Cardinal

Cardinal Scale Manufacturing Co.

Digital Counting Scale

Models 2240 and 2241

Operation Manual

8526-M231-O1 Rev C
10/99

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Printed in USA

INTRODUCTION

We wish to thank you for your purchase of our Digital Counting Scale. This instrument has been designed and manufactured at our factory in Webb City, MO U.S.A. with quality and reliability.

This manual will help aquaint you with the features of this instrument and instruct you in the proper installation, operation and maintenance of your new scale. Please read it before attempting to use the scale and keep it handy for future reference.

FCC COMPLIANCE STATEMENT

WARNING! This equipment generates, uses and can radiate radio frequency and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the user will be responsible to take whatever measures necessary to correct the interference.

You may find the booklet "How to Identify and Resolve Radio TV Interference Problems" prepared by the Federal Communications Commission helpful. It is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 001-000-00315-4.

Serial Number_____
Date of Purchase _____
Purchased Form_____
_____
_____

RETAIN THIS INFORMATION FOR FUTURE USE

TABLE OF CONTENTS

PRECAUTIONS

Before using this instrument, read this manual and pay special attention to all "WARNING" symbols:

IMPORTANT

ELECTRICAL WARNING

SPECIFICATIONS

Power Requirements	115VAC 50/60Hz (*2240*) 220/240 VAC 50/60Hz (*2241*)
Power Consumption	20 Watts (maximum)
Power Cord	2240: 6 foot, 3-pin polarized - 2241: 6 foot
Operating Temperature	14º F to 104º F (-10º C + 40º C)
Internal Resolution	1,000,000
Weight Displayed Resolution	10,000 divisions
Sample Rate	2 samples per second
Load Cell Excitation	9.3 VDC
ID Number Capacity	300
Dimensions	13½" W x 13¼" D x 4" H (345mm W x 339mm D x 102mm H)
Shipping Weight	28 lbs (incl. optional battery)

MODEL	Capacity x Division Value	Commodity Tray Dimensions
2240-5 2241-5*****	5 lb x 0.0005 lb or 2 kg x 0.0002kg	13½" W x 10¼" D
2240-10 2241-10*****	10 lb x 0.001 lb or 5 kg x 0.0005kg	13½" W x 10¼" D
2240-20 2241-20*****	20 lb x 0.002 lb or 10 kg x 0.001kg	13½" W x 10¼" D
2240-50 2241-50*****	50 lb x 0.005 lb or 20 kg x 0.002kg	13½" W x 10¼" D
2240-100 2241-100*****	100 lb x 0.01 lb or 40 kg x 0.005kg	13½" W x 10¼" D

* 220/240 VAC 50/60Hz models

Standard Features:

- 0.6" high red LED 6 Character Count/Data display
- 0.6" high red LED 5 Character Weight Display
- LED Operating Status Annunciators
- Metric (lb/kg) Conversion
- Bi-Directional RS-232 Printer Port
- Fixed Printer Port Data Format, 9600 baud, 8 data bits, No parity and 1 stop bit
- Mechanical Overload Protection
- Adjustable Leveling Feet and Bubble Level Indicator
- User-accessible Setup Parameters
- Digital Calibration
- Auto Recall of Last Piece Weight
- Simplified Operation Selection
- Automatic Recomputation of Average Piece Weight
- Manual Count Accumulators
- Auto Shut-Off Feature
- Auto Selection of Optional Remote Scale
- Switch between Local and Remote Scale during Sample or Count Operation
- Non-volatile Memory stores up to 300 ID's and retains associated data base

Optional Features:

- Battery Operation using readily available Sealed Lead-Acid Camcorder battery
  Approximately 10 hours use on fully charged battery (without remote scale)
- Remote Scale
- Label Printer

INSTALLATION

Unpacking

Before beginning installation of your Digital Counting Scale, make certain the instrument has been received in good condition. Carefully remove the instrument from the shipping carton and inspect it for any evidence of damage (such as exterior dents or scratches) that may have taken place during shipment. Keep the carton and packing material for return shipment if it should become necessary. It is the responsibility of the purchaser to file all claims for any damages or loss incurred during transit. **Refer to the Counting Scale Unpacking and Re-Packing Instructions, 8526-M246-01, for additional information.**

Placement

Place the scale on a stable, vibration-free level surface away from direct sunlight and from any rapidly moving air source (heating/cooling vents, fans, etc.). Make certain the power cord and peripheral cables are routed out of the way of normal traffic.

