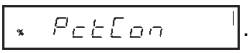
4. MODE  increments to  .

NOTE: PRINT does not return to a lower number. Instead, it sends Set x% command through the RS232 Interface, where x = 5 to 100.

5. When the selected reference value appears on the display, place the reference load in the container (or directly on the platform if no container is used).

6. ON →0/T←  , display indicates the reference load as the percentage entered. The bar graph indicates the load relative to the capacity of the balance.

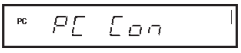
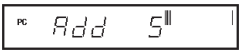
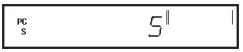
7. Remove the reference load from the balance and replace it with another load. The second load is displayed as a percentage of the reference.

8. MODE  to view alternate display in units.
9. To restart percent weighing at any time, ON →0/T←  .
10. ON →0/T← to exit to a weighing mode.

Parts Counting

Parts Counting is ***enabled only*** when the Parts Counting Function is selected in the Setup menu. Refer to page 40. In the parts counting mode, the balance displays the quantity of parts you place on the platform. Since the balance determines the quantity based on the average weight of a single part, all parts must be reasonably uniform in weight. The accuracy of parts counting results is determined by the error level entered in PC Err of the Setup Options submenu. Refer to page 51. The default setting for PC Err is off.

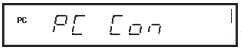
To perform parts counting when in a weighing mode, use the following procedure:

1. ON →0/T←  .
2. ON →0/T←  . The balance requires a sample of the parts to use as a reference for counting. The default for the sample size is 5 parts, but this can be changed to 10, 20, 30, 40, 50, or 100 parts by MODE (Larger samples yield more accurate results). Add the required number of sample pieces to the platform.
3. ON →0/T←  (indicates 5 pieces).
4. If Add X is displayed, the sample is too small to provide results within the selected error level (PC Error of the Setup Options submenu).

NOTE: X represents the number of additional parts needed to provide a sufficient sample.

5. Add the required number of parts, then ON →0/T← again.
6. To count additional pieces, add them to the platform. The display indicates the actual number of pieces based on their sample size. Tolerance will be within whatever was selected under the Parts Counting Error Level.

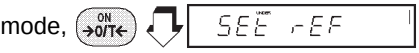
NOTE: If the balance controls are not touched, the sample size is stored in memory. You can continue to use the balance to measure quantities as long as the samples to be measured are of the same weight.

7. MODE to display the weight of the pieces on the pan.
8. MODE again to display the number of pieces.
9. To restart parts counting, ON →0/T←  .
10. MODE, the balance returns to a weighing mode.

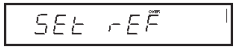
Check Weighing

Check Weighing is ***enabled only*** when the Check Weighing Function is selected in the Setup menu. Refer to page 46. Refer to page 52, Check Weighing Options under the Setup menu to set the Reference Type and Display Type options. In the check weighing mode, a reference weight can be set into the balance either as a reference weight on the pan or as a user entered number. The balance display shows either under, accept or over as each sample is weighed.

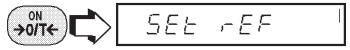
If **reference weight** was selected under CW Options submenu:

1. With the balance in the weighing mode, ON →0/T←  .

NOTE: If **reference number** was selected, go to step 7.

2. Place a sample weight on the pan which is considered to be the under limit for check weighing.
3. ON →0/T←  .
4. Place a sample weight on the pan which is considered to be the over weight limit for check weighing.
5. ON →0/T←. The display blanks until a stable reading is achieved, then it goes to either the (Normal, None or Sign) display type previously selected in CW Options submenu to indicate under, over or acceptacle limits of the objects being weighed.
6. Check weighing can now be made by removing a sample and placing a new sample on the pan.

If **reference number** was selected under the CW Options submenu:

7. With the balance in the weighing mode, ON →0/T←  .
8. MODE to return to weighing .
9. ON →0/T←  indicates under value with first digit flashing.
10. MODE until the first digit (under weight) is correctly displayed.
11. ON →0/T←. to accept the value.
12. Repeat steps 10 and 11and set all digits to the desired value. When the last digit is entered, display changes to an over value to be entered with the first digit flashing  .

NOTE: PRINT allows going back.

Check Weighing (Cont.)

13. Repeat steps 10 and 11 to set the over value. When the last digit is entered, the display indicates one of three display modes for check weighing.

14. Check weighing can now be performed by removing a sample and placing a new sample on the platform.

15. MODE ⇨⇨ allows other weighing units to be displayed if previously selected.

Animal Weighing

Animal Weighing is ***enabled only*** when Animal Weighing Function is selected under the Setup menu. Refer to page 46. To set options, refer to page 55, Animal Weighing Options under the Setup Options submenu.

With the balance in a weighing mode, proceed as follows:

1. ON →0/T← ⇦ AuuCon (Animal Weighing Container).
2. Place the container on the platform.

NOTE: MODE ⇨ to return to weighing mode.

3. ON →0/T← ⇨ rEAdy. The container weight is tared.
4. Place the subject in the container. The balance indicates a countdown to Auu 0 g. This cycle accommodates for movement. The balance then displays the actual weight of the subject with flashing unit indicator and returns to rEAdy after approximately six seconds. Repeat steps 1 through 4 for another subject or ON →0/T← ⇨ to start another weighing cycle.

NOTE: If Auto Print is enabled, the display returns to ready in approximately one second.

5. MODE ⇨ to return to weighing mode while display shows rEAdy.

NOTE: ON →0/T← ⇨ while the same subject is on the balance will cause Animal Weighing to start over.

Fill Guide

Fill Guide is ***enabled only*** when Fill Guide Function is selected under the Setup menu. Refer to page 46. To set options, refer to page 55, Fill Options under the Setup Options submenu.

FILLGUIDE™ BAR GRAPH

FILLGUIDE™ INDICATOR

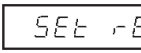
The FillGuide™ is a bar graph which appears in the upper right hand portion of the display. When the load on the balance is at the balance's capacity, all of the segments are on. When the load is at half capacity, only the first half of the segments are on. During normal operation of the balance, the bar graph displays the relationship between the load on the pan and the capacity of the balance. In the Fill Guide mode, the bar graph can be set to a desired target value. The FillGuide™ feature can be used in any one of the available weighing units.

The Fill Option under the Setup Options submenu provides two choices for a reference weight (similar to check weighing). Either a mass can be placed on the pan and used as a reference weight or a number can be entered to establish the weight value. Both methods are used to establish a reference for a 100% bar graph reading. Target parameter provides two choices, one is fill to the reference weight. The other option sets the reference weight to a negative value and allows the operator to see the delta between the actual fill weight and the target weight.

With the balance in a weighing mode, proceed as follows:

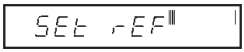
Reference Weight

With the balance in a weighing mode, and if reference weight was selected under Fill Options submenu proceed as follows:

1. ON →0/T← 

.

2. Place a sample weight on the pan which is the reference weight 

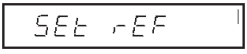


. Assumes 50 grams weight reference.

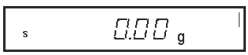
3. ON →0/T← 

. The display indicates a 50 gram mass (target = reference. For target = to zero, display shows 0.0000 as the actual weight of the sample with the bar graph at 100%.

4. The Fill Guide feature can now used by placing samples on the pan. If the sample is equal to the reference weight used to calibrate the fill mode, the actual weight is displayed with a full bar graph. When target is selected, the balance will show the normal weight of the object on the pan.

5. ON →0/T← 

to exit the fill option mode.

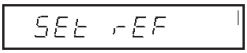
6. MODE 

, the balance is now in a weighing mode.

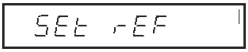
Fill Guide (Cont.)

Reference Number

If reference number was selected under the Fill Option submenu with the balance in a weighing mode, proceed as follows:

1. ON →0/T← 

.
2. ON →0/T← 

. Set the flashing digit to the desired weight value.
3. MODE until the first digit is correctly displayed.
4. ON →0/T← to accept the digit.
5. Repeat steps 3 and 4 until all digits are set. When the last digit is entered , the balance is automatically in the fill mode.
6. The fill mode can now be used by placing samples on the pan. If the sample weight equals the reference weight, the bar graph indicates 100%, the weight is displayed.
7. ON →0/T← 

to exit the fill option mode.
8. MODE 

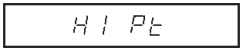
, the balance is now in a weighing mode.

High Point

High Point is ***enabled only*** when High Point Function is selected under the Setup menu. Refer to page 46. High point is a feature which permits a number of samples to be weighed with the balance ***storing the lowest*** sample weight and the ***highest sample weight***. The samples which are in between the low and high points are disregarded and not displayed.

NOTE: When using this function, the balance does not respond to weights below 100 digits.

With the balance in a weighing mode, proceed as follows:

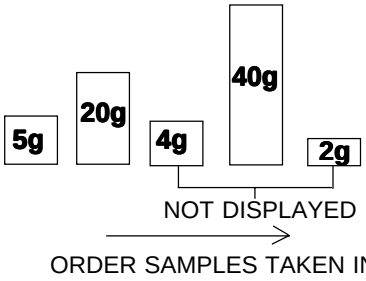
1. ON →0/T← 

. 

, LIMIT is displayed, indicating the function is on.
2. Place the first sample on the balance pan. When the balance has stabilized, the weight is displayed. Remove the weight.
3. Place a second sample on the pan. After the balance stabilizes, the second sample weight is displayed if it is greater than the first sample. This procedure can be continued with a number of samples. The highest weight sample is always displayed.

High Point (Cont.)

4. ON →0/T← To view the lowest and highest sample weight. The display LIMIT flashes, the lowest sample weight is displayed followed by two short beeps, the display then indicates the highest sample weight for a few seconds then automatically changes back to the normal weighing mode.



5. To use the High Point function again, repeat steps 1 through 4.
6. MODE s 0.00 g to exit High Point and return to a weighing mode.

Printing Data

Printing data to an external computer or printer requires that the communications parameters in the Print menu be set first. Refer to page 60 Print menu. A wide variety of printing options are available, refer to page 64, Print Options under the Print menu and set the desired options before proceeding. To print data, PRINT.

This section defines the various printing setups with printing samples.

Time and Date

When time and date are entered in the balance through the Setup menu and with both Time and Date options set to ON under the Print Options submenu, each printout starts with the time and date on the first line.

6/22/95 1:00:30 PM

Printing Data (Cont.)

List

List is a convienent method of examining which parameters are set up in the balance. The parameters do not show up on the display but print out when selected. Both the Setup and Print menus have a List function.

When LIST is displayed in either the Setup or Print Menu, 

causes the parameters of the User, Setup and Print menus to be printed on an external printer or computer screen.

The sample shown, indicates the status in three menus.

```
GT MODEL 98101-18    Sr 1.0

User Menu
AL = 3, Stb = 1d
AZT = Off, Beep = Off

Setup Menu
LFT is Off
Enabled Modes:
g, dwt,
oz, ozt,
tael, momme,
lb, custom
Tael = Hong Kong
C. Units:
1.000000 EXx1
Units = custom
Functions = None
Statistics On
  Std Dev = Sample
  Mean = On
  Sum = On
  Max = On
  Min = On

  Diff = On
Total = Off
Auto Tare = Off
GLP
  Time/Date On
  Bal Id = On
  User Id = On
  Project # = On
  Cal = On
Time = US 12:00:00 PM
Date = US 4/1/94
Lock Switch is Off

Print Menu
  RS-232 = 2400: N: 7: 2
          Print Options
            Auto Print = Off
            Interval = 2
            Non - PL = 0.000
            Non - PH = 50.000
            Stable Print = Off
            Nu = Off
            Time  = On
    Date  = On
    Print Ref = On
    Print Ref = On
```

Printing Data (Cont.)

