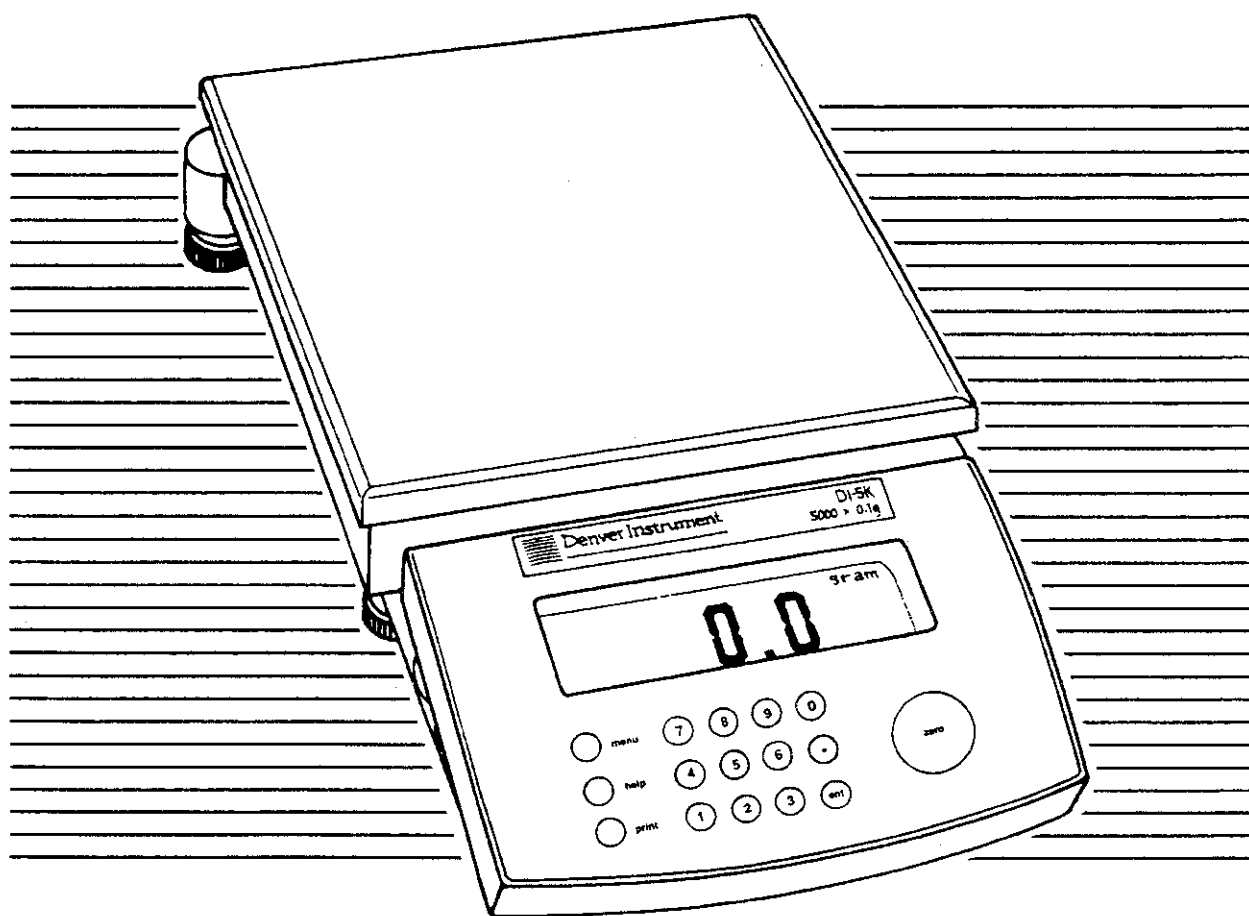



# DI-Series

Toploading Electronic Balances



## Operating Instructions

 Denver Instrument Company

P/N 601274.1  
Rev. G

You have purchased a quality precision instrument that requires handling with care.

*Read entire contents of this **Operation Manual** prior to operating your new Denver Instrument balance.*

Class A Digital Devices:

**Notice:** 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. The 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 device in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

**Caution:** Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

**Read all instructions prior to operating your balance! Remember, this is a precision weighing instrument and should be handled with care.**

Manufactured in the U.S.A. by:



**Denver Instrument Company**

6542 Fig Street • Arvada, Colorado 80004 U.S.A.  
1-800-321-1135 • (303) 431-7255 • Fax (303) 423-4831

*SOFTWARE VERSION COVERED BY THIS MANUAL IS 4.0*

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## **INTRODUCTION**

Thank you for selecting one of our precision balances. Your balance is designed and engineered to give you years of service.



**Warning:** Use of this product in a manner not specified by the manufacturer may impair any safety protection provided by the equipment!

### ***Unpacking Your Balance***

The Top Loading Electronic Balance is shipped in a single carton. Your balance is beneath a protective layer of packaging foam with the power transformer attached. The power transformer is attached and threaded through the bottom of the balance so you need only to plug in the AC adapter to any standard wall socket. The weighing pan and a 12' communication cord are located at the bottom of the carton beneath another layer of packaging foam.

Check the following list for the contents of the shipping carton to ensure that all items have been shipped with your balance. You should find the following items:

- Operating Instructions Manual
- Warranty Registration Card
- Balance
- Weighing Pan (round or square depending on model)
- 3/32 Allen Wrench
- Power Transformer (attached to balance)
- 12' Coiled Communication Cord for Remote Display

Carefully read your operating manual so that you can take full advantage of the many features of your balance. It contains step-by-step procedures, examples, and other useful information.

Remember to return your completed warranty card within ten days and to record all purchase information in the space provided on the inside back cover of this manual.

## Model Specifications


### Single Range Models

MODEL	CAPACITY	RESOLUTION	PAN SIZE
100	100g	0.0001g	3 ¼" dia. (8.3 cm)
200	200g	0.0001g	3 ¼" dia. (8.3 cm)
400	400g	0.001g	5 ½" dia. (14 cm)
800	800g	0.01g	5 ½" dia. (14 cm)
2200	2200g	0.01g	6 ¼" dia (15.8 cm)
4K	4000g	0.01g	6 ¼" dia (15.8 cm)
5K	5000g	0.1g	8"x 9" (20x23 cm)
8K	8000g	0.1g	8"x 9" (20x23 cm)
12K	12000g	0.1g	8"x 9" (20x23 cm)

### Dynamic Fine Range Models

MODEL	CAPACITY		RESOLUTION		PAN SIZE
	OVERALL RANGE	FINE RANGE	OVERALL RANGE	FINE RANGE	
400D	400g	100g	0.01g	0.001g	5 ½" dia. (14 cm)
4KD	4000g	400g	0.1g	0.01g	6 ¼" dia (15.8 cm)
8KD	8000g	800g	0.1g	0.01g	8" x 9" (20x23 cm)

### Common Specifications and Features For All Models

Electrical Requirements: ..... 12 VDC  @ 500 mA with AC Adapter.\*\*  
 Response Time: ..... minimum 3 seconds.  
 Controls: ..... Silicone Rubber Keypad, 16 Keys.  
 Display: ..... 1.5" x 5.25" liquid crystal display (LCD).  
 RS-232 Bidirectional Interface  
 Multiple Functions  
 Statistical Analysis  
 Count Modes  
 Check Weighing  
 Calibration  
 Auto Zero  
 Menu Selectable Filters

\*\*Note: Model 12K is supplied with 15 VDC transformer.

See **Appendix E- External Transformers** for further assistance.

## **Installation**

### **Preparation**

- This product is intended for indoor use.
- Select a suitable work area. The work area should be relatively free from drafts and vibrations, and the work surface should be level and rigid.
- The line voltage to the balance should be reasonably constant  $\pm 10\%$  and free from fluctuations.
- It is not advisable to use an outlet that is shared with fluorescent fixtures or other electrical equipment that draw current in an inconsistent manner.
- Do not locate balance near magnetic materials, equipment or instruments which use magnets in their design.
- Avoid areas which have extreme variations in room temperature or have excessive room temperature. Room temperatures above  $105^{\circ}\text{F}/40^{\circ}\text{C}$  or below  $60^{\circ}\text{F}/15^{\circ}\text{C}$  could affect balance operation and accuracy.