CAUTION! DO NOT place the scale on any unstable cart, stand or table. The scale may fall causing injury to the operator, and seriously damage the unit, or proper operation of the scale may be inhibited.

Level Adjustment

Check to make certain the scale is level. The level indicator is located in the center of the weighbridge under the Stainless Steel commodity tray. Remove the commodity tray and observe the level bubble (see Figure No. 1). If the scale is not level (the bubble will not be centered), loosen the locking nut on all four (4) mounting feet (see Figure No. 2) and adjust them as required to center the bubble and attain a level scale. Once a level condition has been obtained, lock the mounting feet in place by tightening the adjustment nuts against the bottom of the scale.

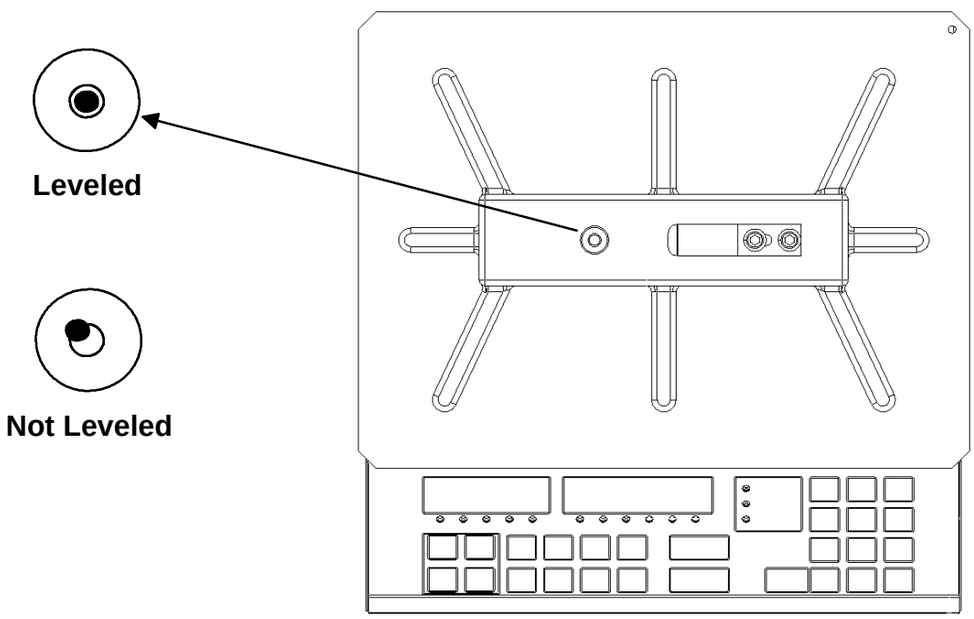


Figure No. 1

Power Connection

The scale contains a power supply which converts the 110/120/220/240 VAC 50/60Hz wall supply to the power required by the scale circuitry. The power supply also contains the circuitry necessary to monitor and recharge the optional battery and is capable of operating the scale and recharging the battery simultaneously.

INSTALLATION, Cont.

AC Operation (Model 2240)

Plug the power cord into a grounded, polarized wall receptacle that supplies 110/120 VAC 50/60Hz power. *If it is necessary to use an extension cord, make certain it is a 3-wire, fully grounded type using a minimum of 18 gauge wire.* Be certain the power cord is routed out of the way of normal traffic. If only a ungrounded wall receptacle is available, **it is the customer's responsibility** to contact a qualified electrician to replace the ungrounded receptacle with a properly grounded polarized wall receptacle or have a grounding adapter properly installed.

CAUTION! To avoid electrical hazard, DO NOT under any circumstances, cut, remove, alter, or in any way bypass the power cord grounding prong.

AC Operation (Model 2241)

It is the responsibility of the customer to contact a qualified electrician to install the proper power cord connector. Plug the power cord into a grounded, polarized wall receptacle that supplies 220/240 VAC 50/60Hz power. Be certain the power cord is routed out of the way of normal traffic.