Span Calibration Printout

With GLP on, when performing a Span calibration, a printout is automatically made after the calibration mass is placed on the platform and ON →0/T← is pressed.

```
- - - - - SPAN CAL - - - - - -
4/01/95          12:00:00 PM
Bal Id  1234
Cal:             4000.00g
Old:             4000.00g
Dif:                0.00g
Wt.  Ref.....
ID 2056853
PR 100012
Name.....

- - - - - END - - - - -
```

Linearity Calibration Printout

When performing a Linearity calibration with GLP on, a printout is automatically made after the calibration mass is placed on the platform and ON →0/T← is pressed.

```
- - - - - LIN CAL - - - - - -
4/01/95          12:00:00 PM
Bal Id  1234
Cal:             4000.00g
Old:             3999.94g
Dif:                0.06g
Wt.  Ref.....
ID 2056853
PR 100012
Name.....

- - - - - END - - - - -
```

Calibration Test Printout

When performing a Calibration Test with GLP on, a printout is available. When the display indicates the mass value to be placed on the platform, the balance the automatically displays the calibration weight required.

```
- - - - - CAL TEST - - - - - -
4/01/95          12:00:00 PM
Bal Id  1234
Cal:             4000.00g
Act:             4000.04g
Dif:                0.04g
Wt.  Ref.....
ID 2056853
PR 100012
Name.....

- - - - - END - - - - -
```

Printing Data (Cont.)

Statistics Printout

When statistics is enabled, a printout can be made with any of the major balance functions such as; Percent, Parts Counting, Check Weighing, Animal Weighing and FillGuide™. Under the Setup Options menu, Statistics has parameters such as Enable, Standard Deviation, Mean, Sum, High, Low and Difference which can be turned on or off. Statistics can be printed any time the balance is operational and statistics is enabled (turned on).

For example, to weigh ten samples and obtain a printout, proceed as follows:

Sampling

1. PRINT → StArt.
2. Place the *first* sample on the platform, wait for the stability indicator **S** on the display to show.
3. PRINT → Sn 1 appears and the printer outputs the first sample weight.
4. Remove the first sample.
5. Place the *second* sample on the platform, wait for the stability indicator **S** on the display to show.
6. PRINT → Sn 2 appears and the printer outputs the second sample weight.
7. Remove the second sample.

NOTE: The weight of each sample is shown on the display and printed. Maximum sample size = 256.

8. Repeat procedure for as many samples as required.
9. PRINT → StOP to end the sampling procedure. Printout completes the data. See sample at right.

```
      - - - - - START - - - - -
4/01/95          12:00:00 PM
  1              49.54 g
  2              49.54 g
  3              49.56 g
  4              49.57 g
  5              50.03 g
  6              50.54 g
  7              50.04 g
  8              50.04 g
  9              50.03 g
 10              50.04 g
- - - - - - - - - - - - - - - - - - - - - -
SD Pop.           0.314
Mean             49.893
Sum              498.93
Maximum          50.54
Diff              1.00
Finish           12:05:00 PM
Bal Id  1234
ID 2056853
PR 100012
Name.....

      - - - - - - END - - - - - -
```

Printing Data (Cont.)

Percent Weighing

Statistical printouts of Percent Weighing are similar to sampling statistics. Loads on the balance platform may be displayed as a percentage from 5% to 100% in 1% increments. To obtain a printout in this mode, the balance must be set up in Percent Weighing. Refer to basic Sampling procedure for operation. The sample illustration shown at the right had the balance reference set to 100% using a weight of 17.398 grams.

```
      - - - - - START - - - - -
4/01/95      12:00:00 PM
  1                   5 Pcs
  2                   5 Pcs
  3                  15 Pcs
  4                  23 Pcs
  5                  36 Pcs
  6                  42 Pcs
  7                  52 Pcs
  8                  50 Pcs
  9                  41 Pcs
 10                  50 Pcs
- - - - - - - - - - - - - - - - - - - - - - -
SD Pop.             17.530
Mean                31.900
Sum                319.00
Maximum             52.00
Diff                 5.00
Finish       12:05:00 PM
PC Ref           0.496 g
Bal Id  1234
ID 2056853
PR 100012
Name.....
    - - - - - - - - END - - - - - -
```

```
      - - - - - START - - - - -
4/01/95      12:00:00 PM
  1                  99.9%
  2                 100.1%
  3                 100.0%
  4                  55.9%
  5                 123.2%
  6                 155.9%
  7                 102.8%
  8                 102.9%
  9                 105.9%
 10                 105.7%
- - - - - - - - - - - - - - - - - - - - - - -
SD Pop.             23.276
Mean               105.230
Sum                1052.30
Maximum             155.90
Diff                100.00
Finish       12:05:00 PM
Bal Id  1234
ID 2056853
PR 100012
Name.....

      - - - - - - END - - - - - -
```

Parts Counting

When the balance is in a Parts Counting mode, each time a batch of items are counted, they can be recorded statistically by pressing PRINT as described in the Sampling procedure. The example shown on the left used a sample weighing 0.496 gram each.

Printing Data (Cont.)

Check Weighing

When the balance is in a Check Weighing mode, each sample can be checked either to show or print an under, accept or over weight on the printout. Use the procedure described in Sampling to obtain data by pressing PRINT each time a sample is weighed. A numeric entry of 50.00 grams was used for this sample printout.

```
        - - - - - START - - - -     -
4/01/9512:00:00 pm
 1    50.78 g          ACCEPT
 2    52.74 g          ACCEPT
 3    55.25 g          ACCEPT
 4    57.63 g            OVER
 5    52.79 g          ACCEPT
 6    51.78 g          ACCEPT
 7    50.79 g          ACCEPT
 8    47.79 g           UNDER
 9    47.79 g           UNDER
10    50.30 g          ACCEPT
- - - - - - - - - - - - - - - - - - - - - - -
SD Pop.                          2.682
Mean                            51.964
Sum                             519.64
Maximum                          57.63
Diff                              9.84
Finish                     12:05:00 PM
Min Ref                        50.00 g
Max Ref                        53.00 g
Bal Id  1234
ID 2056853
PR 100012
Name.....

        - - - - - - END - - - - - -
```

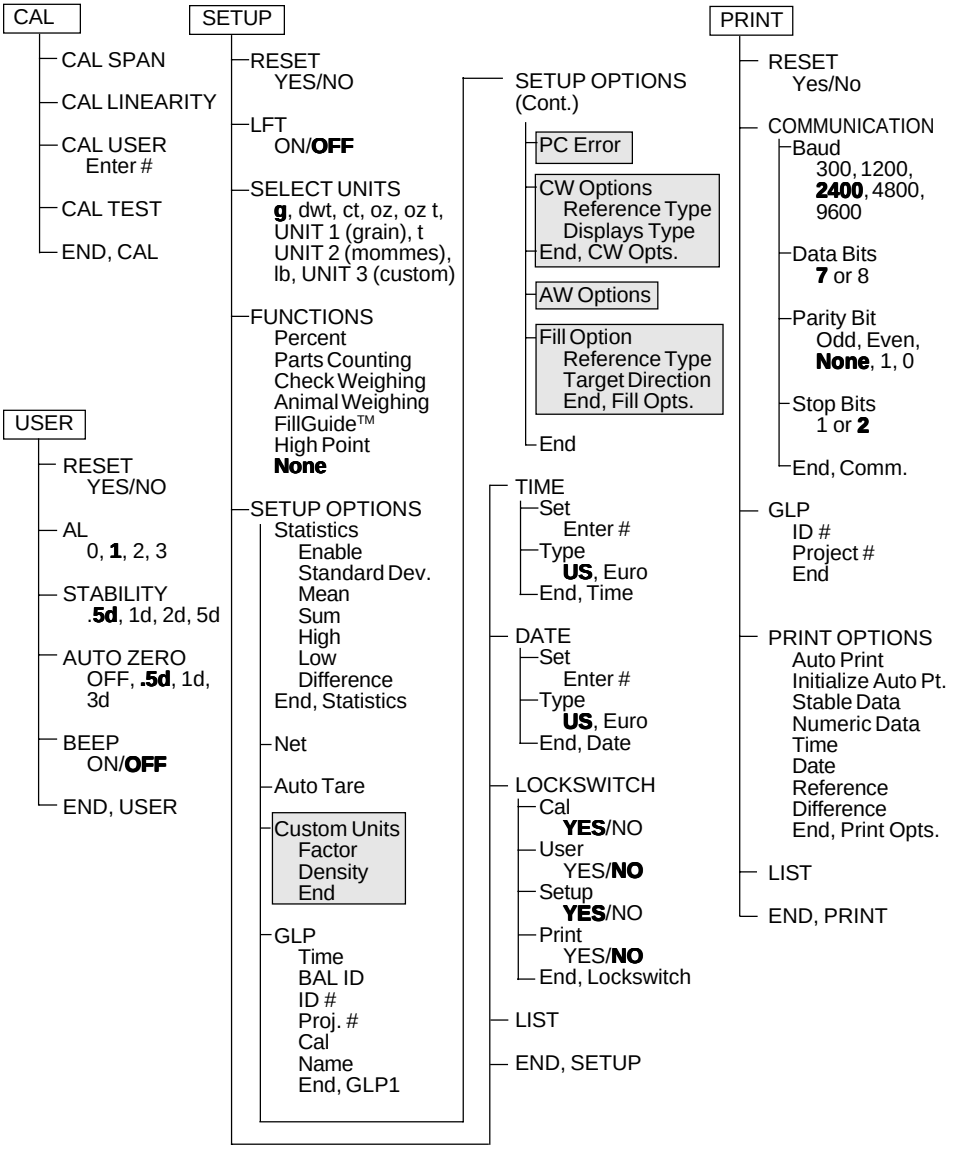
```
4/01/95      12:00:00 PM
  1999.9 g
Fill Ref          1999.98 g
Fill Dif -           0.01 g
4/01/94      12:01:00 PM
  2023.87 g
Fill Ref          1999.98 g
Fill Dif-           23.89 g
  4/01/94    12:02:00 PM
  2050.28 g
Fill Ref          1999.98 g
Fill Dif -           50.30 g
```

FillGuide™

When the balance is in a FillGuide™ mode, each sample can be checked on the printout. By accessing the Custom Units submenu, Density settings can be in *Milliliter, Liters, Fluid Ounces or Quarts*. Use the procedure described in Sampling to obtain data by pressing PRINT each time a sample is weighed. A standard mass of 2,000 grams was used for this sample printout and a sample taken each minute.

MENUS

Each submenu of the GT Balance contains numerous selections which can be set for specific operations. To customize the operation of the balance for specific measurements, functions and printing, it is necessary to make selections in each menu. The following illustration identifies the major items in each menu and the factory default settings are shown in bold type with the exception of the Setup Options and Print options which are shown in their respective menus. Shaded areas only appear in the menu if the appropriate function or weighing unit is selected in the Setup menu.



MENU LOCK-OUT PROTECTION

Access to the ***Calibration***, ***User***, ***Setup*** and ***Print*** menus, can be disabled using the Lockswitch located on the PC board inside the balance. The Lockswitch locks out menus selected in the Lockswitch menu. The default setting for the Lockswitch is OFF.