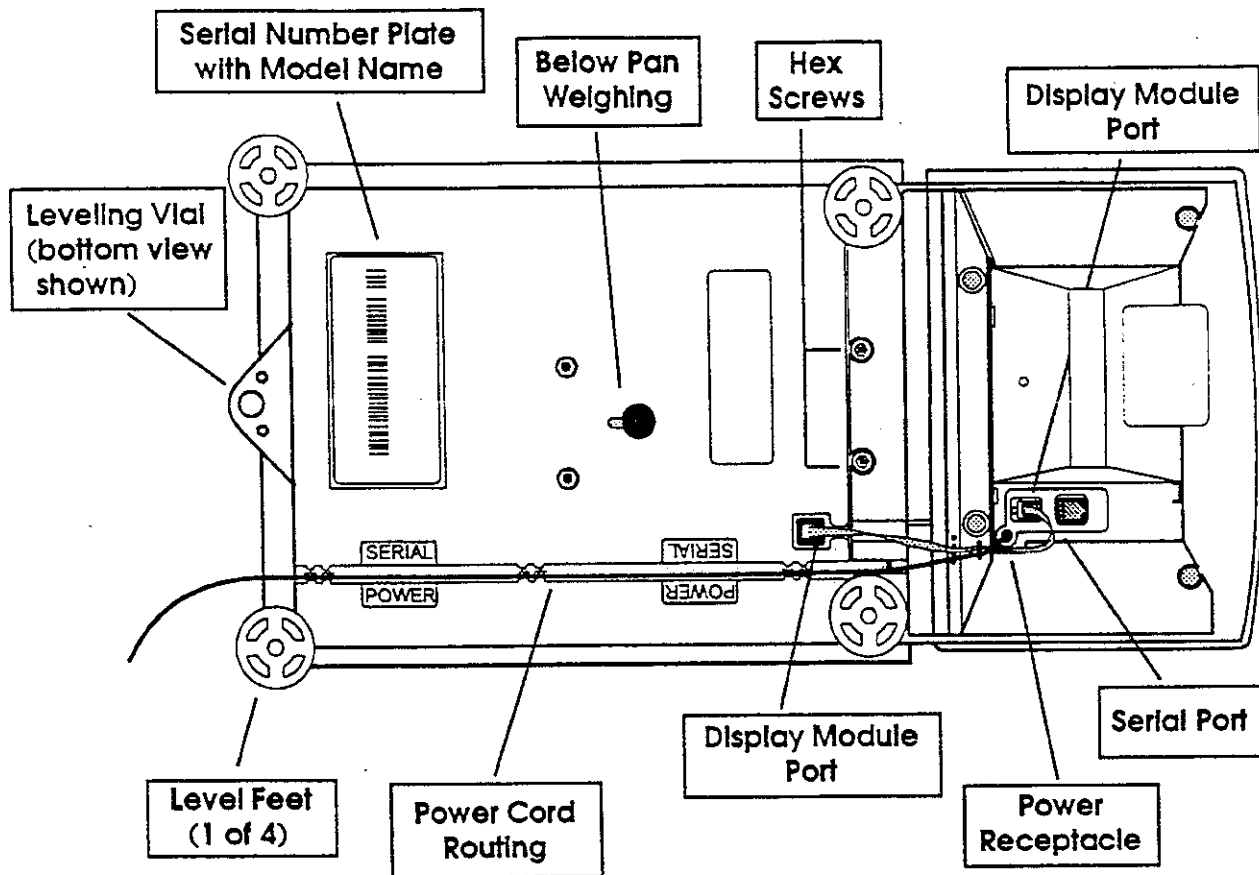
### **Setup**

Carefully remove balance and all accessories from the carton. There are no tie downs or internal packing inside the balance.

Level the balance by using the following procedure: (See Figure 1 on the following page.)

1. Turn all leveling feet counter clockwise until they are fully retracted into the bottom of the balance base. (When viewing the balance from above, turning the feet clockwise will result in the full extension of the feet.)
2. Look at the leveling vial located at the rear of the balance. The bubble must be inside the black circle on the vial in order to be balanced. The bubble moves toward a foot when that foot is turned clockwise and away from that foot when the foot is turned counter-clockwise.
3. Begin with the corner from which the bubble in the leveling vial is furthest away from and turn clockwise until the bubble is centered in the leveling vial. Repeat this process with the remaining 3 feet as necessary until the balance is level.
4. To improve stability, avoid extending the leveling feet as much as possible. If the feet are excessively extended, check the levelness of the surface the balance is on, or repeat steps 1 & 2.
5. Insert the power cord of the transformer into the power receptacle located on the bottom of the unit if it is not already attached. The power cord is routed from the bottom of the display module to the rear of the balance through routing grooves on the bottom of the balance.
6. It is not necessary to unplug your balance. There is no power switch. This unit is designed to be continuously plugged in with power supplied to it at all times.
7. Where appropriate, place the rectangular weighing pan on the balance by aligning the 4 brass supports on the top of the balance to the mounting surfaces on the bottom of the weighing pan. If you have a balance that uses a round weighing pan, place the pan on the stud in the top center of the balance.
8. The balance has an internal temperature sensor, so allow a 60 minute warm up period (average warm up time) for the temperature to stabilize.

Figure 1: Balance-Bottom View



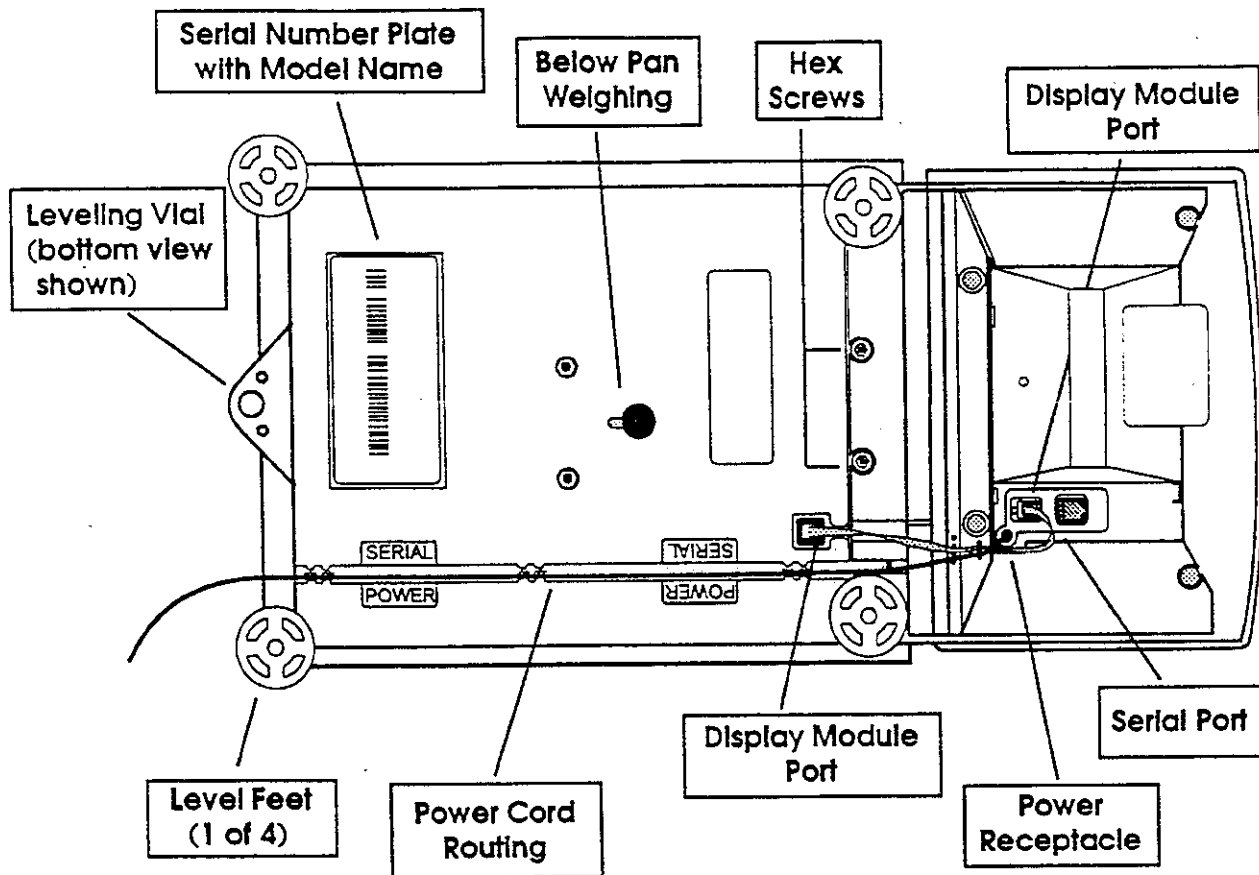
### Cleaning Instructions

The exterior surfaces of the product may be cleaned with a mild detergent and a lint-free nonabrasive cloth. Alternatively, isopropyl alcohol may be used. Do not immerse the product in any liquid.

### Maintenance:

This product contains **no user serviceable parts**. All replacement parts should be obtained from the manufacturer or an authorized distributor.

Figure 1: Balance-Bottom View



### Cleaning Instructions

The exterior surfaces of the product may be cleaned with a mild detergent and a lint-free nonabrasive cloth. Alternatively, isopropyl alcohol may be used. Do not immerse the product in any liquid.

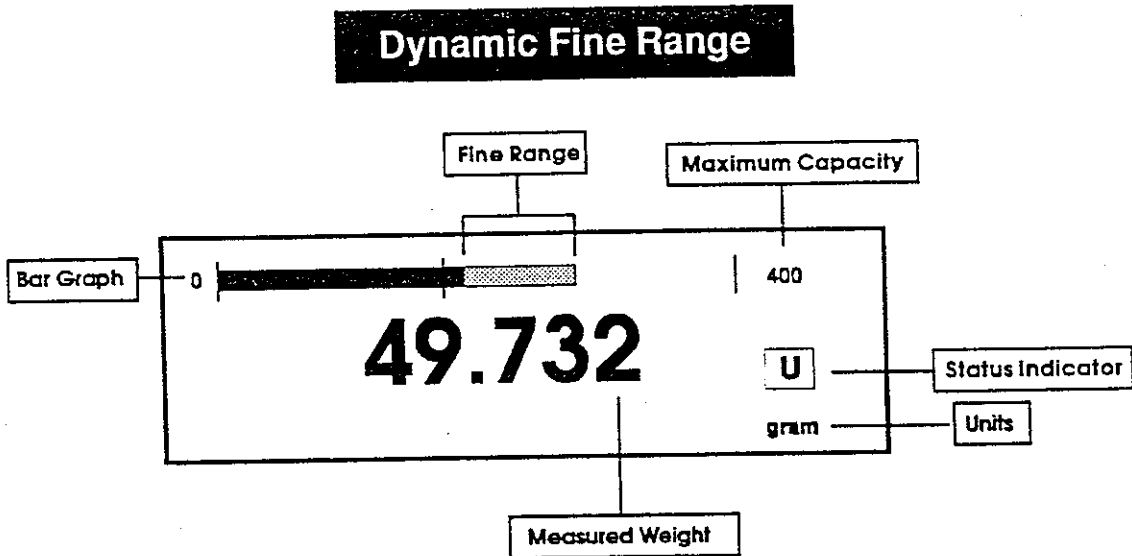
### Maintenance:

This product contains **no user serviceable parts**. All replacement parts should be obtained from the manufacturer or an authorized distributor.