COMPONENTS and CONTROLS

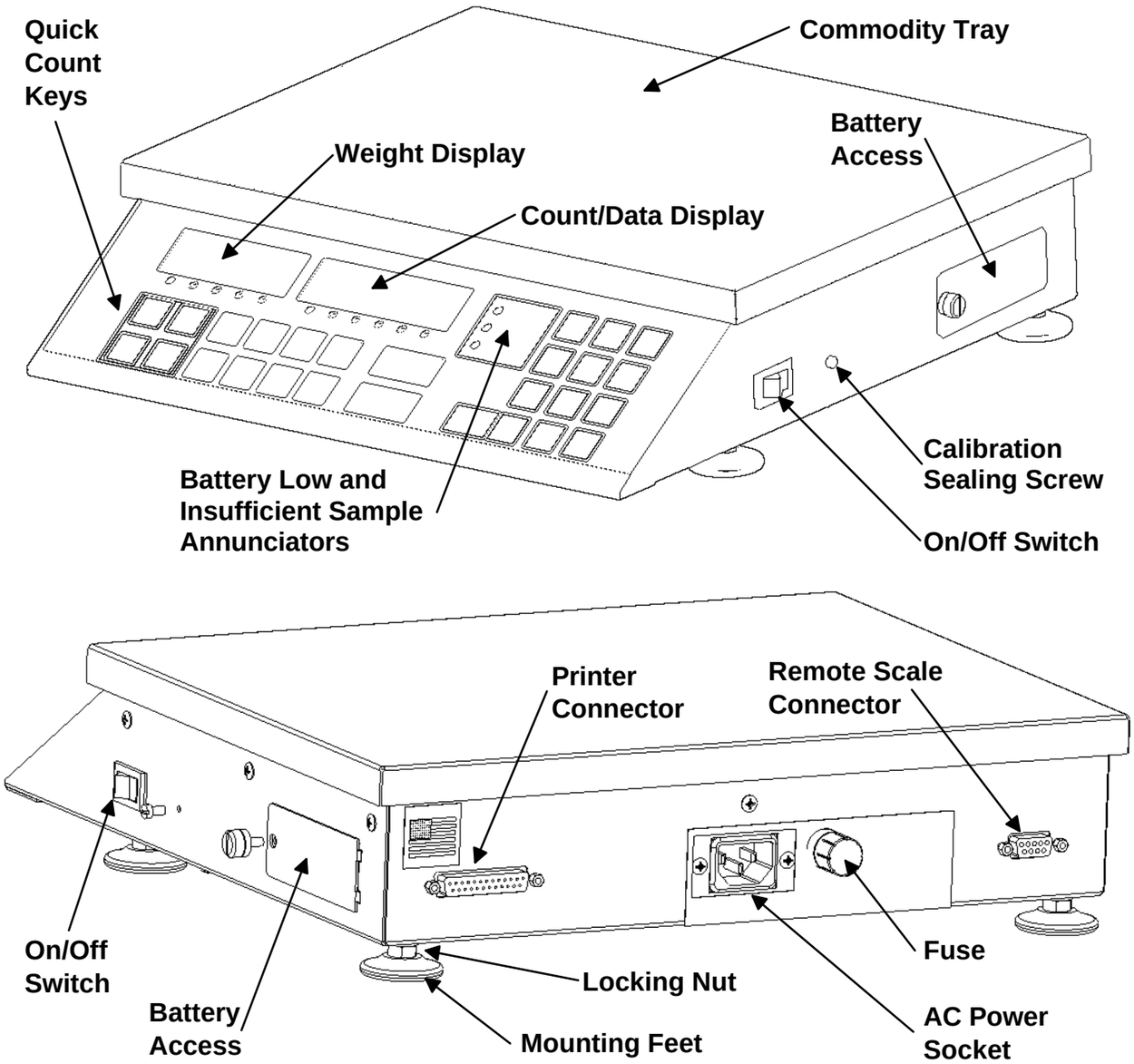