1. Turn the display off and unplug the power cord.

WARNING

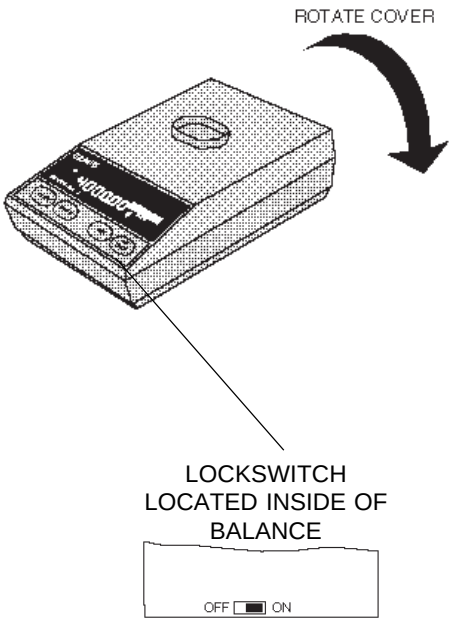
- To avoid shock hazards, always be certain that the power cord is disconnected BEFORE removing the balance cover.
- Even though the balance may have been switched OFF, high voltage is present inside the balance as long as the power cord is connected.
- A power cord has been furnished with the balance.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

3. Remove the two (2) cover screws and tilt the cover towards the right side of the balance.

4. The menu Lockswitch is located on the front of the PC board. The OFF position is to the left facing the front of the balance.

5. Select the desired position on the Lockswitch and reassemble the balance.



TYPE APPROVED BALANCE SEALING

Precision Advanced Electronic Balances with an "E" suffix, may be sealed for type approved applications. Type Approved balances include a lead seal with wire and security screw as shown in the figures below. Non Draft Shield equipped models have two fastening points (lances) and Draft Shield equipped balances have three fastening points for sealing wire.

Type approved balances are Class II devices, consult local Weights and Measures officials to determine sealing method requirements.

After the balance has been set up properly and the menus are locked out (see section titled Type Approved/LFT), proceed as follows to seal the balance: Turn OFF and unplug the balance. Remove Platform and Platform Support.

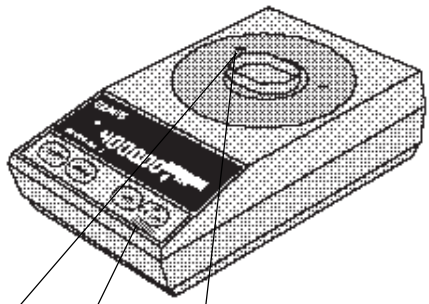
- **LEAD SEAL METHOD**

1. Pass the wire through the Security Screw and the lances on the Plate as shown in the illustration. **NOTE**: On balances with a draft shield, both sides of the wire from the screw ***must*** pass through the first lance, otherwise the wire may interfere with balance operation by touching the bottom of the platform.
2. Crimp the lead seal tightly.
3. Reinstall items removed.

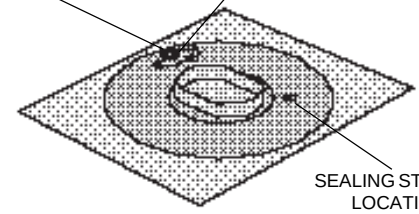
OR

- **SEALING STICKER METHOD**

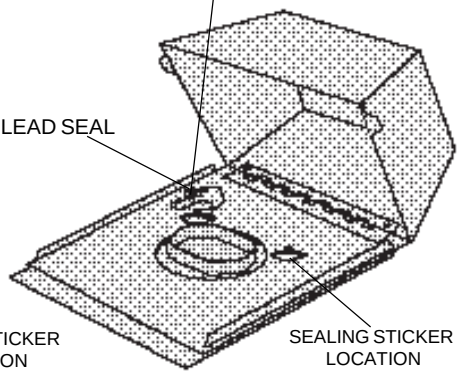
1. Apply Seal, see illustration for location.
2. Seal is provided by Weights and Measures officials or authorized Ohaus representatives.
3. Reinstall items removed.



ALTERNATE LABEL (LFT) (See page 39)



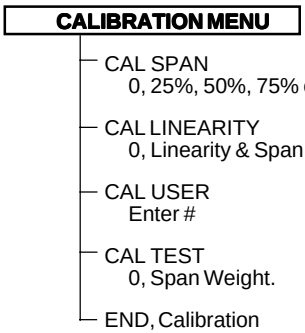
SEALING FOR BALANCES **WITHOUT** DRAFT SHIELDS



SEALING FOR BALANCES **WITH** DRAFT SHIELDS

CALIBRATION MENU

Precision Advanced balances features CalTest™ which offers a choice of three calibration methods: Cal Span, Cal Linearity, and Cal User. ***Cal Span*** calibration ensures that the balance reads correctly within specifications using two weight values: zero and a weight value at either 25%, 50%, 75% of or at the balance's full capacity. ***Cal Linearity*** calibration minimizes deviation between actual and displayed weights within the balance's weighing range. Three weight values are used: zero, a weight value at midpoint of the balances weighing range, and a weight value at or near the balance's specified capacity. ***Cal User*** is a method where the balance can be calibrated using a mass of known value by entering that value into the balance. ***Cal Test*** allows the stored calibration data to be tested against the current mass being used for the test. The following figure illustrates the sequence in which submenus appear on the Calibration menu. Item shown bolded is a default setting.



NOTE: Multiple Span values and Cal User are disabled for Type Approved/LFT balances.

Calibration Menu Protection

NOTES:

1. Calibration may be locked out to prevent unauthorized personnel from changing calibration. If calibration has been locked out, you can only access Cal Test.

2. To lock out calibration menu, after calibration, refer to the section titled Menu Lock-Out Protection.

Calibration Masses

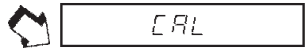
Before beginning calibration, make sure masses are available. If you begin calibration and realize calibration masses are not available, exit the menu. The balance will retain previously stored calibration data. Calibration should be performed as necessary to ensure accurate weighing. Masses required to perform the procedures are listed in the adjacent table.

CALIBRATION MASSES

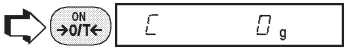
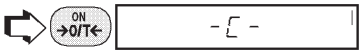
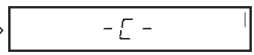
MODEL	LINEARITY MASSES	SPAN ONLY MASSES
GT210	100g, 200g	200g
GT400	200g, 400g	400g
GT410	200g, 400g	400g
GT410D	200g, 400g	400g
GT2100	1kg, 2kg	2kg
GT4000	2kg, 4kg	4kg
GT4100	2kg, 4kg	4kg
GT4100D	2kg, 4kg	4kg
GT8000	4kg, 8kg	8kg

Masses must meet or exceed ASTM Class 1 Tolerance. Calibration masses are available as accessories.

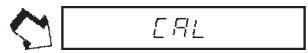
Span Calibration

1. ON →0/T←   .
2. ON →0/T←  .

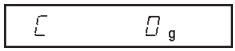
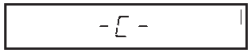
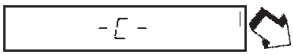
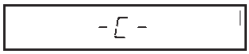
NOTE: Do not disturb the balance when -C- is displayed.

3.  , = no mass should be on the platform.
4.  = mass which must be placed on the platform.
5. MODE allows the selection of either 25%, 50%, 75%, or 100% of full span to be used to calibrate the balance. Example shows value of 50% for a 4 kg balance.
6. Place required mass on the platform , ON →0/T←  .  . When mass is displayed with current unit indicator, and the stability indicator (S) is ON, the balance is recalibrated.
7. Remove the mass from the platform  .  Span calibration is complete. The balance is now in a weighing mode.

Linearity Calibration

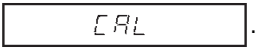
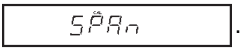
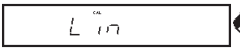
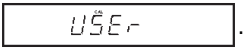
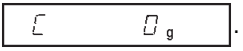
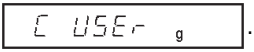
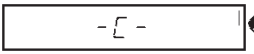
1. ON →0/T←   .
2. ON →0/T←  .
3. MODE  .

NOTE: Do not disturb the balance when -C- is displayed.

4. ON →0/T←  , = no mass should be on the platform.
5. ON →0/T←  = mass which must be placed on the platform.
6. Place the required mass on the platform, ON →0/T←   = next mass to be placed on the platform.
7. Place the required mass on the platform, ON →0/T←  .  . When mass is displayed with current unit indicator and the stability indicator (S) is ON, the balance is recalibrated.
8. Remove the mass from the platform  .  . Linearity calibration is complete. The balance is now in a weighing mode.

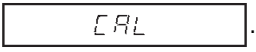
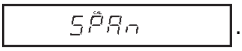
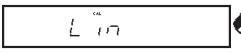
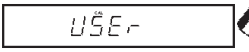
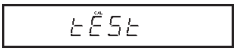
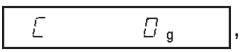
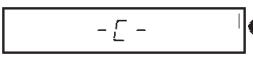
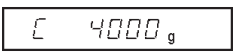
User Calibration

User calibration is used when it is desired to calibrate the balance using a mass of known value. To use this calibration feature, proceed as follows:

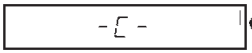
1. ON →0/T←   .
2. ON →0/T←  .
3. MODE   .
4. ON →0/T←  . Last calibration mass value is displayed with the first digit flashing.
5. MODE to change flashing digit.
6. ON →0/T← to accept and proceed to the next digit. PRINT to backup.
7. Set the number to match the value of the selected calibration mass. The number entered must be at least 25% of the full span value.
8. After the last digit has been accepted,  .
9. ON →0/T←  .
10. Place calibration mass on the platform.
11. ON →0/T←   . The balance is now calibrated, remove the calibration mass. The balance is now in a weighing mode.

Cal Test

Cal Test offers a choice of the span calibration value (1/4, 1/2, 3/4 or full). To ensure reproducibility, this feature allows a check of a known calibration mass against last stored calibration information.

1. ON →0/T←   .
2. ON →0/T←  .
3. MODE    .
4. ON →0/T←  , = no mass should be on the platform.
5. ON →0/T←   = mass which must be placed on the platform.

Cal Test (Cont.)

6. MODE switch allows the selection of either 25%, 50%, 75%, or 100% of full span to be used to calibrate the balance.
7. Place the required mass on the platform ON →0/T←  .

The balance weighs the test mass based on current calibration data, then displays the difference between the measured value and requested value. The example shows a normal display if the test mass equals the mass value stored in memory.

8. After a short period of time, the balance returns to the weighing mode.

USER MENU

The User menu is used to adapt the balance to environmental conditions. It contains submenus which enable you to turn features on or off, and program balance parameters. *Reset* changes all submenus to original factory default settings. *Reset* does not appear if menu has been locked out. *AL* specifies the averaging level. *STB* specifies the desired stability range. *Auto Zero* sets the automatic zero threshold. *Beep,* when set on, provides audible tones to signify various balance conditions. *End User* is used to exit the Setup menu and store the selections. The following figure illustrates the sequence in which submenus appear on the User menu. Items shown in bold type are the default settings.

USER MENU

- RESET
  YES/NO
- AL
  0, **1**, 2, 3
- STABILITY
  .5d, 1d, 2d, 5d
- AUTO ZERO
  OFF, **.5d**, 1d, 3d
- BEEP
  ON/**OFF**
- END, User

User Menu Protection

The User menu may be locked out to prevent unauthorized personnel from changing the settings. If -SAFE- is displayed, the User menu has been locked out. Settings may be viewed but not changed. To lock out the User menu, refer to the section titled Menu Lock-Out Protection.

Reset

This submenu enables you to reset all User menu selections to the *factory default settings:* Averaging Level **1**, Stability Range **.5d,** Auto-Zero Tracking **.5d** and Beep **OFF.** Reset does not appear if the menu has been locked out.