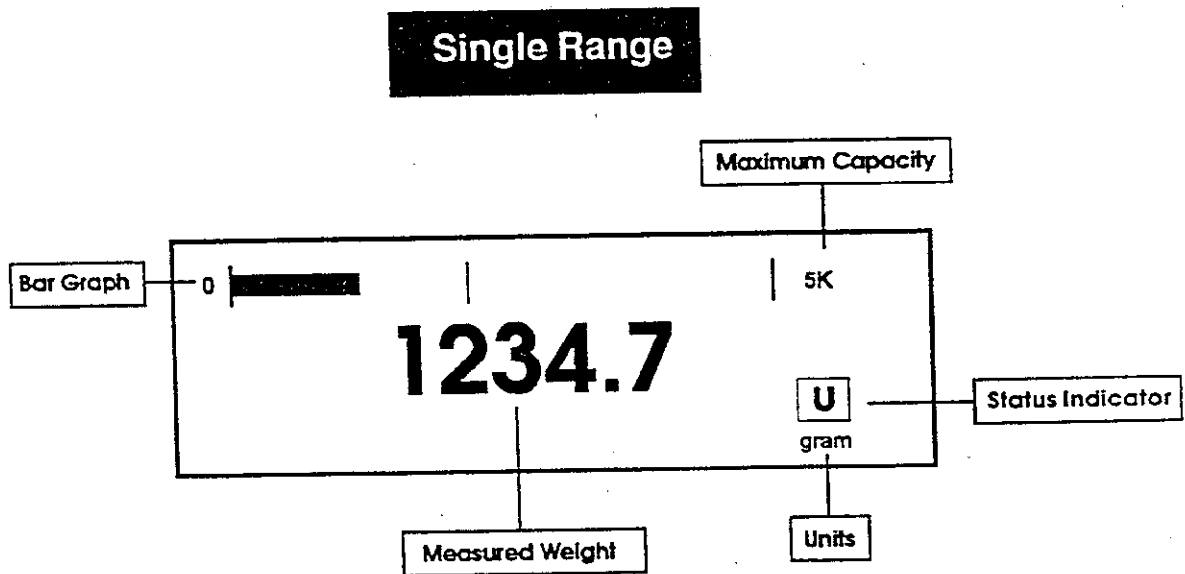
## Weighing Displays

The large bold numbers in the center of the LCD display indicate the measured weight.

*Figure 3: Weighing Mode Display  
(400D Model shown)*



*Figure 4: Weighing Mode Display  
(5K Models shown)*



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## Status Indicators

This area of the screen displays one of four symbols or is blank. The symbols (referred to as icons) are as follows:

- U** - indicates an unstable condition.
- Z** - indicates that the **zero** key was pressed and the balance is zeroing.
- P** - indicates that data is being sent out to the serial port.
- E** - indicates that the **ent** key has been pressed and data is entered into the statistics memory.

### — Units

The current selected weighing unit is displayed. (See Appendix C for unit display abbreviations.)

### — Bar Graph

The top of the display has a bar graph which visually illustrates the total amount of the weight on the balance relative to its maximum capacity. The number to the right of the bar shows the maximum capacity in the current weighing unit. The dynamic fine range models also differentiate the fine range of the distribution from the coarse range by a finer graphic density in those regions. The bar graph display of a zeroed balance with additional weight in the container would have two regions on a dynamic fine range (DFR) balance. See Figure 3 on the previous page.

## *Weighing Messages*

### — Calibrated

Indicates balance has successfully been calibrated. The balance will return to Weighing mode after 3 seconds.

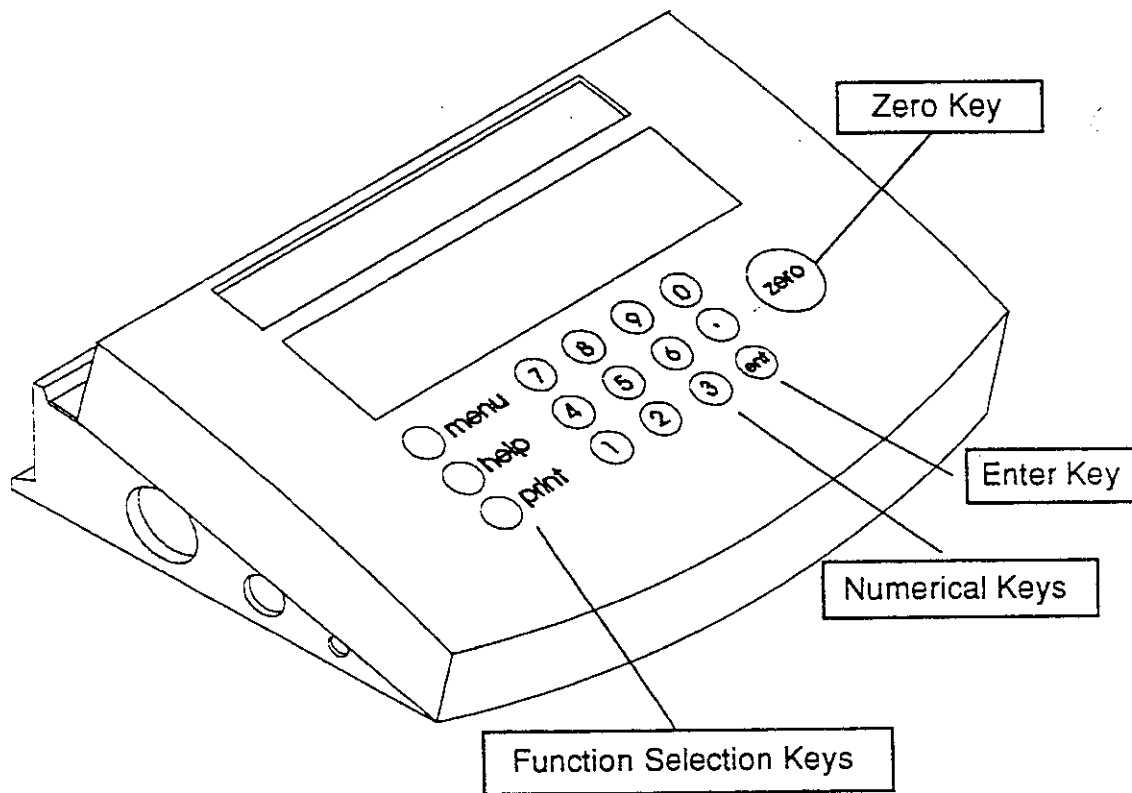
### — Zeroing

Indicates that the **zero** key has been pressed and the balance is currently unstable.

### **Numeric Keys**

The numerical keys are **0** through **9** and the "." (decimal point) key. These keys are used to enter numerical information into the balance. To key a number into the balance, press the numeral key corresponding to each digit of that number using the "." (decimal point) key where necessary. The **zero** key functions as a backspace key that can delete data which has been entered incorrectly.

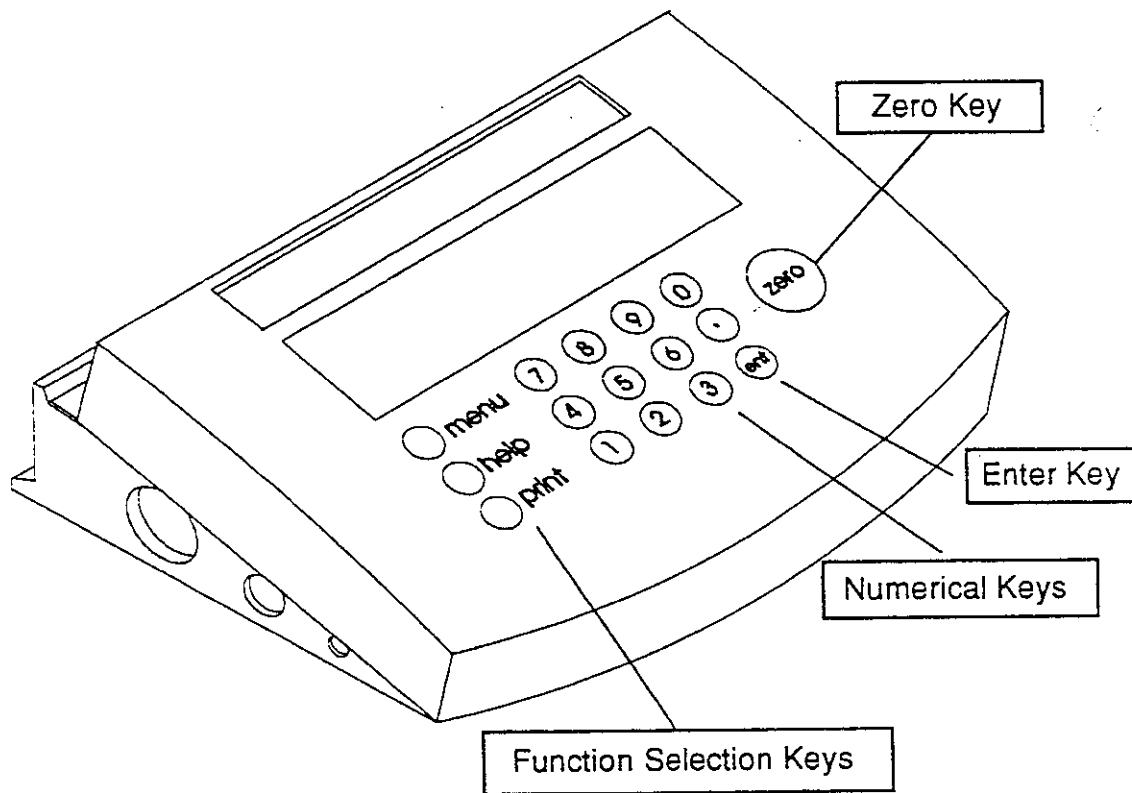
**Figure 5: Balance Keypad**



### **Numeric Keys**

The numerical keys are **0** through **9** and the "." (decimal point) key. These keys are used to enter numerical information into the balance. To key a number into the balance, press the numeral key corresponding to each digit of that number using the "." (decimal point) key where necessary. The **zero** key functions as a backspace key that can delete data which has been entered incorrectly.