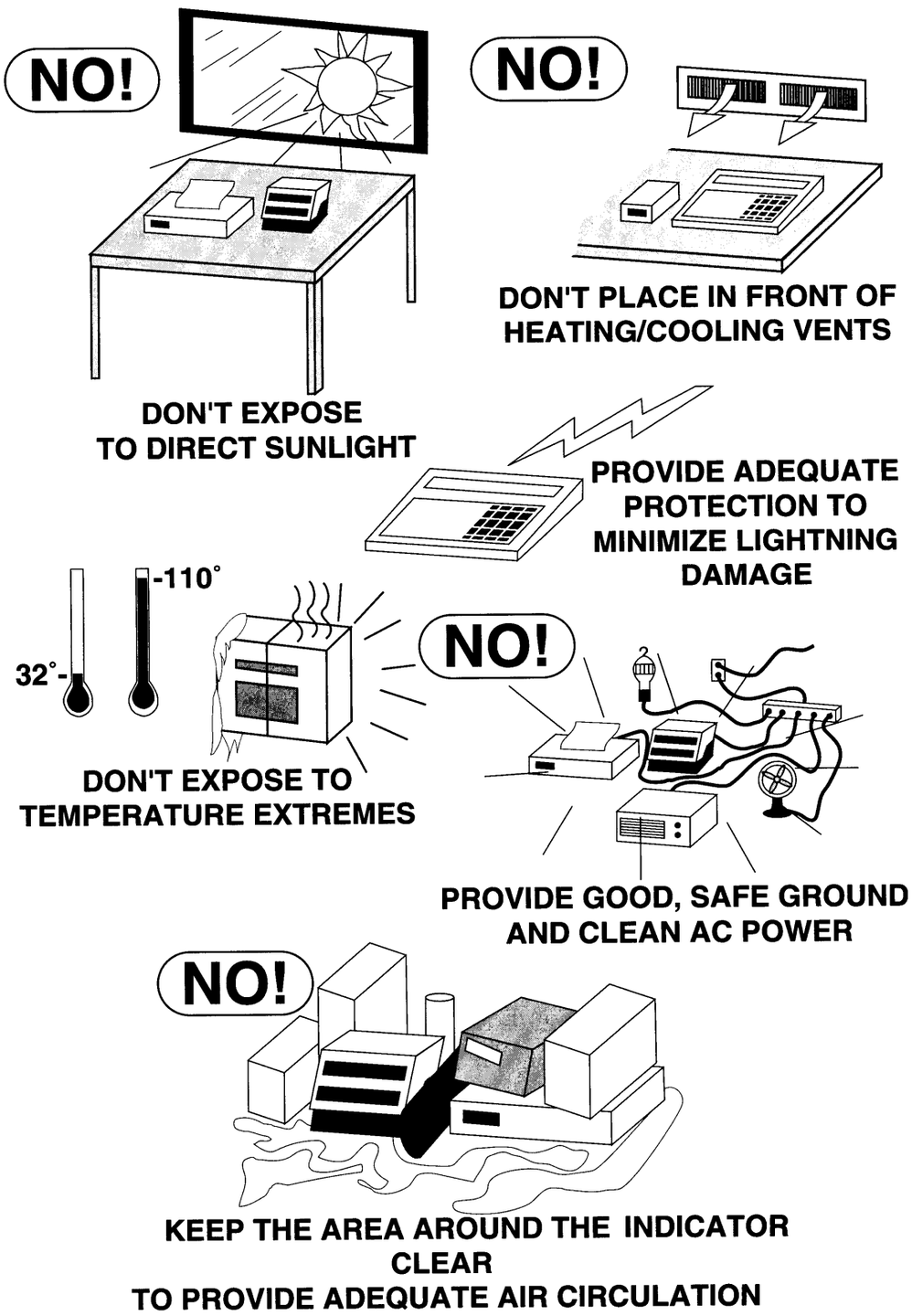