1. ON →0/T← MENU CAL.
2. MODE USEr.
3. ON →0/T← rESEt.
4. ON →0/T← YES.
5. MODE to select YES or no.
6. ON →0/T← rESEt. If YES is selected, the balance signals a *two short beeps*. Reset values are stored only if exited through End USr.

Averaging Level

Averaging level compensates for vibration or excessive air currents. Factory default setting is shown in bold type.

AL 0 reduced stability, fastest stabilization time

AL 1 normal stability, normal stabilization time

AL 2 more stability, slow stabilization time.

AL 3 maximum stability, slowest stabilization time.

NOTE: Averaging level does not affect balance accuracy, but it does affect stabilization time.

To view or change the averaging level:

1. Access the Averaging Level AL submenu.
2. ON →0/T← AL 1.
3. MODE to select AL 0 through AL 2.
4. ON →0/T← AL.

Stability Range

The stability range specifies the weighing results must be within a preset tolerance limit for a certain time to turn the stability indicator ON. When a displayed weight changes beyond the allowable range, the stability indicator turns OFF, indicating an unstable condition. Factory default setting is shown in bold type.

Stb .5 d	**Smallest range: stability indicator is ON only when displayed weight is within .5 divisions.**
Stb 1 d	Reduced range.
Stb 2 d	Normal range.
Stb 5 d	Largest range: stability indicator is ON even though displayed weight changes slightly.

When the RS232 interface is configured to print stable data only, the stability range also governs data output. Displayed data will only be output if it is within the selected stability range.
To view or change the stability range:

1. Access the Stability Range [Stb] submenu.
2. (ON →0/T←) ⇨.
3. (MODE) ⇨⇨ to select [.5 d] through [5 d].
4. (ON →0/T←) ⇨ [Stb].

Auto-Zero

Auto-Zero minimizes the effects of temperature changes and shift on the zero reading. The balance maintains the zero display until the threshold is exceeded. Factory default setting is shown in bold type.

OFF	Turns Auto-Zero OFF.
.5 d	**Sets threshold to .5 divisions.**
1 d	Sets threshold to 1 division.
3 d	Sets threshold to 3 divisions.

To view or change the auto-zero setting:

1. Access the Auto-Zero [Auto-0] submenu.
2. (ON →0/T←) ⇨ [.5 d].
3. (MODE) ⇨⇨ to select [.5 d] through [OFF].
4. (ON →0/T←) ⇨ [Auto-0].

Beep Function

A beep (sound) feature is a tone or series of tones emitted to annunciate various balance conditions. The table below defines when the beeps are sounded if turned ON. The default setting for the Beep menu is OFF. To turn the sound feature ON, proceed as follows:

1. Access the Beep [bEEP] submenu.
2. ON →0/T← [On].
3. MODE to select [On] or [OFF].
4. ON →0/T← [bEEP].

GT BEEPS

Power-On Single long beep (Plug in, not front panel On)	Single long beep *
Key Press	Single short beep
Auto-Tare occurrence	Double short beep *
FillGuide™ 100% (first time after no load)	Triple short beep
Check Weigh Accept First time after no load)	Triple short beep
High Point - new high or low value detected	Double short beep
End of Animal Weigh cycle	Double short beep
Reset in Menu	Double short beep *

* Indicates that the beep cannot be disabled.

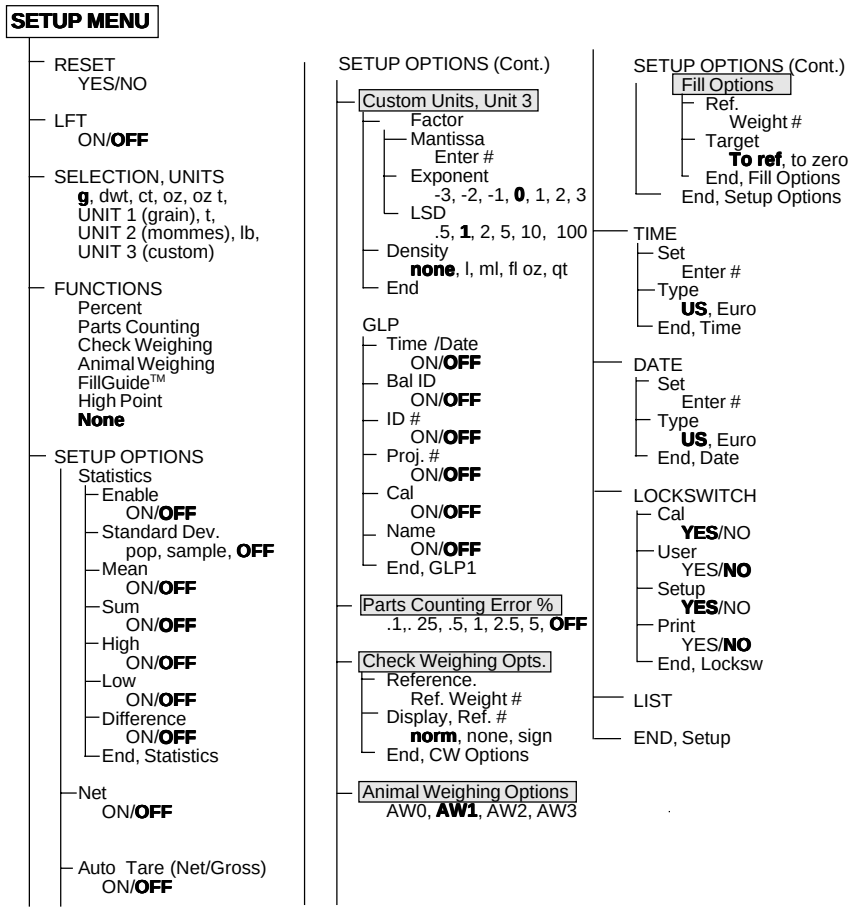
Exiting User Menu

To exit the User menu and store settings, proceed as follows:

1. Access End Usr [End USr] submenu.
2. ON →0/T← [USEr].
3. MODE [End].
4. ON →0/T← [0.00 g].

SETUP MENU

The Setup menu is used to customize the operation of the balance for your specific requirements. It contains submenus which enable you to turn features on or off, and program balance parameters. *Reset* changes all submenus to original factory default settings. *Reset* does not appear if menu has been locked out. *LFT* sets the balance for type approved operation. The following figure illustrates the sequence in which submenus appear on the Setup menu. Areas shaded appear only appear in the menu if the appropriate function or weighing unit is selected. Items shown in bold type are the default settings.



Setup Menu Protection

The Setup menu may be locked out to prevent unauthorized personnel from changing the settings. If -SAFE- is displayed, the Setup menu has been locked out. Settings may be viewed but not changed. To lock out the Setup menu, refer to the section titled Menu Lock-Out Protection on page 34.

Reset

This submenu enables you to reset **all** Setup menu selections to the factory default settings shown in the table. Reset does not appear if the menu has been locked out.

NOTES:
1. Default settings of the Lockswitch menu only appear if the hardware Lock-out switch is set to the locked position.
2. Function related options shown in itailics in the table only appear if that function is enabled.

SETUP MENU
FACTORY DEFAULTS

Unit Selection	grams
Functions	None
Statistics	All-Off
Net	Off
Auto Tare	Off
Conversion Factor	
Mantissa	1.000000
Exponent	0
LSD	1
Density	Off
GLP	Off
*Animal Weighing**	*AW1*
*PC Error Level**	*OFF*
*Check Weighing**	
Reference	Ref Wt.
Display	Normal
*Fill Options**	
Reference	Ref Wt.
Target	To Ref
Time	U.S.
Date	U.S.
Lockswitch Menu	
Cal	Yes
User	No
Setup	Yes
Print	No

1. ON →0/T← → [mENU] → [CAL].
2. MODE → → [SEtUP].
3. ON →0/T← → [rESEt].
4. ON →0/T← → [YES].
5. MODE → → [YES] or [no].
6. ON →0/T← → [rESEt]. If [YES] is selected, the balance signals a *double short beep*.

Type Approved/LFT

LFT can be set to ON or OFF. Selecting ON automatically sets the parameters shown in the table to conform to type approved requirements. For sealing method, refer to Type Approved Sealing section. Default setting are shown as follows:

Auto Zero	.5 d
Lockswitch Menu	Setup & Calibration
Stable Data Only	Locked ON
Auto-Tare	Locked OFF
Net/Gross	Enabled

1. Access the LFt submenu.
2. ON →0/T← On .
3. MODE On or OFF .
4. ON →0/T← LFt .

IMPORTANT NOTICE

United States Legal for Trade

All balances which contain the suffix "E" after the model number are Type Approved/Legal for Trade. In accordance with the Marking Requirements of Handbook 44, these products are designed for use in the Net Weigh mode. Users who do not enable the Net Weigh mode must attach the "RE-ZERO" label below switch marked "ON" and ">O/T<". Refer to the Setup Menu, Net Weigh mode in this Instruction Manual for directions on enabling Net Weigh mode.

For label location, see page 29.

Unit Selection

The Unit Selection (SEL) submenu permits the selection of weighing units for use during operation. The balance can display weights in every unit of measure listed in table. The default setting is shown in bold type.

NOTE:
If Taels is enabled, see next page before exiting the menu.

Weighing Units	
g	**Grams**
dwt	Pennyweight
ct	Carats
oz	Ounces
ozt	Troy ounces
UNIT1	Grains
t	Taels (see note)
UNIT2	Mommes
lb	Pounds
UNIT3	Custom

Unit Selection (Cont.)

To view or change the various weighing units:

1. Access the SEL submenu.
2. ON/→0/T← On g.
3. MODE On g or OFF g.
4. ON/→0/T← for next unit status.
5. Repeat steps 2 through 4 for each unit.
6. ON/→0/T← SEL.

Taels

If taels are enabled, choose one of three different taels: Hong Kong, Singapore, or Taiwan.

1. ON/→0/T← On ,.
2. MODE tAEL 1 , (Hong Kong), tAEL 2 , (Singapore), or tAEL 3 , (Taiwan).
3. ON/→0/T← On ,.

Functions

The Functions submenu permits the selection of only one function. These functions are: Percent, Parts Counting. Check Weighing, Animal Weighing, FillGuide™, High Point or None. The default setting is **none**. *Only **one** function at a time can be selected for balance operation.* Selection of a function, other than None or Percent, requires additional selections to that function be reviewed in the section titled Setup Options.

1. Access the Functn submenu.
2. ON/→0/T← nonE.
3. MODE PCt, PC, CUU, AUU, FILL, HI Pt.
4. ON/→0/T← Functn.

Statistics

Statistics provides printed display data of: Standard Deviation either population or sample, Mean, Sum, High, Low and Difference readings. Each can be individually set ON or OFF.

1. Access [OPtions] menu.
2. ON/→0/T← [STATS].
3. ON/→0/T← [ENABLE]. Enable allows the statistics feature to be turned off without losing the individual settings programmed into memory.
4. ON/→0/T← [On].
5. MODE [On] or [OFF].
6. ON/→0/T← [ENABLE].
7. MODE [Std d].
8. ON/→0/T← [SAMPLE].
9. MODE [SAMPLE], [OFF], [POP].
10. ON/→0/T← [Std d].
11. MODE [MEAN].
12. ON/→0/T← [On].
13. MODE [On] or [OFF].
14. ON/→0/T← [MEAN].
15. Continue the same procedure to set Sum, High, Low and Difference parameters and finish by selecting [End].

Net

Weight shown on the display can be referred to as a zero value (gross value) or tare value (net value). When enabled the display value also has GROSS/NET Indicator turned ON, this feature will allow you to obtain a zero value by a long press on ON →0/T←. A short press is a tare.