**Figure 5: Balance Keypad**



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## Basic Weighing Operations

You are now ready to do any basic weighing operation without further adjustment, provided that you have properly installed your balance, have allowed adequate warm up time, and have done the necessary calibration.

***Note: The factory settings are automatically activated when the balance is initially powered up. (See "Factory Settings" section for the default values.)***

Your balance is designed to make accurate measurements independent of sample placements on the pan. However, repeatability, accuracy, and stability are maximized if the load is placed as close to the center of the pan as possible.

### Taring:

1. Press the **zero** key to go to Weighing mode and zero the display. If a separate container is used and that weight is to be disregarded, place it on the balance before pressing the **zero** key.
2. Place your sample on the weighing pan and wait for stability.
3. Read result in units selected when the " U " icon disappears.

## PROGRAMMING YOUR BALANCE - Menu #1

**MENU #1 OF 3**

1. CALIBRATE
2. UNITS
3. COUNT MODES
4. CHECK WEIGHING
5. STATISTICS
6. TARE WEIGHTS

### 1. Calibration

*Before calibrating your balance, please set the date and time.* This ensures that the correct calibration data is stored in memory. See page BC-2.

Ref. Appendix F

All balances are calibrated at the factory prior to shipment. However, you should calibrate your balance before using it for the first time. We recommend that you check the calibration once a week, whenever the balance has been moved or whenever excessive temperature variations have occurred. Use only calibrated weights. Calibrated weights may be purchased from your sales representative or supplier. You may calibrate the balance in two different ways using the following:

#### A. Preset Weight Values

Calibration is not possible if the balance is not stable or the mass is incorrect. The balance will not accept weights that are out range or that exceed the capacity. The fastest calibration procedure is outlined below. Use Preset weight values as your calibration standard. (See Appendix D - Preset Weights for each model.)

To **Calibrate** with a **Preset Weight Value**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **1** key to select Calibrate.
3. Place preset mass on pan.
4. The balance will automatically calibrate. A short beep will occur and the display will read CALIBRATED for three seconds, and then return to the Weighing screen displaying the calibration weight value.

#### B. Other Weight Values

To calibrate with weights other than a preset weight or specific weights that are close to a preset weight (e.g., known weight = 400.35 grams and preset weight = 400 grams) use the following procedure.

To set the **Other Weight Value**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **1** key to select Calibration.
3. Place weight on pan. The display will change to enter calibration weight.
4. Press the ". " (decimal point) key and enter known mass.
5. Enter the actual value, in grams, of the calibration weight and press the **ent** key.
6. The display will read CALIBRATED. Wait three seconds and the display will return to Weighing mode displaying the calibration weight value. Or if you do not have those particular weights, you may manually enter other weight values. It is recommended that you use the calibrated weight closest in value to our typical sample weight. *Remember to use only calibrated weights.*

If you choose a weight value other than a preset weight when calibrating, place the weight on the pan and wait for the display to request data input. If the entered weight and the measured weight agree, the balance will calibrate.

## 2. Units

The current weighing units are displayed on the Weighing screen. (See Appendix C for Unit Display Abbreviations.)

### A. Unit Selection

Your balance is preset to weigh in GRAMS. If a different unit of measure is required it must be selected by going to the UNITS MENU.

To set a **Different Weighing Unit**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **2** key to select Units.
3. Press the number key corresponding to the desired unit.
4. If the unit desired is not displayed, press the **8** key to select Next Menu (Units Menu 2).
5. Press the **5** key in Units Menu 2 to select the Math Function or the **6** key to return to Units Menu 1.
6. Press the **zero** key to return to weighing screen.
7. The balance is now displaying the weight in the new unit you have selected.

### B. Math Function

A multiplier or a divisor can be entered into memory so that the balance automatically calculates the math while the weight value is on the weighing pan.

The Math Function uses the following equations:

Math A display value =  $A \times \text{Weight in grams}$

Math B display value =  $B / \text{Weight in grams}$

A & B are constants that you enter.

In order to use this function following the above equations, the Math A or Math B function must be selected. To use this option follow the procedure on the next page.

**Note: When choosing either the Math A or Math B function, the Count mode or Check Weighing mode will be disabled.**

To set a **Math function**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **2** key to select Units.
3. Press the **8** key to select Next Menu (Units Menu 2).
4. Press the **5** key to select Math Menu.
5. Press either the **1** key to select Math A ( $\text{WGT} \times \text{Constant}$ ) or the **2** key to select Math B ( $\text{Constant}/\text{WGT}$ ), then press the **ent** key.
6. Enter a constant value and press the **ent** key. Then press the **ZERO** key to return to the message next display.

**NOTE: If the message "CONSTANT TOO LARGE" appears, the entered constant is larger than allowed.**

## Programming

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7. To turn off the Math Function and return to a different unit of measurement, cycle back through the units menu until the unit you want is displayed and select that unit.
8. Press the **zero** key to return to the Weighing display.

### 3. Count Modes

The balance can be set to count common pieces that are within the capacity and resolution of the balance. Please note that counting accuracy may be affected by weight variation that may occur from one part to another. Select the balance with the appropriate resolution for the parts you are counting. The total sample weight must not exceed the balance capacity and the weight of each piece must be greater than the resolution of the balance. (See "Specifications" section for the specifications on your particular model.) All count modes have on line instruction. The count mode has four different options. The following is an explanation of those options:

#### A. Basic Count Mode

Basic Count mode allows the operator to perform basic counting of identical items. This operation is carried out by first weighing a known number of items and then entering that number into the balance. Placement of subsequent identical items results in a display of total number of items.

To set the **Basic Count Mode**:

1. Press the **menu** key until Menu #1 is displayed.
2. Press the **3** key to select Count Modes.
3. Press the **1** key to select Basic Count Mode and press the **ent** key.
4. If a container is used, zero the container weight prior to placing pieces in the container.
5. Place known number of identical pieces on the pan or in the container, allow the balance to stabilize and press the **ent** key.
6. Key in the number of pieces and press the **ent** key.
7. Press the **zero** key to exit the menu and return to the Count mode.
8. Add or remove identical pieces until you reach the desired count.
9. To count a different part with a different weight and without reentering the Menu mode, press the ". " (decimal point) key and follow steps 4 through 8.

#### B. Count with Gross Weight

Count with gross weight is the same as basic count except the gross weight is also displayed.

To set the **Count with Gross Weight**:

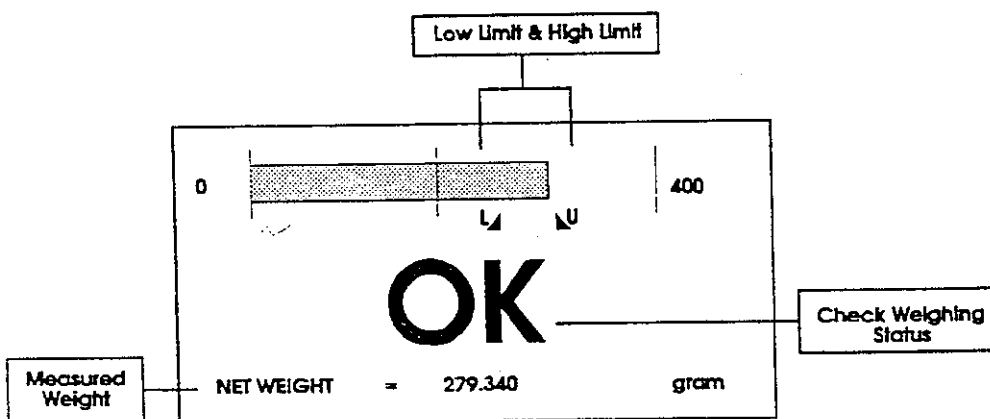
1. Press the **menu** key until MENU #1 is displayed.
2. Press the **3** key to select Count Modes.
3. Press the **2** key to select Count with Gross Weight and press **ent** key.
4. If a container is used, zero the container.
5. Place known number of identical pieces on the pan, allow the balance to stabilize, and press the **ent** key.
6. Key in the number of pieces and press the **ent** key.
7. Press the **zero** key to exit the menu and return to the Count mode.
8. Add identical pieces until you reach the desired count or gross weight.
9. To count a different part with a different weight and without reentering the Menu mode, press the ". " (decimal point) key and follow steps 4 through 8.

To **set values** for the **Low Limit** and the **High Limit**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **4** key to select Check Weighing mode.
3. Press the **1** key to select Low and High Limit Weighing and press the **ent** key.
4. Enter the desired Low Limit weight in the current weighing units and press the **ent** key.
5. Enter the desired High Limit weight and press the **ent** key. You will automatically return to the MENU #1 display.
6. Press the **zero** key to go to Weighing display mode.
7. Place sample for weighing on the pan. The display will read **OK** if the sample is within the High and Low Limits set in steps 4 and 5, **UNDER** if it is under the low limit, and **OVER** if it is over the High Limit.
8. Return to Check Weighing Menu and select the **3** key to display current settings or select the **4** key to turn Check Weighing OFF. See Figure 6 below.

**Note: For proper operation, the High Limit value must be greater than the Low Limit value.**

Figure 6: Check Weighing Display (with user defined high and low limits).