Figure No. 2

PRECAUTIONS

Most scales are designed for an office type environment. The Digital Counting Scale is no exception to that rule. Such an environment is free of excessive dust and moisture and provides a comfortable temperature. In general, the scale will perform well over a temperature range of 32° to 104° F (0° to +40° C). In order to keep cooling requirements to a minimum, the scale should be placed out of direct sunlight and to provide adequate air circulation, keep the area around the scale clear. Make certain the scale is not directly in front of a heating or cooling vent. Such a location will subject the scale to sudden temperature changes and air currents which may result in unstable weight readings. Insure that the scale has good, clean AC power and is properly grounded. In areas subject to lightning strikes, additional protection to minimize lightning damage, such as surge suppressors, should be installed.



CAUTION! When in parallel runs, locate external Load Cell cables a minimum of 24 inches away from all AC wiring.

INTERCONNECTIONS

Remote Scale Connection

If a remote scale is used, it connects to the counting scale via a 9-pin "D" connector (REMOTE SCALE) located on the rear panel of the scale (see Figure No. 2). Before connecting your remote scale to the counting scale, verify that your scale cable is correctly wired. Refer to Figure No. 3 for pin identification of the remote scale connector.

The Digital Counting Scale ships from the factory configured for remote scales that do not use load cells with sense leads (4 wire load cells). The sense jumpers, J1 and J2 are installed for proper operation with 4 wire load cells. If your remote scale uses load cells with sense leads (6 wire load cells), jumpers J1 and J2, located on the printed circuit board (see Figure No. 5) should be placed on one pin only or disconnected.

Make certain that the connector retaining screws are used to hold the remote scale cable connector securely to the rear panel.