Net Weight - the weight of a material or sample after deducting the weight of its packaging or container with which it had previously been weighed.

Gross Weight - the weight of object or sample (Net Weight) including container or packaging.

NOTE: When in a weighing mode, MODE switches between Gross weight and Net weight.

The Net function can be set either ON or OFF.

1. Access the nEt menu under the Setup Options menu.
2. ON →0/T← → On.
3. MODE → → On or OFF.
4. ON →0/T← → nEt.

Auto Tare

NOTE: Auto Tare is disabled for LFT.

To set Auto Tare feature ON or OFF, proceed as follows:

1. Remove any material from the platform.
2. Access the Auto Tare AutoT submenu under Setup Options menu.
3. ON →0/T← →.
4. MODE → → On or OFF.
5. ON →0/T← → AutoT.

Custom Unit or Volume Selection

Custom Unit is enabled when Unit 3 under Unit Selection is selected. This feature can be used to create your own custom weighing unit. It permits entering a conversion factor which the balance will use to convert grams to the desired unit of measure.

Conversion Factor x *Weight in grams* = *Weight in custom unit*

Conversion factors are expressed in scientific notation and entered into the balance in three parts:

- a number between 0.1 and 1.999999 called the mantissa
- a power of 10 called the exponent
- a least significant digit (LSD)

SCIENTIFIC NOTATION

Conv. Factor		Number Between 0.1 and 1.999999		Power of 10		Mantissa	Exp.
123.4	=	.1234	x	1000	=	.1234	x 10^{3}
12.34	=	.1234	x	100	=	.1234	x 10^{2}
1.234	=	.1234	x	10	=	.1234	x 10^{1}
.1234	=	.1234	x	1	=	.1234	x 10^{0}
.01234	=	.1234	x	.1	=	.1234	x 10^{-1}
.001234	=	.1234	x	.01	=	.1234	x 10^{-2}
.000123	=	.123	x	.001	=	.123	x 10^{-3}

1. Access the [CUnit] submenu under the Setup Options menu.
2. (ON →0/T←) ⇨ [FACtor].
3. (ON →0/T←) ⇨ [1000000].
   The mantissa of the current conversion is displayed. The mantissa of the current conversion factor is displayed. This is a number between 0.1 and 1.999999 with the first digit flashing. For conversion factors outside of this range, the exponent will be used to move the decimal point.
4. (MODE) ⇨⇨ changes first digit.
5. (ON →0/T←) ⇨ [1000000]. next digit flashes.
6. Repeat steps 4 and 5, and set value of all digits.
7. (PRINT) ⇨⇨ to backup for errors.

EXPONENTS

E-3	Moves decimal point 3 places to the left.
E-2	Moves decimal point 2 places to the left.
E-1	Moves decimal point 1 place to the left.
E0	**Leaves decimal point in normal position.**
E1	Moves decimal point 1 place to the right.
E2	Moves decimal point 2 places to the right.
E3	Moves decimal point 3 places to the right.

Custom Unit or Volume Selection (Cont.)

8. After the last digit is entered, the display indicates the current exponent preceded by the letter [E 0]. There are 7 exponent values which you can choose from (see table).
9. MODE ⇨⇨ to change the exponent.
10. ON →0/T← ⇨. When released, the display shows the current least significant digit. The least significant digit is the digit in the last decimal place on the display. The selection you make causes the balance to count by 1's, 2's or 5's in this position. There are 6 LSD settings you can choose from (see table).
11. MODE ⇨⇨ to change the LSD.
12. ON →0/T← ⇨ [FACtor].
13. MODE ⇨ [dEnSitY]. Density permits the selection of the density of a liquid by measuring the volume by weight. If the Factor is the density of a liquid, the appropriate unit of volume can be selected for printing.
14. ON →0/T← ⇨ [nonE].
15. MODE ⇨⇨ [LitEr], [nAL], [FL 02], [9UArt]. Selecting NONE disables the volumetric units.
16. ON →0/T← ⇨ [dEnSitY].

LSD's	
LSD .5*	Adds one decimal place display counts by 5's.
LSD 1	**Display counts by 1's.**
LSD 2	Display counts by 2's.
LSD 5	Display counts by 5's.
LSD 10	Display counts by 10's.
LSD 100	Display counts by 100's.

* Sensitivity to vibration is increased with this LSD setting.

NOTE: To use this function the printer must be on and all communication parameters must be set first.

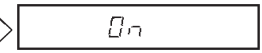
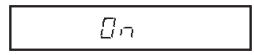
Operating Procedure

1. Place a container on the platform, ON →0/T← ⇨ to tare the container .
2. Fill the container.
3. PRINT ⇨, printer will now print out quantity of selected unit of measurement.

Good Laboratory Practices

Good Laboratory Practices (GLP) submenu allows the selection of Time, Balance Identification Number, Identification Number, Project Number, Calibration and Name data to be printed. The purpose of this submenu is to permit the printing of the above selected items. These items are not displayed. The default setting is off.

When an external printer is used, and all items are set ON and the balance is calibrated, the printer will print out calibration data for audit trail purposes and will indicate date, and time. (It should be noted that the ID number and Project number must be entered in the Print/GLP submenu before printed data is available). Since all of the settings for the GLP submenu are done in a similiar manner, only one example is shown.

1. Access the GLP submenu under SETUP Options menu.
2. ON →0/T←  .
3. ON →0/T←  .
4. MODE  or  .
5. ON →0/T←  .
6. Repeat steps above for Balance ID#, ID#, Project#, Calibration and Name.

Parts Counting Error

Parts counting Error is enabled only when the Parts Counting Function is selected.

The parts counting error level is the level of accuracy you consider acceptable for parts counting results. The adjacent table lists error levels that you can choose from. The default setting is shown in bold type.

EXAMPLE: With 5 Pct selected, 100 parts on the platform may yield a displayed count from 95 to 105 parts.

To view, change or disable the PC Error Level:

1. Access the PC PC Err submenu under the Setup Option submenu.

Parts Counting Error (Cont.)

2. ON →0/T← ⇨ [% SEt .1] indicates percentage of acceptable error. Settings are shown in table.
3. MODE ⇨⇨ [% SEt .1] to [% SEt 5] to change the percentage error limits,
4. ON →0/T← ⇨ [PC PC Err] when the desired setting is reached.
5. MODE ⇨ [End].
6. ON →0/T← ⇨ [OPt ions].

ERROR LEVELS	
OFF	**Disables error level limits.**
.1 %	±0.1% acceptable error.
.25 %	±0.25% acceptable error.
.5 %	±0.5% acceptable error.
1 %	±1.0% acceptable error.
2.5 %	±2.5% acceptable error.
5 %	±5.0% acceptable error.

Check Weighing Options

Check Weighing is enabled only when the Check Weighing Function is selected. This feature may be used for check weighing 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 plartform, 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. The default settings are: Reference = Reference weight, Display = normal.

Two choices are provided for programming the Reference Weight. One choice is the use of a mass (package, container, etc,) and the other is a number which can be entered as a high and low limit.

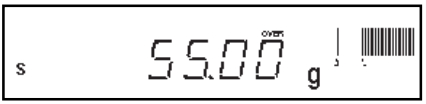
Three choices are provided for programming the display: normal, none, and sign. Sample displays are shown on the next page.

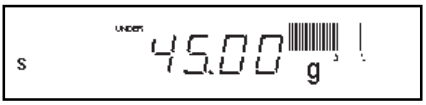
SAMPLE DISPLAYS

NOTE: Samples of the displays for check weighing are shown as follows using a reference weight of 50 grams. The over limit was set at 55 grams, and the lower limit was set at 45 grams.

NORMAL DISPLAYS

When normal is selected, the display indicates the actual weight.



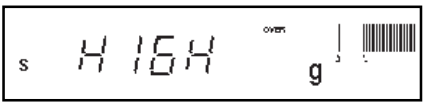


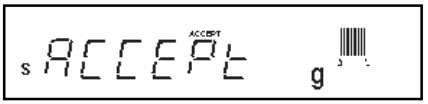
NONE DISPLAYS

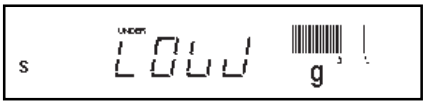
When none is selected, the numeric section of the display is blank if the values exceed the limits. Numbers appear only if they are within the limits.

SIGN DISPLAYS

When sign is selected, the display spells in words; HIGH, LOW or ACCEPT with no weight values showing.







Check Weighing Options (Cont.)

The following procedure describes how to set up the balance for all choices. Before starting, the Check Weighing option must have been selected under the Functions submenu.

1. Access the CUU OPt submenu under the Setup Options sub menu.
2. ON →0/T← → rEF (reference).
3. ON →0/T← → rEF WT (reference weight).
4. MODE → rEF WT ⇄ NUMBER.
   If REF WT is selected, a sample reference is used later to set the weight parameter into the balance. If NUMBER is selected, a number representing the sample weight has to be entered manually. See section titled Check Weighing.
5. ON →0/T← → rEF .
6. MODE → DISPLAY .
7. ON →0/T← → NORMAL .
8. MODE → NORMAL, NONE, SIGN .
9. ON →0/T← → DISPLAY .
10. MODE → End .
11. ON →0/T← → CUU OPt .
12. MODE → End .
13. ON →0/T← → OPtions .

Animal Weighing Options

Animal Weighing Options is enabled only when Animal Weighing Function is selected. Animal weighing settings allow the balance to compensate for animal activity.

Four settings are available: AW OPT levels, 0 through 3. AW0 should be used for an inactive subject, where AW3 should be used for an active subject. The default setting is AW1.

1. Access the AUJ OPt submenu under the Setup Option sub-menu.
2. ON →0/T← AUJ 1.
3. MODE AUJ 1, AUJ 2, AUJ 3, AUJ 0 for desired sensitivity.
4. ON →0/T← AUJ OPt.
5. MODE End.
6. ON →0/T← OPtions.

Fill Option

Fill Option provides two choices for a reference weight (similar to check weighing). Either a mass can be placed on the platform and used as a reference weight or a number can be entered to establish the weight value. Both methods are used to establish a reference for a 100% bar graph reading. Target parameter provides two choices, one is fill to the reference, the other to zero. The following procedure describes how to set up the balance for all choices. Before starting, the Fill Function must have been selected.

1. MODE to select the desired weighing unit, g, dwt, oz, etc.
2. Access the FiLLOPt submenu under the Setup Options sub menu.
3. ON →0/T← rEF (reference).
4. ON →0/T← rEF Wt (reference weight).

Fill Option (Cont.)

5. MODE → rEF WT ⇄ NUMBER.
   If REF WT is selected, a sample reference weight is used later to set the weight parameter into the balance. If NUMBER is selected, a number representing the desired sample weight has to be entered. Select either REF WT or NUMBER.
6. ON →0/T← → rEF.
7. MODE → tARGEt. When target is selected, the balance will show the normal weight of the object on the pan.
8. ON →0/T← →.
9. MODE → to rEF or to ZERO. When zero is selected, the balance indicates the weight as a negative number after the reference is set in the main menu. When an object is placed on the balance that weighs exactly what the reference was set to, the display shows zero with a full bar graph.
10. ON →0/T← → tARGEt.
11. MODE → End.
12. ON →0/T← → FILLOPt.
13. MODE → End.
14. ON →0/T← → OPtions.

Time

Time is a feature which enables the balance to be set to the current time in either U.S.A. standards (12 hour periods) or European/Military standards (24 hour periods). The default setting is US Standard. To enter time, proceed as follows:

1. Access the TIME submenu which is under the Setup menu.
2. ON →0/T← → tYPE.
3. ON →0/T← → US.
4. MODE → US or EU-0.
5. MODE → tYPE.