## B. Setting Percentage to Target

To set the **Percentage To Target**:

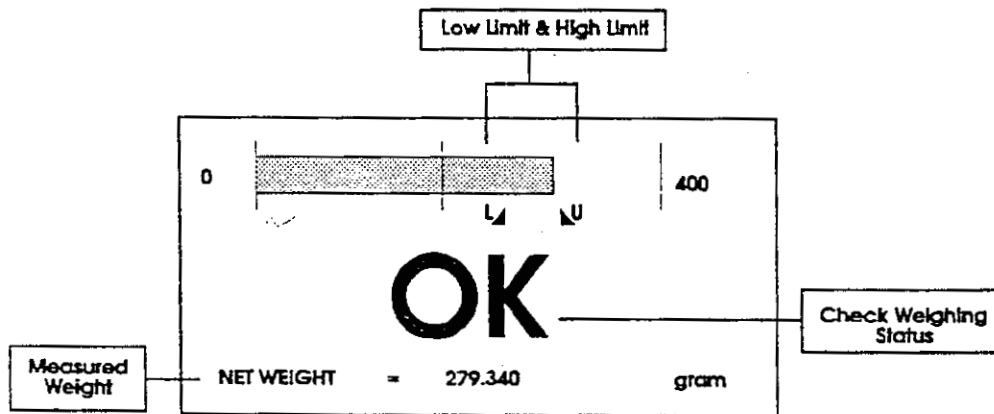
1. Press the **menu** key until MENU #1 is displayed.
2. Press the **4** key to select Check Weighing.
3. Press the **1** key to select Percentage To Target and press the **ent** key.
4. Enter the desired target weight value as prompted and press the **ent** key. This returns you to MENU #1.
5. Press the **zero** key to go to Weighing display as read as a percent to target.

To **set values** for the **Low Limit** and the **High Limit**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **4** key to select Check Weighing mode.
3. Press the **1** key to select Low and High Limit Weighing and press the **ent** key.
4. Enter the desired Low Limit weight in the current weighing units and press the **ent** key.
5. Enter the desired High Limit weight and press the **ent** key. You will automatically return to the MENU #1 display.
6. Press the **zero** key to go to Weighing display mode.
7. Place sample for weighing on the pan. The display will read **OK** if the sample is within the High and Low Limits set in steps 4 and 5, **UNDER** if it is under the low limit, and **OVER** if it is over the High Limit.
8. Return to Check Weighing Menu and select the **3** key to display current settings or select the **4** key to turn Check Weighing OFF. See Figure 6 below.

**Note:** For proper operation, the High Limit value must be greater than the Low Limit value.

Figure 6: Check Weighing Display (with user defined high and low limits).



## B. Setting Percentage to Target

To set the **Percentage To Target**:

1. Press the **menu** key until MENU #1 is displayed.
2. Press the **4** key to select Check Weighing.
3. Press the **1** key to select Percentage To Target and press the **ent** key.
4. Enter the desired target weight value as prompted and press the **ent** key. This returns you to MENU #1.
5. Press the **zero** key to go to Weighing display as read as a percent to target.

---

## 5. Statistics Mode

The Statistics menu offers the options of listing the entered data and editing it, calculating statistics, or turning the statistics function OFF, or clearing the data entirely.

To turn **Statistics mode ON**:

1. Press the **menu** key till MENU #1 is displayed.
2. Press the **5** key to select statistics.
3. Press the **1** key for Statistics Function ON.
4. Return to MENU #1 by pressing the **ent** key or press **zero** to return to the Weighing display.

### A. Storing Values

The balance can be in any mode when storing values. As many as 255 weight samples can be stored in the statistical buffer. The values stored are those shown on the display when it is in Weighing display mode and the balance is stable.

To **Store Values**:

1. Values are stored by pressing the **ent** key. The icon "E" is displayed when data is entered while the balance is in Statistics mode.
  - Also, the buffer count is displayed directly below the "E". This indicates the current data point.
  - When the buffer is full, the balance will no longer accept data and the count will show as full.
  - If the **ent** key is pressed while the balance is unstable, the "E" icon will remain ON until stability occurs. This assures that only stable measurements are stored data.In addition, if the beeper is activated, it will beep giving the user an audible verification of data input.

### B. Calculate Statistics

To **Calculate Statistics**:

By pressing the **2** key for Calculate Statistics, the balance will compute the following statistical information:

n (Number of Samples) = 15  
Minimum = 38.159  
Maximum = 38.162  
Range = 0.003

Mean = 38.161  
Standard Deviation = 0.001  
Total = 572.409

### C. Standard Deviation

The balance calculates standard deviation according to the following formula.

$$\text{Standard Deviation (Std Dev)} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}} \quad \bar{x} = \text{Mean of the sample}$$

## 5. Statistics Mode

The Statistics menu offers the options of listing the entered data and editing it, calculating statistics, or turning the statistics function OFF, or clearing the data entirely.

To turn Statistics mode ON:

1. Press the **menu** key till MENU #1 is displayed.
2. Press the **5** key to select statistics.
3. Press the **1** key for Statistics Function ON.
4. Return to MENU #1 by pressing the **ent** key or press **zero** to return to the Weighing display.

### A. Storing Values

The balance can be in any mode when storing values. As many as 255 weight samples can be stored in the statistical buffer. The values stored are those shown on the display when it is in Weighing display mode and the balance is stable.

To Store Values:

1. Values are stored by pressing the **ent** key. The icon "E" is displayed when data is entered while the balance is in Statistics mode.
    - Also, the buffer count is displayed directly below the "E". This indicates the current data point.
    - When the buffer is full, the balance will no longer accept data and the count will show as full.
    - If the **ent** key is pressed while the balance is unstable, the "E" icon will remain ON until stability occurs. This assures that only stable measurements are stored data.
- In addition, if the beeper is activated, it will beep giving the user an audible verification of data input.

### B. Calculate Statistics

To Calculate Statistics:

By pressing the **2** key for Calculate Statistics, the balance will compute the following statistical information:

n (Number of Samples) = 15  
 Minimum = 38.159  
 Maximum = 38.162  
 Range = 0.003

Mean = 38.161  
 Standard Deviation = 0.001  
 Total = 572.409

### C. Standard Deviation

The balance calculates standard deviation according to the following formula.

$$\text{Standard Deviation (Std Dev)} = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n - 1}} \quad \bar{x} = \text{Mean of the sample}$$

---

## **BALANCE CONFIGURATION - MENU #2**

<p><b>MENU #2 OF 3</b></p> <ol style="list-style-type: none"><li>1. FILTER</li><li>2. BEEPER</li><li>3. AUTO ZERO</li><li>4. CLOCK</li></ol>
----------------------------------------------------------------------------------------------------------------------------------------------

Ref. Appendix F

### **1. Filter**

It is possible to optimize the balance response to compensate for varying conditions, including building vibrations, drafts, surface vibrations, etc. Five settings, listed below, are available.

#### **Setting #1 - Ultra Fast**

Used under ideal conditions. It provides the fastest response time. When weighing in this setting, the balance is most susceptible to environmental conditions.

#### **Setting #2 - Fast Filter**

Used in areas with some vibrations and drafts. This setting updates faster than medium-normal filter. It is suggested you try fast before Ultra-Fast.

#### **Setting #3 - Medium-Normal Filter (Default Setting)**

Used under normal conditions. The balance operates at moderate speed.

#### **Setting #4 - Slow Filter**

Used in areas with vibrations and drafts. This setting updates faster than ultra-slow. It is suggested you try slow filter before ultra-slow.

#### **Setting #5 - Ultra-Slow Filter**

Used when there is extreme environmental noise situations such as manufacturing or animal weighing situations. This filter has the slowest update speed.

#### **To change the Filter setting:**

Using the numerical key pad, enter a number from 1-5 that corresponds to the above filter settings and then press the **ent** key.

We recommend that you try various filter settings to determine the most suitable setting for the environment the balance is located.

### **2. Beeper**

The default state of the beeper is OFF. The balance will give an audible beep when a key is pressed or during certain weighing applications. Follow the procedure below to turn the beeper ON.

#### **To turn the Beeper ON:**

1. Press the **menu** key until MENU #2 is displayed.
2. Press the **2** key to select Beeper.
3. Press the **1** key to select Beeper ON.
4. Press the **ent** key to return to MENU #2 or press **zero** key to return to Weighing display.

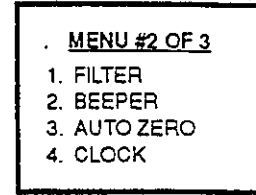
### **3. Auto Zero**

Auto Zero helps to maintain a zero display reading when the balance has been zeroed. It is recommended that this remain ON. Use the procedure below.

#### **To turn Auto Zero ON:**

1. Press the **menu** key two times to get to MENU #2.
2. Press number the **3** key to select Auto Zero.
3. Press the **1** key or the **2** key to select Auto Zero ON or OFF status.
4. Press the **ent** key to return to Menu #2 or or press **zero** key to return to Weighing display.

## **BALANCE CONFIGURATION - MENU #2**



Ref. Appendix F

### **1. Filter**

It is possible to optimize the balance response to compensate for varying conditions, including building vibrations, drafts, surface vibrations, etc. Five settings, listed below, are available.

#### **Setting #1 - Ultra Fast**

Used under ideal conditions. It provides the fastest response time. When weighing in this setting, the balance is most susceptible to environmental conditions.

#### **Setting #2 - Fast Filter**

Used in areas with some vibrations and drafts. This setting updates faster than medium-normal filter. It is suggested you try fast before Ultra-Fast.

#### **Setting #3 - Medium-Normal Filter (Default Setting)**

Used under normal conditions. The balance operates at moderate speed.

#### **Setting #4 - Slow Filter**

Used in areas with vibrations and drafts. This setting updates faster than ultra-slow. It is suggested you try slow filter before ultra-slow.

#### **Setting #5 - Ultra-Slow Filter**

Used when there is extreme environmental noise situations such as manufacturing or animal weighing situations. This filter has the slowest update speed.

#### **To change the Filter setting:**

Using the numerical key pad, enter a number from 1-5 that corresponds to the above filter settings and then press the **ent** key.

We recommend that you try various filter settings to determine the most suitable setting for the environment the balance is located.