Time (Cont.)

6. MODE → SEt .
7. ON →0/T← → 12 00 A first two digits are flashing.
8. MODE → → or MODE ↓ to change flashing digits to current local hour.
9. ON →0/T← → 1 00 A flashes the last two digits.

   NOTE: PRINT → will back up display.

10. MODE → → or MODE ↓ changes minutes display.
11. ON →0/T← → to accept. AM or PM is flashing, A for AM, P for PM.
12. MODE → → to select AM or PM
13. ON →0/T← → SEt .

Date

Date is a feature which enables the balance to be set to a U.S.A. date standard or European date standard. U.S. standard has the month, date followed by the year each separated by (/) in the printout. The European date standard has the day first, followed by the month and then the year each separated by a period. The default setting is US Standard.

1. Access the dAtE submenu which is under Setup menu.
2. ON →0/T← → tYPE .
3. ON →0/T← → US .
4. MODE → → US or Eu-0 .
5. ON →0/T← → tYPE .
6. MODE → SEt .
7. ON →0/T← → 00.00.00 flashes first two digits.
8. MODE → → to change the first flashing digit to current month for US or day for European standard.
9. ON →0/T← → 3.00.00 .

Date (Cont.)

10. MODE ⇨⇨ to change flashing digit.
11. ON →0/T← ⇨ 30 195 .
12. MODE ⇨⇨ to change year.
13. ON →0/T← ⇨ SEt .
14. ON →0/T← ⇨ End .
15. ON →0/T← ⇨ dAtE .

NOTE: At power up, if Time in the GLP submenu is set to ON, the display flashes E TIME for about 1.5 seconds to prompt setting of time and date .

Lockswitch

Lockswitch enables you to lock out one or more menu selections. Each menu can be individually locked on or off ***after all functions have been set***. The **Calibration**, **User, Setup** and **Print** menus can be individually locked on or off by selecting the appropriate menu and then locked by the switch located under the front of the control panel. See Menu Lockout Section. Cal Test under Calibration remains functional with the Lockswitch On or Off. Before performing the lockout procedure, decide which functions of the balance are to be locked on or off.

1. Access the LOCSWU submenu which is under the Setup menu.
2. MODE ⇨⇨ to access either Calibration, User, Setup or Print menus.
3. ON →0/T← ⇨ to access selected desired menu.
4. MODE ⇨⇨ to select YES or no .
   YES = locked, NO = not locked.
5. ON →0/T← ⇨ to accept.
6. MODE ⇨⇨ to change to other menus.
7. To change other menus, repeat steps 2 through 5.

List

This submenu can be used to output a listing of current menu settings via the RS232 interface. When selected, all menu settings for the User, Setup and Print menus will be output either to an external printer or computer. To use this feature, your balance must be connected to a computer or printer.

1. Access the [LiSt] submenu under the Setup or Print menus.

2. (ON →0/T←) [LiSt] [. . . . .]. The display indicates a series of dots traveling right to left when the balance is sending information.

Exit Setup Menu

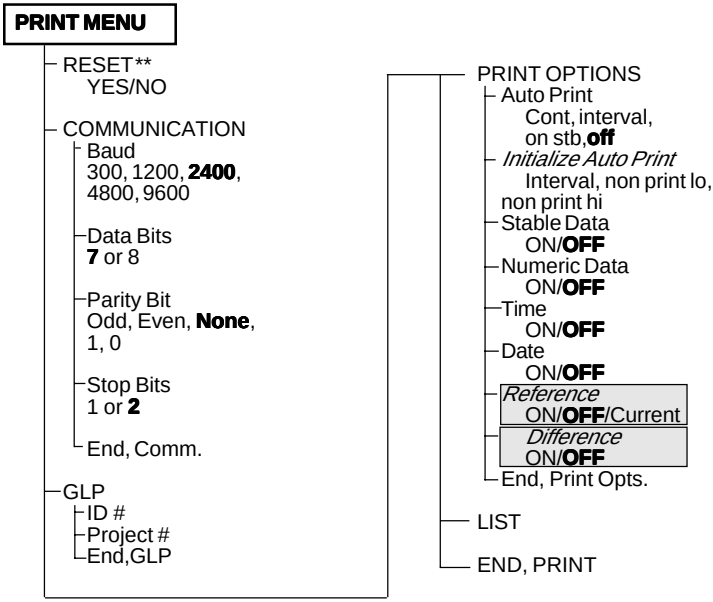
1. (MODE) [End].

NOTE: If any Setup parameter is different from previous settings, indicator SETUP in the display flashes while the balance is storing new settings. Proceed with next step.

2. (ON →0/T←) [SEtUP].

PRINT MENU

The Print menu provides a number of options which includes: reset, communications, good laboratory practices, and list. *Reset* sets all submenus contained in the Print submenu to factory default settings. *Communication* specifies baud rate, number of data bits, parity bit type and stop bits. *GLP* Good laboratory practices permits the entering of your own identification number and project number which shows up on printing. *Print Options* Enables/disables Auto print feature, specifies time interval for automatic output of displayed data and/or a range of displayed weight values that cannot be output. The following items can be turned on or off: Stable data-only feature, numeric only or full display data for output, time, date. Also prints reference weight value when using FillGuide™ or Parts Counting functions. Difference feature indicates the difference between weight value currently being used and reference value set into the balance. Items shown in bold type are default settings. Items shown in italics in the print menu below appear only if the appropriate Functions are turned on. Shaded areas only appear in the menu if the appropraite options are selected in the Setup menu. Items shown in bold type are the default settings.



Print Menu Protection

The Print menu may be locked out to prevent unauthorized personnel from changing settings. If SAFE is displayed, the Print menu has been locked out. Settings may be viewed but not changed. To lock out the Print menu or unlock, refer to the section titled Menu Lock-Out Protection.

Reset

This submenu enables you to reset **all** Print menu selections to the factory default settings shown below. Reset does not appear if the menu has been locked out.

Function	Default
Baud Rate	br2400
Data Bits	7 data
Parity	None
Stop Bits	2 stop
Auto Print	OFF
Autp Print interval	1 second
Non Print Low Limit	0
Non Print High Limit	0
Stable data Only	OFF
Numeric Data Only	OFF
Time	OFF
Date	OFF
Reference	OFF
Difference	OFF

1. ON →0/T← → mENU → CAL.
2. MODE → Print .
3. ON →0/T← → rESEt.
4. ON →0/T← → YES.
5. MODE → YES or no.
6. ON →0/T← → rESEt. If YES is selected, the balance signals a ***double short beep*** and all selections reset tp factory settings.

Communication

The Communication submenu contains submenus which permit the setting of: baud rates, data bits, parity and stop bits necessary for communications to an external printer or computer.

Access the COMM submenu under the Print menu..

Baud Rate

This submenu is used to select the desired baud rate. There are five available baud rates to choose from: 300, 1200, 2400, 4800 and 9600. The default setting is 2400 baud.
To view or change the baud rate:

1. Access the bAud submenu.
2. ON →0/T← br 1200.
3. MODE br 1200, br2400, br4800, br9600, br 300, br 1200. Normal baud rate is 2400.
4. ON →0/T← bAud.

Data Bits

To set the number of data bits to 7 or 8:

1. Access the dAtA submenu.
2. ON →0/T← 7 dAtA.
3. MODE 7 dAtA or 8 dAtA.
4. ON →0/T← dAtA.

Parity

Parity can be set to Odd, Even or None. The default setting is None. To set parity, proceed as follows:

1. Access the PAr itY submenu.
2. ON →0/T← nonE.
3. MODE nonE, -E-, -Odd-.
4. ON →0/T← PAr itY.

Stop Bits

The number of stop bits can be set to 1 or 2. The default setting is 2. To set stop bits, proceed as follows:

1. Access the `StOP` submenu.
2. ON →0/T← `2 StOP`.
3. MODE `2 StOP` or `1 StOP`.
4. ON →0/T← `StOP`.

Good Laboratory Practice (GLP)

This submenu enables the storage of an identification number and/or a project number. When entered into the balance, the identification number and project number are available when printing. The reason the entries are made under the Print submenu, is that when legal for trade operation (LFT) is enabled, the Setup submenu is locked out, leaving the Print submenu free to make entries.

1. Access the `GLP` submenu.
2. ON →0/T← `Id no`.
3. ON →0/T← `0000000` first digit is flashing.
4. MODE changes the value of the first digit.

NOTE: MODE allows going back to the previous digit for correction.

5. ON →0/T← accepts value and moves to second digit.
6. MODE to change next digit.
7. Repeat steps 4 through 6 to change all digits.
8. ON →0/T← `Id no`.
9. MODE `Pr no` to enter project number.
10. ON →0/T← and repeat steps 3 through 7.
11. MODE `Pr no`.

Print Options

This submenu contains additional features which can be set and include Auto Print, Initialize Auto Print, Stable Data only, Numeric Data only, Time, Date and Reference data and Difference. To change any of the above listed options, enter the submenu.

Auto Print Feature

When enabled, the Auto Print feature causes the balance to automatically output display data in one of three ways: continuously, at user specified time intervals, or upon stability.

To select one of these Auto Print methods, or to turn the feature off:

1. Access the AutoP submenu.
2. ON →0/T← OFF.
3. MODE OFF, Cont, IntEr or On Stb.
4. ON →0/T← AutoP.

NOTE: If you select interval to automatically output data at user specified time intervals, the interval is entered in the Initialize submenu which follows.

Initialize

This submenu allows you to:

- Specify a time interval (in seconds) for automatic output.
- Exclude a range of weights from being output, or specify a range for output, by the Auto Print feature.

It does not appear on the Print menu if Auto Print is set to OFF. Use the following procedure to set these features:

1. Access the In it submenu under the Print Options submenu.
2. ON →0/T← IntEr displays if Interval was selected in the Auto Print submenu and you may continue with step 3. If interval was not selected, non-PL is displayed. Proceed to step 7.
3. ON →0/T← Int 1 to enter time interval for automatic data output. The current interval from Int 1 to Int 256 (in seconds) is displayed.

Initialize (Cont.)

4. MODE ⇨⇨ to increase or PRINT ⇨⇨ to decrease the interval number.
5. ON →0/T← ⇨ [InterV].
6. MODE ⇨ [non-PL] to enter a range of non printing values.
7. ON →0/T← ⇨ [0000000 g], the current value for the low end of the range is displayed with the first digit flashing.
8. MODE ⇨⇨ to change the number, start with the first digit (flashing). Change the value to any number from -9 to +9. A minus sign will light to indicate a negative value.
9. ON →0/T← ⇨ to accept it and the next digit will begin flashing.

To exclude data WITHIN SELECTED RANGE:
SET non-PL < non-PH

Example: non-PL=7g, non-PH=11g
Values <7 **OR** >11 will be output.

To exclude data OUTSIDE SELECTED RANGE:
Set non-PL > non-PH

Example: non-PL=11g, non-PH=7g
Values >7 **AND** <11 will be output.

10. Set all digits in the same manner. If an error is made, PRINT ⇨ to backup to the desired digit and change it.
11. After the last digit is entered, [non-PL] is displayed again.
12. MODE ⇨ [non-PH] for the high limit.
13. ON →0/T← ⇨ [0000000] indicates current high end value.
14. Repeat steps 8 through 10 to change the numbers as required.
15. After the last digit is entered, [non-PH] displayed again.
16. MODE ⇨ [End].
17. ON →0/T← ⇨ [Init].

Print Stable Data Only

When enabled, this feature permits only stable display data to be output. To set the feature ON or OFF, proceed as follows:

1. Access the [StAbLE] submenu under the Print Options menu.
2. ON →0/T← [OFF].
3. MODE [OFF] or [On].
4. ON →0/T← [StAbLE].

Print Numeric Data Only

This submenu is used to select numeric data only, or full display data for RS232 output. Set this feature ON to output numeric display data only, or OFF to output full display data as follows:

1. Access the [nu] submenu under the Print Options menu.
2. ON →0/T← [OFF].
3. MODE [OFF] or [On].
4. ON →0/T← [nu].

Time

When the Time function is set ON, allows the balance to output the current time to the printer. To set the Time feature ON or OFF, proceed as follows:

1. Access the [t iME] submenu under the Print Options menu
2. ON →0/T← [OFF].
3. MODE [OFF] or [On].
4. ON →0/T← [t iME].

Date

When the Date function is set ON, allows the balance to output the current date to the printer. To set the Date feature ON or OFF, proceed as follows:

1. Access the dAtE submenu under the Print Options menu
2. ON →0/T← OFF.
3. MODE OFF or On.
4. ON →0/T← dAtE.

NOTE: With Print Time or Date set to ON, if either current Time or Date has not been set in Setup menu, "Set Time/Date !" is sent through the RS232 Interface with each press of PRINT button.

Reference

When the Reference function is set ON, prints the value of weight used as a reference in either Check Weighing, Fill Guide, Percent and Parts Counting modes. When set to Current, the printer prints the current reference immedediately.

1. Access the rEF submenu under the Print Options menu
2. ON →0/T← OFF.
3. MODE OFF, On or CurrEnt.
4. ON →0/T← rEF.

Difference

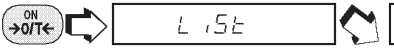
Difference data is only output to the printer when Check Weighing or Fill Guide™ mode was selected.

1. Access the d.FF submenu under the Print Options menu
2. ON →0/T← OFF.
3. MODE OFF or On.
4. ON →0/T← d.FF.

List

This submenu can be used to output a listing of current menu settings via the RS232 interface. When selected, all menu settings for the User, Setup and Print menus will be output either to an external printer or computer. To use this feature, your balance must be connected to a computer or printer.

1. Access the LiSt submenu under the Setup or Print menus.

2. 

The display indicates a series of dots traveling right to left when the balance is sending information.

CARE AND MAINTENANCE

To keep the balance operating properly, the housing and platform should be kept clean and free from foreign material. If necessary, a cloth dampened with a mild detergent may be used. Keep calibration masses in a safe dry place.

TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE(S)	REMEDY
Unit will not turn on.	Power cord not plugged in or properly connected to balance.	Check power cord connections.
Incorrect weight reading.	Balance was not re-zeroed before weighing. Balance not properly calibrated.	Press ON →0/T← with no weight on the platform, then weigh item. Recalibrate correctly.
Cannot display weight in desired unit or cannot access desired weighing mode.	Desired unit/mode not set to ON in Unit Selection of Setup menu.	See Unit Selection section of Setup menu.
Unable to store menu settings/changes.	End not being used to exit menus.	You MUST use End to exit menus and save settings.
RS232 interface not working.	Print menu settings not properly set up. Cable connections.	Verify interface settings in Print menu correspond to those of peripheral device. Check cable connections.
Random segments displayed or display locks up.	Microprocessor locks up.	Turn power off, then turn on again. If condition persists, unit must be serviced.
Unable to change settings.	Lock set ON. (LFT set ON)	Set Lock switch to OFF.
Unstable readings.	Vibration on table surface.	Place balance on a stable surface or change averaging level.
Error message display.	———	See Error Codes list.

Error Codes List

The following list describes the various error codes and which can appear on the display and the suggested remedy.

Data Errors

0.0 Transient error (hardware error, probably static discharge). If error persists, the balance must be serviced.

Tare Errors

2.0 Balance is unable to stabilize within time limit after taring. Environment is too hostile or balance needs recalibration.

2.1 Power on load out of specification.

Calibration Errors

3.0 Incorrect or no calibration weight used for calibration. Recalibrate with correct weights.

RS232 Errors

4.0 Bad RS232 frame. Check RS232 menu parameters and correct.

4.4 RS232 buffer is full (if installed). May occur if no printer or computer is connected to the interface. To clear buffer, turn balance off or enter Print menu and select END.

4.5 Function is disabled by the Lock switch.

User Errors

7.0 User entry out of bounds.

7.1 Bad percent (%) mode, sample too low.

7.2 Number outside of display capacity.

Over-Under Load Errors

8.0 Hardware error causing an internal weight signal which is too low. Check if platform or platform support is off. If not, the balance must be serviced.

8.1 Hardware error caused by an internal weight signal which is too high. Check load on the platform which may be excessive. If error persists, the balance must be serviced.

Error Codes List (Cont.)

CheckSum Errors

8.2 Power-on load out of specification: Balance was turned on with load on platform or platform off balance. No load may be on platform when turned on and platform must be in place.

8.3 Rated capacity exceeded. Remove excessive weight from platform.

8.4 Underload condition on balance. Check that the proper platform and platform support are installed.

9.0 Bad factory checksum. If error persists, have the balance serviced.

9.5 Bad factory calibration checksum. If error persists, have the balance serviced.

9.6 Bad mode checksum. Turn the balance off using the front panel controls. If the error persists, have the balance serviced.

9.7 Invalid setup data checksum. Check Setup, User and Print menus (when RS232 is installed) settings. If possible, try to enter menus and exit using END to restore menu settings. May be caused by a faulty component, or in rare cases, a severe static charge. If error persists, balance must be serviced.

9.8 Hardware error causing invalid calibration data checksum. Balance may need recalibration - particularly linearity calibration. If error persists, balance must be serviced.

9.9 Invalid temperature compensation checksum. Balance will work with default temperature compensation data, however, error will occur each time balance is turned on. Have balance serviced.

SERVICE INFORMATION

If the Troubleshooting section does not resolve or describe your problem, you will need to contact an authorized Ohaus Service Agent. For Service assistance in the United States, please call Ohaus Corporation toll-free at (800) 526-0659. An Ohaus Product Service Specialist will be available to help you.

REPLACEMENT PARTS

Description	Ohaus Part No.
In-Service Cover Kit	76901-00
In-Service Cover (GT8000)	76657-02
In-Service Cover Plate	76815-01
Power Cord, 120 V, U.S.	6569-00
Fuses 100/120 V .315 AT	90167-45
220/240 V .160 AT	90167-42

ACCESSORIES

Description	Ohaus Part No.
Calibration Masses - ASTM Class 1 Tolerance:	
4kg	49046-11
2kg	49026-11
1kg	49016-11
400g	49045-11
200g	49025-11
100g	49015-11
Security Device (GT210, GT410, GT410D, GT2100, GT4100, GT4100D)	76288-00
Animal Container Kit (GT2100, GT4000, GT4100 and GT4100D)	76290-01
Animal Container (GT2100, GT4000, GT4100 and GT4100D)	76431-01
Animal Container Cover (GT2100, GT4000, GT4100 and GT4100D)	3052-00
Glass Draft Shield Kit (GT210, GT400, GT410 and GT410D)	76510-01
Scoops	
Aluminum - 1-1/2" x 2' x 7/16"	5076-00
Aluminum - 2-1/4" x 3' x 3/4"	5077-00
Footed Stainless Steel	1078-03
Footed Polypropylene	1011-20

SPECIFICATIONS

MODEL	GT210	GT410	GT410D	GT400	GT2100
Capacity (g)	210	410	100/410*	410	2100
dwt	135	263	60/263*	263	1350
c	1000	2000	500/2000*	2000	10000
oz avd	7	14	3.5/14*	14	74
oz t	6	13	3.2/13*	1 3	67.5
gn	3240	6327	1543/6327*	6327	32407
mommes	56	109	26.6/109*	109	560
lb avd	0.44	0.88	0.22/0.88*	0.88	4.6
Readability (g)	0.001	0.001	0.001/0.01*	0.01	0.01
dwt	0.001	0.001	0.001/0.01*	0.01	0.01
c	0.005	0.005	0.005/0.05*	0.05	0.05
oz avd	0.00005	0.00005	0.00005/0.0005*	0.0005	0.0005
oz t	0.00005	0.00005	0.00005/0.0005*	0.0005	0.0005
gn	0.02	0.02	0.02/0.2*	0.2	0.2
mommes	0.0005	0.0005	0.0005/0.005*	0.005	0.005
lb avd	0.000002	0.000002	0.000002/0.00002*	0.00002	0.00002
Weighing modes	g, dwt, ct, oz , oz t, gn, taels, mommes, lb, 1 custom unit				
Functions	percent, parts counting, check weighing, animal weighing, FillGuide™, high point				
Options	GLP,statistics, net/gross, auto tare, volume determination, time, date, lockswitch, LFT (U.S.)/type approved				
Repeatability (Std. dev.) (g)	0.001	0.001	0.001/0.005*	0.007	0.01
Linearity (g)	±0.002	±0.002	±0.002/0.01*	±0.01	±0.02
Tare range	Full Capacity by Subtraction				
Stabilization time	2 seconds				
Sensitivity drift (10°- 30°C)	4 ppm/ °C	3 ppm/°C	4 ppm/ °C	4 ppm/ °C	4 ppm/ °C
Operating temperature	50° to 104°F/10° to 40°C (Non-type approved) 50° to 86°F/10° to 30°C (Type Approved)				
Calibration	Auto-calibration				
Power requirements	100, 120, 220, 240 V ac, 50/60 Hz				
Display (in/cm)	Vacuum fluorescent (0.4/1 high)				
Platform size (in/cm)	4.9/12.4 diameter				6.6/16.8 diameter
Dimensions (WxHxD) (in/cm)	7.5 x 3.75 x 12.75/19 x 9.5 x 32.4 without draft shield				
Net Weight (lb/kg)	11/5			8/4	11/5
Shipping Weight (lb/kg)	17.1/8	17.5/8	17.5/8	13.3/6	17.8/8

*Moveable FineRange™ **NOTICE:** These specifications are for non-type approved balances.

SPECIFICATIONS (Cont.)