### **2. Beeper**

The default state of the beeper is OFF. The balance will give an audible beep when a key is pressed or during certain weighing applications. Follow the procedure below to turn the beeper ON.

#### **To turn the Beeper ON:**

1. Press the **menu** key until MENU #2 is displayed.
2. Press the **2** key to select Beeper.
3. Press the **1** key to select Beeper ON.
4. Press the **ent** key to return to MENU #2 or press **zero** key to return to Weighing display.

### **3. Auto Zero**

Auto Zero helps to maintain a zero display reading when the balance has been zeroed. It is recommended that this remain ON. Use the procedure below.

#### **To turn Auto Zero ON:**

1. Press the **menu** key two times to get to MENU #2.
2. Press number the **3** key to select Auto Zero.
3. Press the **1** key or the **2** key to select Auto Zero ON or OFF status.
4. Press the **ent** key to return to Menu #2 or or press **zero** key to return to Weighing display.

---

## 4. Clock

To set the **Date Format**:

1. Press the **menu** key until MENU #2 is displayed.
2. Press the **4** key to select Clock.
3. Press the **5** key to select Format & Clock Standby.
4. Select date format of #1 for month, day and year (MM/DD/YY) or #2 for day, month, and year (DD/MM/YY), then press the **ent** key.

To **set Date and Time**:

1. Press the **1** key to change the time to AM setting, then key in the hour, minutes, and seconds and press the **ent** key.  
**OR** - Press the **2** key to change the time to PM setting, then key in the hour, minutes, and seconds then press the **ent** key.  
**OR** - Press the **3** key to select a 24 Hour format, then key in the hour, minutes, and seconds and press the **ent** key.
2. Press the **4** key to change the date, then key in the day, the month, and the year and press the **ent** key.
3. Press **zero** key to return to Weighing display.

### Clock Standby

The Clock standby can be switched ON or OFF by selecting item 3 or 4 from the Clock Menu. When the Clock Standby is enabled (ON), the balance will automatically display the current time after an elapsed time of approximately 12 minutes of non-use. The timer is reset after the balance has become unstable or when a key has been pressed.

To turn the **clock off** and return to the Weighing screen after the clock has automatically been turned on:

1. Press any key or remove/place a weight on the pan. When the clock is enabled, the weight data can not be sent to the serial port. Therefore, it might be necessary to turn off the clock default when long term weighing applications occur. However, you can still observe the clock from the Weighing display by pressing the **2** key. This will display the time until any key is pressed.

## UTILITIES - MENU #3

MENU #3 OF 3
1. SERIAL PORT SET UP
2. USER ID NUMBER
3. FACTORY DEFAULTS
4. PASS CODES

Ref. Appendix C

### 1. *The SERIAL PORT SET UP*

#### A. Serial Port Parameters

The serial port enables the balance to communicate with other serial devices such as printers, computers, and data loggers. You can connect a printer to the serial port by following the procedures stated in the section "Interface Applications." The serial port has eight different parameters that can be selected and is accessed with the following procedure:

1. Press the **menu** key three times to get to MENU #3.
2. Press the **1** key for Serial Port Set Up.
3. Select particular setup selection by pressing the appropriate number.

The **Serial Port Set Up** menu has the following options:

##### - Balance ID Number

Is a four digit number that is used to reference that particular balance. The ID number can be modified to any four digit number.

##### - Calibration Data

Enables automatic or manual output of calibration data. The option to display current calibration data is also available. The data includes the calibration weight used, and the date and time of last calibration.

##### - Baud

Sets the transfer rate for serial data transmission in bits per second. Choose the baud that matches the setting on the printer or computer used with your balance.

Seven choices are available:

150 baud    1200 baud

**300 baud**    2400 baud

600 baud    4800 baud

9600 baud

The default value is **300 baud**.

To **change the Baud Setting** use the following procedure:

1. Press the **menu** key until MENU #3 is displayed.
2. Press the **1** key to select Serial Port Set Up.
3. Press the **3** key to select Baud.
4. Press the appropriate key to select the baud required.

##### - Parity

This option permits you to set a control bit to check the accuracy of serially transmitted data. The parity setting must match the printer or computer interfaced with the balance. Even parity requires that the number of set bits be even. Odd parity requires that the number of set bits be odd. The default value is parity OFF.

##### - Misc I/O Menu

###### • *Output Tare*

Can either be switched ON or OFF. This determines whether or not the character

**Z** is sent out to the serial port each time the **zero** key is pressed in the Weighing screen.

- **Clear to Send**

The **CTS** (Clear To Send) can be turned ON or OFF. The **CTS** option displays whether or not an output device is cleared to accept data sent from your balance.

- **Print Icon**

The Print Icon can be toggled ON or OFF in the Misc. menu. This determines whether the **P** icon is displayed when printing data.

- **Print Mode**

Sets the conditions under which the balance outputs to the serial port. The operator may set printing to occur under three different conditions.

- Manual printing option means the serial port only outputs data when the **print** key is pressed and the balance is stable.
- Stable printing option means the weight value will automatically be sent to the printer when the reading becomes stable.
- Continuous printing option means data is output to the serial port after each time interval. The time interval can be either selected from the menu (5 sec., 10 sec., 60sec.) or a number may be entered (up to 9999sec.) by selecting user defined interval.

The print icon can be switched ON or OFF in the print mode setup depending on your particular weighing and printing application.

- **Format**

Sets the format for the type of I/O string. Refer to Output Specifications chart below.

### OUTPUT SPECIFICATIONS CHART

Output can be in one of the following formats:

Type	Unit #*	Stable		Unstable
Type 1	1	+ 10.0002	U	+ 10.0002
	1	+ 0.0003	U	+ 0.0003
Type 2	S	+ 0.0002	SD	+ 10.0002
	S	- 0.0003	SD	- 0.0003
Type 3	ST	+ 0.0002	US	+ 10.0002
	ST	- 0.0003	US	- 0.0003
Type 4		+ 10.0002		+ 10.0002
		- 0.0003		- 0.0003
Type 5		+ 10.0002 gram		+ 10.0002 US
		- 0.0003 gram		- 0.0003 US
Type 6		+ 10.0002 gram		+ 100.0002 gram
		- 0.0003 gram		- 0.0003 gram
Type 7 Balance ID	S	+ 100.0002 gram	Balance ID U	- 100.002 gram
Type 8 Batch Routine (See page UTIL-3)				
Type 9 Sequence Number		± 10.0004	U	- 07/11/1994 12:59:22

\* For type 1 only, the numerical prefix for stable readings corresponds to the unit # in the table on the following page.

## UNIT NUMBER CHART

Unit #	Weighing Unit	Unit #	Weighing Unit
0	Gram	11	Momme
1	Troy Ounce	12	Pound Avoirdupois
2	Avoirdupois Ounce	13	Not Used
3	Dram	14	Not Used
4	pennyweight	15	Tael Hong Kong
5	Carat	16	Tael Singapore
6	Grain	17	Tael Taiwan
7	Kilogram	18	Not Used
8	Not Used	19	Not Used
9	Milligram	20	Not Used
10	Not Used		

**- Batch Routine**

The batch routine is a method of applying Good Laboratory Practice (GLP) in your laboratory. This requires either a printer or computer attached to your balance to capture the Batch data and the balance is set to manual print. The Batch data includes the following:

Date:

Time:

Balance ID:

Tare:

Net:

Gross:

Weighed By: \_\_\_\_\_

Verified By: \_\_\_\_\_

**To access the Batch Routine:**

1. Go to the Serial Port Menu (MENU # 3 of 3) and press the **7** key for Formats.
2. Then press the **8** key from the Format menu and press the **ent** key. Once you return to the Weighing screen, you will notice the word "TARE" on the lower right hand corner of the screen. This prompt, and the next 2 prompts, will keep you informed as to where you are at in the batch process.
3. With no weight on the pan, tare the unit by pressing the **zero** key. Place the container on the pan, and once stable, press the **ent** key. This will store the container weight under the Tare value. Press the **zero** key again to tare out the container weight.
4. Next, you will notice that the word "TARE" has been replaced by the word "NET". Place the material to be measured into the container and wait for the balance to stabilize. Press the **ent** key again to accept the weight and store this weight under the Net weight.
5. Finally, the word "NET" has been replaced with the word "PRT" or "PRINT" depending on whether you have a Dynamic Fine Range or Single Range Balance. At this time, you can press the **print** key to send the data to the serial port for your in-house documentation.

Your next batch sampling can be performed after the RS-232 communications port has completed the output.

#### - Zero Print

Permits the option to select whether or not to print when zero is displayed on the screen.

**Note:** *Data is always followed by a carriage return and line feed.*

## 2. User ID Number

Four different user ID Numbers can be used to reference a particular user. The ID number can be modified to any four digit number.

## 3. Default Values (Factory Settings)

The Default Values are activated when your balance is powered up. These settings (listed below) remain in memory until changed by the user.

Auto Zero .....	ON	Parity .....	OFF
Baud .....	300	Print Calibration ....	Automatic
Beeper .....	OFF	Print Icon .....	ON
Clock Standby .....	ON	Print Interval .....	OFF
Count Mode .....	OFF	Print Mode .....	Manual
CTS .....	OFF	Statistics .....	OFF
Filter - Medium .....	Normal	Weigh Units .....	Grams
Manual .....	Print	Zero Print .....	ON
Output Format .....	Type 1		

You can easily change the factory settings to any of these options by following the procedure outlined in that section.

### Recalling Factory Settings (Defaults)

To return to all of the default values, go to MENU #3 and select Factory Defaults. You will be prompted to accept or reject the default values. If you select YES, all data, statistics, menu options, etc. will be cleared and returned to the factory settings. If you select NO all data, statistics, menu options, etc. entered by the user will remain.