MODEL	GT4100	GT4100D	GT4000	GT8000	GT8000T
Capacity (g)	4100	1000/4100*	4100	8100	8100
dwt	2630	643/2630*	2630	5200	5200
c	20000	5000/20000*	20000	40000	40000
oz avd	144	35/144*	144	285	285
oz t	131	32/131*	131	260	260
gn	63272	15432/63272*	63272	125002	125002
mommes	1093	266/1093*	1093	2160	2160
lb avd	9	2.2/9*	9	17.8	17.8
Readability (g)	0.01	0.01/0.1*	0.1	0.1	0.1
dwt	0.01	0.01/0.1*	0.1	0.1	0.1
c	0.05	0.05/0.5*	0.5	0.5	0.5
oz avd	0.0005	0.0005/0.005*	0.005	0.005	0.005
oz t	0.0005	0.0005/0.005*	0.005	0.005	0.005
gn	0.2	0.2/2*	2	2	2
mommes	0.005	0.005/0.05*	0.05	0.05	0.05
lb avd	0.00002	0.00002/0.0002*	0.0002	0.0002	0.0002
Weighing modes	g, dwt, ct, oz , oz t, gn, taels, mommes, lb, 1 custom unit				
Functions	percent, parts counting, check weighing,animal weighing,FillGuide™, high point				
Options	GLP,statistics, net/gross, auto tare, volume determination, time, date, lockswitch, LFT (U.S.)/type approved				
Repeatability (Std. dev.) (g)	0.01	0.01/0.05*	0.07	0.07	0.07
Linearity (g)	±0.02	±0.02/0.1*	±0.1	±0.1	±0.
Tare range	Full Capacity by Subtraction				
Stabilization time	2 seconds				
Sensitivity drift (10°- 30°C)	3 ppm/ °C	4 ppm/ °C		15 ppm/ °C	
Operating temperature	50° to 104°F/10° to 40°C (Non-type approved) 50° to 86°F/10° to 30°C (Type Approved)				
Calibration	Auto-calibration				
Power requirements	100, 120, 220, 240 V ac, 50/60 Hz				
Display (in/cm)	Vacuum fluorescent (0.4/1 high)				
Platform size (W x H x D) (in/cm)	6.6/16.8 diameter		7 x 7/ 17.8 x 17.8	8.9 x 7/22.6 x 17.8	
Dimensions (WxHxD) (in/cm)	7.5 x 3.75 x 12.75/19 x 9.5 x 32.4 without draft shield				7.5 x 16.75 x 12.75/ 19 x 42.5 x 32.38
Net Weight (lb/kg)	11/5		8/4	21/10	
Shipping Weight (lb/kg)	17.8/8		14.6/7	24.9/11	29.9/14

* Moveable FineRange™

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. The warranty period shall begin at the date of installation, or three months from shipment to the buyer, whichever occurs first. A properly completed Warranty Registration Card must be received by Ohaus within 30 days from date of purchase to initiate coverage under the warranty. 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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P/N 76769-16 R1095

HOW TO

ENTER THE MAIN MENU

Press and hold ON →0/T← , release when **MENU** is displayed. The calibration menu **CAL** is automatically displayed after **MENU**. **CAL** is one of the four primary menus used in the balance. The primary menus are: **CAL**, **USER**, **SETUP** and **PRINT**.

CHANGE PRIMARY MENUS

When the **CAL** menu is displayed, each press of MODE places the balance in the next menu as follows: **USER**, **SETUP**, **PRINT, END** and back to **CAL**.

ENTER THE SUBMENUS

Pressing ON →0/T← when in a primary menu places the balance in the ***first*** parameter which can be set in that submenu. For example, when in the **USER** primary menu, the first parameter in that submenu is **RESET**. To access each of the remaining parameters**,** simply press MODE once for each parameter. Repeated pressing of MODE cycles through all of the parameters.

SET BALANCE PARAMETERS

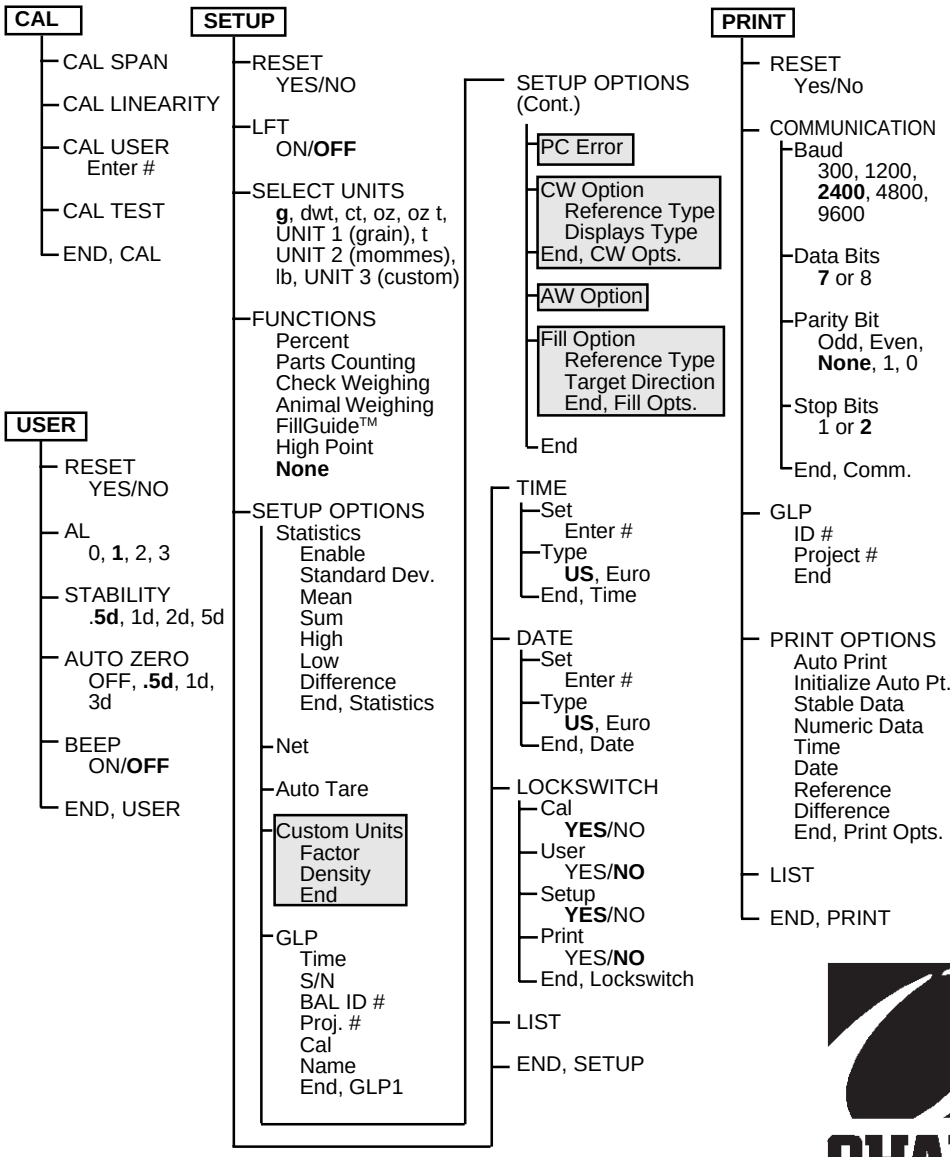
After a parameter has been accessed in the submenu, for example **RESET**, press ON →0/T← to display the Reset options **Yes** or **No**. Press MODE to change the option from **Yes** to **No** and back again. To accept the setting, press ON →0/T← which brings the balance back to the parameter heading, **RESET** in this case.

SAVE YOUR SETTINGS AND EXIT THE MENUS

After parameters have been set, press MODE repeatedly until the end of the menu is reached. **End** is displayed, press ON →0/T← one time then press MODE repeatedly until **End**$_{\text{MENU}}$ is displayed, and press ON →0/T← to return to weighing.

GT MENU STRUCTURE

This illustration identifies the four Main menus and Submenus. The factory default settings in the submenus are shown in bold type with the exception of the Setup Options and Print options which are shown in their respective menus in the manual. Shaded areas only appear in the menu if the appropriate function or weighing unit is selected in the Setup menu.



P/N76769-17

SUPPLEMENT

Precision Advanced Electronic Balance Model GT310

Preface

This supplement is intended to be used in conjunction with the Precision *Advanced* Electronic Balances GT Series Instruction Manual. Unless otherwise specified in this supplement, the Instruction Manual contains the necessary procedures for setting up, calibrating, operating and maintaining the balance.

INTRODUCTION

This supplement describes the basic differences for Models GT310, GT310E and GT310V which are not covered in the GT Series Instruction Manual.

UNPACKING

Your Precision Advanced balance was shipped with the following items:

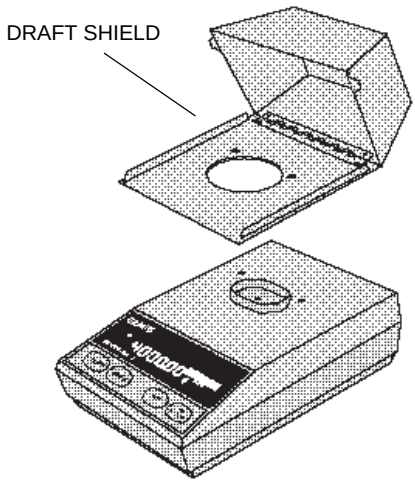
- Platform
- Platform Support
- Power Cord
- Below Balance Weighing Hook
- Draft Shield
- Instruction Manual
- Warranty Card
- In-Service Cover

It is recommended to save the carton and packing material for storing, transporting the balance or returning it for service.

Draft Shield

To install the Draft Shield:

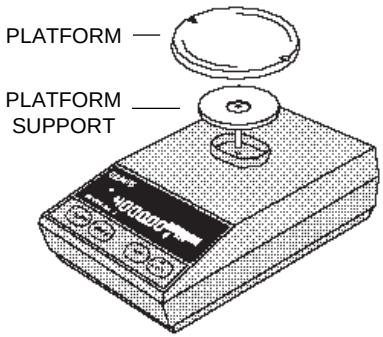
1. Remove the two existing screws and washers located on top of the balance.
2. Position the Draft Shield on top of the balance as shown.
3. Insert the two screws, with washers (supplied with the Draft Shield) though the holes in the Draft Shield into the balance. Tighten both screws securely.



Platform and Platform Support

Insert the Platform Support into the hole in the weighing mechanism as shown in the illustration.

Place the Platform on the Platform Support making sure the Platform is properly centered.



SPECIFICATIONS

MODEL	GT310
Capacity (g)	310
dwt	195
ct	1550
oz avd	10
oz t	9.9
gn	4784
mommes	82
lb avd	0.68
Readability (g)	0.001
dwt	0.001
ct	0.005
oz avd	0.00005
oz t	0.00005
gn	0.02
mommes	0.0005
lb avd	0.000002
Weighing modes	g, dwt, ct, oz , oz t, gn, taels, mommes, lb, 1 custom unit
Functions	percent, parts counting, check weighing, animal weighing, FillGuide™, high point
Options	GLP,statistics, net/gross, auto tare, volume determination, time, date, lockswitch, LFT (U.S.)/type approved
Repeatability (Std. dev.) (g)	0.001
Linearity (g)	±0.002
Tare range	Full Capacity by Subtraction
Stabilization time	2 seconds
Sensitivity drift (10°- 30°C)	4 ppm/ °C
Operating temperature	50° to 104°F/10° to 40°C (Non-type approved) 50° to 86°F/10° to 30°C (Type approved)
Calibration	Auto-calibration
Power requirements	100, 120, 220, 240 V ac, 50/60 Hz
Display (in/cm)	Vacuum fluorescent (0.4/1 high)
Platform size (in/cm)	4.9/12.4 diameter
Dimensions (WxHxD) (in/cm)	7.5 x 3.75 x 12.75/19 x 9.5 x 32.4 without draft shield
Net Weight (lb/kg)	11/5
Shipping Weight (lb/kg)	17.1/8

NOTICE: These specifications are for non-type approved balances.

Calibration Masses

Before beginning calibration, make sure masses are available. If you begin calibration and realize calibration masses are not available, exit the menu. 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 adjacent table.

CALIBRATION MASSES		
MODEL	**LINEARITY MASSES**	**SPAN ONLY MASSES**
GT310	200g, 300g	300g

Masses must meet or exceed ASTM Class 1 Tolerance. Calibration masses are available as accessories.

PARTS INFORMATION

If you require replacement parts or would like to purchase accessories, please call Ohaus Corporation toll-free at (800) 526-0659, an Ohaus Product Parts Specialist will be available to help you.

REPLACEMENT PARTS

Description	Ohaus Part No.
In-Service Cover Kit	76901-00
In-Service Cover Plate	76815-01
Power Cord, 120 V, U.S.	6569-00
Fuses 100/120 V .315 AT	90167-45
220/240 V .160 AT	90167-42

ACCESSORIES

Description	Ohaus Part No.
Calibration Masses - ASTM Class 1 Tolerance:	
100g	49015-11
200g	49025-11
Security Device (GT310)	76288-00
Glass Draft Shield Kit (GT310)	76510-01

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