To set **Recall Values** procedure:

1. Press the **menu** key until MENU #3 is displayed.
2. Press the **3** key to select Factory Defaults.
3. Select the **1** key, Yes (Clear All) or select the **2** key, No (Exit Do Not Clear).
4. Disconnect (unplug) input power transformer and then reconnect.

**NOTE:** *Unit will not reset to default values if power is not cycled.*

#### 4. Pass Codes

The Pass Code option allows you to enter a security pass code number with a maximum of four digits. After entering the pass code, all other keys are locked except for the **zero** key and the **print** key. A small key icon will appear in the upper left corner of the measurement display when keys are locked. To unlock the keypad re-enter the same pass code. The **zero** key will return you to the Weighing display. For the default pass code setting, call your supplier. To set up a pass code, use the following procedure.

To **lock the balance** using a **Pass Code**:

1. Press the **menu** key until MENU #3 is displayed.
2. Press the **4** key to select Pass Codes.
3. Enter a pass code using up to 4 digits on the numeric keypad.
4. Press the **ent** key to store the pass code.

To **Unlock the Balance** procedure:

1. Press most any key other than the **zero** and **print** keys.
2. Enter the pass code.
3. All of the menus are now accessible.

# INTERFACE APPLICATIONS

## 1. Technical Specifications

### A. I/O Connector

The mating connector is a 6 pin modular telephone plug. The pins used are as follows:

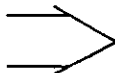
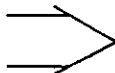
<u>PIN #</u>	<u>FUNCTION</u>	<u>PIN #</u>	<u>FUNCTION</u>
1	RXA	4	RTS
2	Case GND	5	Signal GND
3	CTS	6	TX

### B. Signal Definition

The balance uses a level compatible RS-232C interface, with your 8 data bits, null parity, and two (2) stop bits. For the balance to interface, it **must** receive one (1) or two (2) stop bits.

**Data output** - voltage output compatible with RS-232C levels, 300 ohm source resistance and  $\pm 10$  volt swing minimum

**Data input** - voltage input compatible with RS-232C levels, nominal 3000 ohms input impedance,  $\pm 5$  volt minimum,  $\pm 20$  volts maximum voltage.

**Case ground** - Pin 2.  **Signal ground** - Pin 5.  Tied Together

### C. I/O Specifications

The information transfer to and from the balance is accomplished with the RS-232C serial compatible signals, using your choice of 8 data bits with Parity On or 7 data bits with Parity Off. The interface connector is a 6 pin RJ11.

It is important to determine the interface requirements of equipment connected to the balance. The maximum recommended cable length is 25 feet. The information is transmitted at variable baud rates (from 150 to 9600) in standard ASCII format. The default default baud is 300. Baud from 150 to 9600 will have less than 1% error factor.

## 2. Input Specifications

It is possible to control the balance from a terminal or computer with RS-232C interface and a baud rate between 150 and 9600. When interfaced, all balance settings and operations can be directly accessed from a computer terminal.

To interface with a computer terminal you must have a communications program or other software that will allow you to access and send information through the RS-232C. A 6 pin modular telephone plug with a computer port communications connector must be used.

**To access your balance from a computer or terminal:**

1. Plug a six pin telephone connector into the balance in the empty slot provided underneath the keypad module.

2. Plug the other end of the cord into your computer terminal. (Special adaptors maybe required.)
3. Press the **M** key on your computer keyboard and then press enter (or carriage return <cr>) on your computer keyboard to access all menu screens.
4. At the menu display, press the number on the computer keyboard that corresponds to the function you want to use.
5. Press the **R** key followed by the <cr> key on your computer keyboard to return to measurement display.
6. Press either the **Z** or **T** key on the computer keyboard and <cr> to zero (tare) the balance.
7. Press **R** on the computer keyboard and <cr> to return to the previous screen.
8. Press **P** on the computer keyboard and <cr> to print the balance displayed weight to the computer.

#### 4. RS-232 Communication Parameters

##### Command Table

H - HELP  
M - MENU  
P - } Print while in Manual Print Mode only.  
? - }  
R - ENTER  
T - }  
t - } ZERO  
Z - }  
0-9 - Numerical Entry  
"." - Decimal Point

## APPENDIX A - TROUBLESHOOTING

<u>DISPLAY SHOWS</u>	<u>PROBLEM</u>	<u>SOLUTION</u>
Blank screen.	Power cord not connected.	Connect cord.
	No power to outlet or improper voltage.	Check power supply.
	Temporary fault.	Disconnect and reconnect power cord. (Wait at least five seconds before reconnecting it.)
	Weighing module not connected.	Plug in connecting cord to display module.
	Bad connection in connecting cord.	Make sure connectors are securely clipped into sockets, disconnect and reconnect cord.
OVERLOAD	Weight exceeds balance capacity.	Reduce weight.
Unstable icon <b>U</b> .	Air movement around balance.	Use draft shield and/or change filter setting.
	Unstable location.	Move balance and/or alter filter setting.
	Sample not stationary.	Alter filter setting. Make sample stationary.
Incorrect weight reading.	Balance operating error.	Re-calibrate balance. Check level.
	Incorrect weigh unit.	Check weigh unit setting.
	Pan obstructed.	Check pan placement. Check in use cover.
Display is too dark or too light.	Contrast needs to be adjusted.	Contact Customer Service
Smart I-O Error	Cable not connected.	Disconnect input power.
		Check cable connections between display and balance modules. Then reconnect power.

## **APPENDIX B - GLOSSARY**

**Auto Zero** - Automatically correcting the zero display due to slow drift.

**Baud Rate** - The transfer rate unit for serial data transmission in transitions per second between the computer and the printer.

**Bit** - Binary digit.

**Calibration** - A process where the balance is adjusted to weigh relative to a standard weight.

**Capacity** - The maximum mass that a balance is capable of weighing accurately. (See "Specifications" in the General Information section for the capacity of your particular model.)

**Check Weighing** - Weighing application that uses a preset reference value to equal 100% with the numeric display showing the deviation of the sample weight in percent.

**Default** - Preset parameters automatically in use when the balance is turned on.

**Dynamic Fine Range** - A dynamically switching fine resolution whose effective measurement range is dependent upon the sample weight and the gross weight.

**Electronic Balance** - An electronic balance senses physical force when weight is placed on it and translates this force into digital form.

**Factory Setting** - Preset operation parameters set by the manufacturer for normal applications and conditions. These can be changed by the user, but they also can be reset using the Recalling Factory Settings procedure outlined in the section "Default Values (Factory Settings".)

**Gross Weight** - The total weight on the balance including tare weight.

**Leveling** - Horizontal aligning of the balance during installation using a level vial.

**Linearity** - The amount a weight reading may deviate from a straight line between 0 grams and the maximum capacity of the balance.

**Menu** - A series of displayed tables listing the parameters that the user can change in order to adapt a balance to a particular weighing situation.

**Parity** - A parameter whose values may be odd, even, or none which is used in a method of error checking information in a data transmission.

**Piece Counting** - A weighing application for determining the piece count of identical weighing samples.

**Resolution** - The smallest fraction of a weight that a balance is able to discern.

*Example:* If weight were added to a balance in increments of .0001 grams, the resolution would be defined as the amount added before the balance reading would change.

**Setup** - The process of configuring the balance to operate in a certain way.

**Tare Weight** - Weight of a container or package that should **not** be taken into account in the weighing. This value is also referred to as the zero weight.

**Taring** - Compensating for a tare weight by setting the display of the balance at zero with the container or other packaging material on the weighing pan. Often called re-zeroing.

**Unstable Indicator** - Symbol that is automatically displayed when the balance reading or weight is **not** stable. It disappears when the reading becomes stable.

**Zero Weight** - The same as the tare weight.

## **APPENDIX C - UNIT DISPLAY CHART**

### **Chart**

<b><u>Units</u></b>	<b><u>Abbreviation</u></b>
Carat	carat
Dram	dram
Pennyweight	DWT
Grain	grain
Gram	gram
Kilogram	kilo
Milligram	mg
Momme	momme
Troy Ounce	ozt
Ounce Avoirdupois	ounce
Pound Avoirdupois	lb
Tael - Hong Kong	H.K.
Tael - Singapore	Sing.
Tael - Taiwan ROC	Taiw.

Press HELP while in Unit Menu for gram equivalent of the selected units.

---

## **APPENDIX D - PRESET WEIGHT SPECIFICATIONS**

### ***Specifications***

The following chart lists the preset weights on the eleven Models.

**Model 100**

- 1) 20
- 2) 30
- 3) 50
- 4) 100

**Model 2200**

- 1) 1000
- 2) 1500
- 3) 2000
- 4) 2200

**Model 12K**

- 1) 2000
- 2) 5000
- 3) 10000
- 4) 12000

**Model 200**

- 1) 50
- 2) 100
- 3) 150
- 4) 200

**Model 4K**

- 1) 1000
- 2) 2000
- 3) 3000
- 4) 4000

**Model 400D**

- 1) 100
- 2) 200
- 3) 300
- 4) 400

**Model 400**

- 1) 100
- 2) 200
- 3) 300
- 4) 400

**Model 5K**

- 1) 1000
- 2) 2000
- 3) 4000
- 4) 5000

**Model 4KD**

- 1) 400
- 2) 2000
- 3) 3000
- 4) 4000

**Model 800**

- 1) 200
- 2) 400
- 3) 500
- 4) 800

**Model 8K**

- 1) 1000
- 2) 2000
- 3) 5000
- 4) 8000

**Model 8KD**




- 1) 800
- 2) 2000
- 3) 5000
- 4) 8000

## APPENDIX E - EXTERNAL TRANSFORMERS




### **Equipment Ratings:**

One of the following external transformers is supplied for use with the product:

All models except DI-12K:

part#	input	output	mains plug type
100711.1	120VAC ~ 60 hz	12 VDC  500mA	North American NEMA 5-15p
601436.1	230VAC ~ 50/60 hz	12 VDC  500mA	Continental European CEE 7/16
601437.1	240VAC ~ 60 hz	12 VDC  500mA	United Kingdom BS 1363

Model DI-12K only:

part#	input	output	mains plug type
601438.1	120VAC ~ 60 hz	15 VDC  1A	North American NEMA 5-15p
601434.1	230VAC ~ 50 hz	15 VDC  1A	Continental European CEE 7/16
601435.1	240VAC ~ 50 hz	15 VDC  1A	United Kingdom BS 1363

The tolerance for AC input voltage is +/- 10%.

Note: Other main plug configurations may be available. Contact your sales representative.

# APPENDIX F - MENU TREES

## MENU #1

**MENU #1 OF 3**  
 1. CALIBRATE  
 2. UNITS  
 3. COUNT MODES  
 4. CHECK WEIGHING  
 5. STATISTICS  
 6. TARE WEIGHTS

**UNITS MENU 1:**  
 → 1. GRAMS  
 2. MILLIGRAMS  
 3. KILOGRAM  
 4. POUND  
 5. GRAIN  
 6. OZ MENU  
 7. CARATS  
 8. NEXT MENU

**UNITS MENU: OUNCES**  
 1. APOTHECARIES (TROY)  
 2. AVOIRDUPOIS

**UNITS MENU 2:**  
 1. DWT  
 2. DRAM  
 3. MOMME  
 4. TAEI MENU  
 5. MATH MENU  
 6. UNITS MENU 1

**UNITS MENU: TAEIS**  
 1. HONG KONG  
 2. SINGAPORE  
 3. TAIWAN ROC

**COUNTING SCALE MENU:**  
 1. BASIC COUNT MODE  
 2. COUNT WITH GROSS WEIGHT  
 3. AVERAGE PIECE WEIGHT  
 4. KITTING - NEGATIVE COUNT  
 → 5. COUNT MODE OFF

**MENU: MULTIPLE TARE VALUES**  
 1. STORE - AUTO ENTRY  
 2. STORE - MANUAL ENTRY  
 3. RECALL TARE WEIGHTS

**CHECK WEIGHING:**  
 1. LOW & HIGH LIMIT WEIGHING  
 2. PERCENTAGE TO TARGET  
 3. DISPLAY CURRENT SETTINGS  
 → 4. CHECK WEIGHING OFF

**STATISTICS MENU:**  
 1. STATISTICS FUNCTION ON  
 2. CALCULATE STATISTICS  
 3. LIST DATA & EDIT  
 4. CLEAR ALL DATA  
 5. SEND STATS TO PORT  
 → 6. STATISTICS FUNCTION OFF

N = 0  
 Min = 0.000  
 Max = 0.000  
 Range = 0.000  
 Average = 0.000  
 Std dev = 0.000  
 Total = 0.000  
 << STRIKE ANY KEY TO EXIT >>

1) PAGE 1  
 2)  
 3)  
 4)  
 5)  
 6)  
 1. MORE 2. DELETE 3. EXIT

**STATISTICS: CURRENTLY N = 0**  
 ARE YOU SURE YOU WANT TO CLEAR ALL STATISTICS DATA?  
 1. YES  
 → 2. NO

**Note:** the arrow → indicates factory setting.

**MENU #2**

**MENU #2 OF 3**  
1. FILTER  
2. BEEPER  
3. AUTO ZERO  
4. CLOCK

**FILTER MENU:**  
1. ULTRA FAST  
2. FAST  
→ 3. MEDIUM - NORMAL  
4. SLOW  
5. ULTRA SLOW

**BEEPER SELECTION:**  
1. BEEPER ON  
→ 2. BEEPER OFF

**AUTO ZERO:**  
→ 1. AUTO ZERO ON  
2. AUTO ZERO OFF

**CLOCK MENU:** 0:00:00  
→ 1. SET AM  
2. SET PM  
3. SET 24 HOUR  
4. SET DATE 00-00-0000  
5. FORMAT & CLOCK STANDBY

**DATE FORMAT MENU**  
→ 1. MONTH, DAY, YEAR  
2. DAY, MONTH, YEAR  
→ 3. CLOCK STANDBY ON  
→ 4. CLOCK STANDBY OFF

**Note:** the arrow → indicates factory setting.

# MENU #3

**MENU #3 OF 3**  
 1. SERIAL PORT SET UP  
 2. USER ID NUMBER  
 3. FACTORY DEFAULTS  
 4. PASS CODES

—  
 ENTER 4 DIGIT PASS CODE

THIS WILL CLEAR EVERYTHING  
 1. YES (CLEARALL)  
 → 2. NO (EXIT DO NOT CLEAR)

MENU USER ID NUMBER  
 → 1. USER NUMBER 1  
 2. USER NUMBER 2  
 3. USER NUMBER 3  
 4. USER NUMBER 4

SERIAL PORT SET UP MENU:  
 1. BALANCE ID  
 2. CAL. DATA  
 3. BAUD  
 4. MISC. I/O  
 5. PARITY  
 6. PRINT MODE  
 7. FORMAT  
 8. ZERO PRINT

CURRENT ID NUMBER = 1234  
 —  
 ENTER NEW 4 DIGIT NUMBER

PRINT CALIBRATION DATA:  
 → 1. AUTOMATIC OUTPUT  
 2. MANUAL OUTPUT  
 3. DISPLAY DATA ON SCREEN

BAUD RATE MENU:  
 → 1. 150  
 2. 300  
 3. 600  
 4. 1200  
 5. 2400  
 6. 4800  
 7. 9600

MISC. I/O  
 → 1. OUTPUT TARE - ON  
 2. OUTPUT TARE - OFF  
 → 3. PRINT ICON - ON  
 4. PRINT ICON - OFF  
 → 5. CLEAR TO SEND - ON  
 6. CLEAR TO SEND - OFF

PARITY MENU:  
 → 1. PARITY OFF  
 2. PARITY ODD  
 3. PARITY EVEN

PRINT MODE SETUP:  
 → 1. MANUAL  
 2. STABLE  
 3. CONTINUOUS

PRINT INTERVAL MENU:  
 → 1. 5 SECONDS  
 2. 10 SECONDS  
 3. 60 SECONDS  
 4. USER DEFINED INTERVAL

OUTPUT FORMAT MENU:  
 → 1. ONE  
 2. TWO  
 3. THREE  
 4. FOUR  
 5. FIVE  
 6. SIX  
 7. SEVEN  
 8. BATCH  
 9. DATE/TIME

ZERO PRINT MENU:  
 → 1. ZERO PRINT ON  
 2. ZERO PRINT OFF

**Note:** the arrow → indicates factory setting.



## Declaration of Conformity

Denver Instrument Company declares that the following products:

### DI Series Electronic Balances

conform to the European Union Council Directives and other standards listed below:

**73/23/EEC, "Low Voltage Directive"**

EN 61010-1, "Safety requirements for electrical equipment for measurement, control, and laboratory use. Part 1. General requirements"

**89/336/EEC, "Electromagnetic Compatibility Directive"**

EN 55011, Group 1, Class A, "Limits and methods of measurement of radio disturbance characteristics of industrial, scientific, and medical (ISM) radio-frequency equipment"

EN 50082-1, "Electromagnetic compatibility - Generic immunity standard; Part 1: Residential, commercial, and light industry"

Further information may be obtained from the manufacturer, or from the manufacturer's representative:

**manufacturer:**

**Denver Instrument Company  
6542 Fig Street  
Arvada, CO 80004 USA**

**manufacturer's representative:**

**Denver Instrument Company, Ltd.  
Denver House  
Sovereign Way  
Trafalgar Business Park  
Downham Market  
Norfolk, UK PE38 9SW**

*December 1995*

## Warranty Instructions

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1. Please return the prepaid, pre-addressed Purchase Registration Card to Denver Instrument Company promptly upon your purchase of the Denver Instrument product. The return of the card is not a condition precedent to warranty coverage.
2. If you have any questions about a Denver Instrument product, please call toll-free, **1-800-321-1135** (or FAX description of problem to (303) 423-4831) for technical assistance.
3. If it becomes necessary to return your Denver Instrument product for service, you must obtain a **"Return Authorization Number"**. Please pack the product securely in its original approved packing carton or other suitable container and include your Return Authorization Number on the shipping label and as a precaution also a note inside the box. Shipping charges must be fully prepaid.

In the U.S. ship to:

**Denver Instrument Company**  
**6542 Fig Street**  
**Arvada, Colorado 80004**

In the U.K. and Europe ship to:

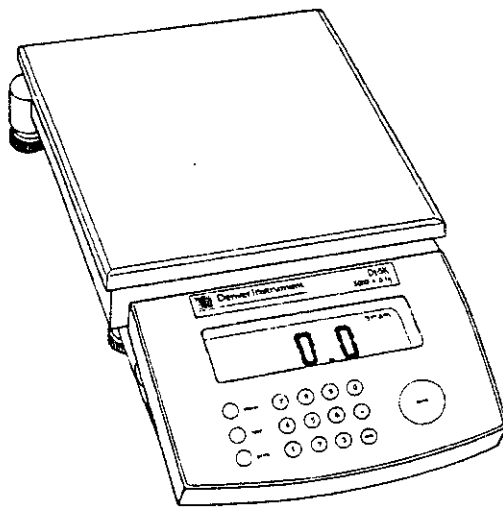
**Denver Instrument Company, Ltd.**  
**Denver House, Sovereign Way**  
**Trafalgar Business Park, Downham Market**  
**Norfolk PE38 9SW England**

For your reference and protection, record:

Model Number \_\_\_\_\_

Serial Number \_\_\_\_\_

Purchase Date \_\_\_\_\_



 **Denver Instrument Company**

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6542 Fig Street • Arvada, Colorado 80004 U.S.A.  
1-800-321-1135 • (303) 431-7255 • Fax (303) 423-4831

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