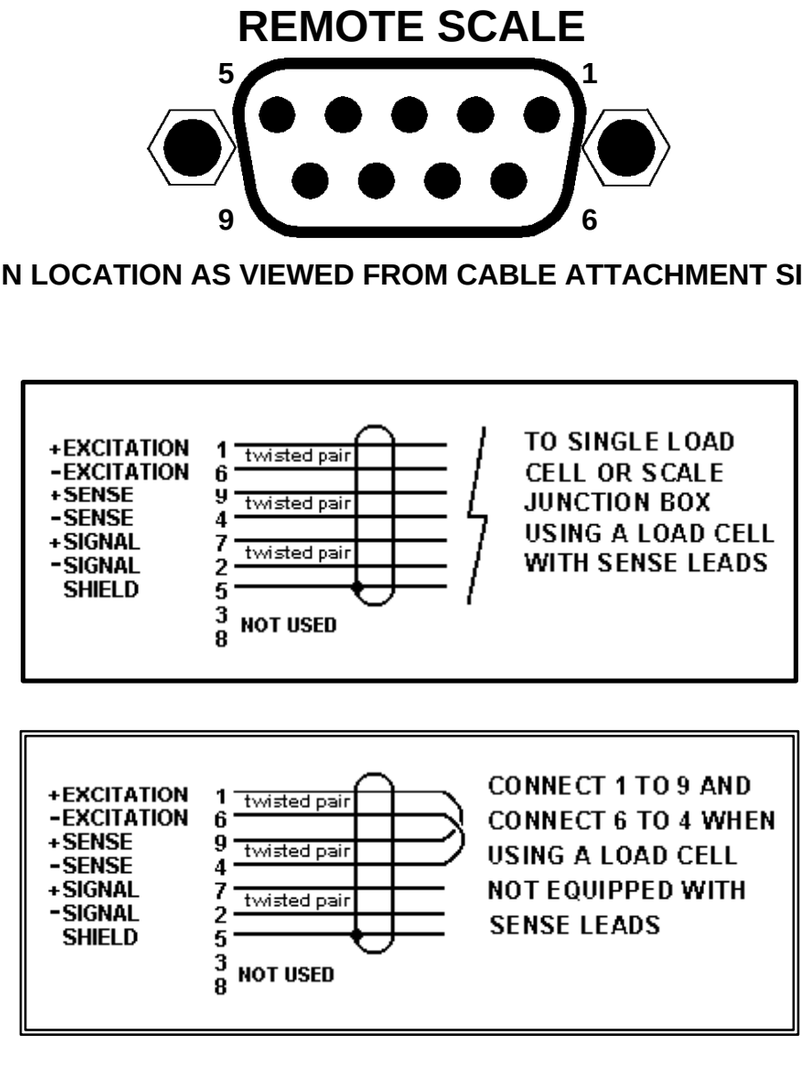


Figure No. 3

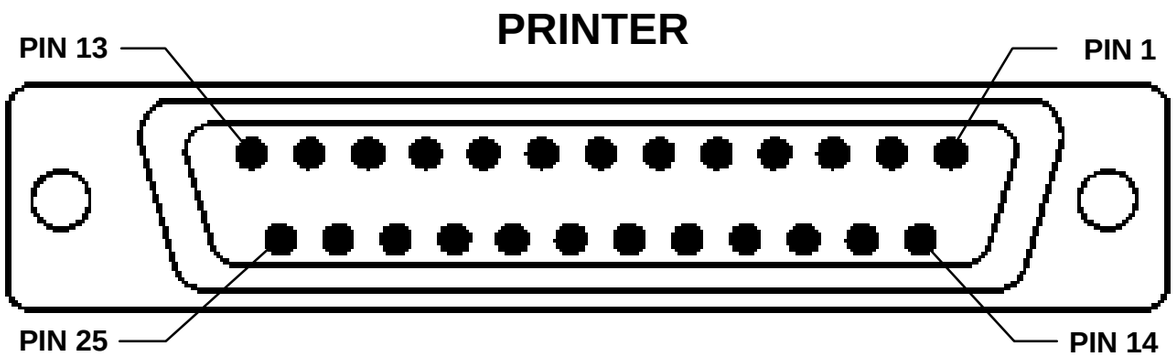
MATING CONNECTOR INFORMATION

PART NO.	VENDOR PART NO.
6610-2379	DE-9P CONNECTOR
6610-1131	DE-24657 SHELL

INTERCONNECTIONS, Cont.

Printer Port Connection

The Digital Counting Scale has a serial printer port that may be used to print weight and associated data. The data is sent to the printer on demand when the **PRINT** key is pressed. The printer connects to the counting scale via the 25-pin "D" connector (PRINTER) located on the rear panel of the scale. Refer to Figure No. 4 for pin identification of the printer port connector.
NOTE: The serial printer port has a fixed data format, configured for 9600 baud, 8 data bits, No parity and 1 stop bit (9600,8,N,1) operation.



PIN LOCATION AS VIEWED FROM CABLE ATTACHMENT SIDE

Figure No. 4

Printer Port Rs-232 Connector Pin Definitions

3	TXD	Output to printer (Transmit)
2	RXD	Input from printer (Receive, not used)
7	COMMON	Common (Signal Ground)
19	CTS	Input from printer (Clear To Send)

MATING CONNECTOR INFORMATION

PART NO.	VENDOR PART NO.
6610-2047	DB-25P CONNECTOR
6610-2218	BACKSHELL

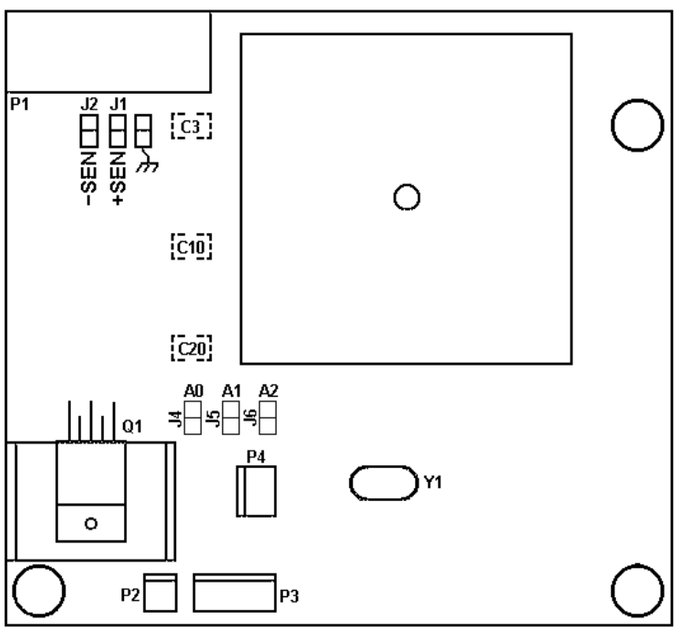


Figure No. 5

KEY FUNCTIONS

This section describes the use of each of the keys on the Digital Counting Scale. It will be helpful to refer to the scale keyboard or Figure No. 6 when reading this section.

The membrane keyboard is not to be operated with pointed objects (pencils, pens, fingernails, etc). Damage to keyboard resulting from this practice will *NOT* be covered under warranty.

ZERO The **ZERO** key is used to perform a variety of functions depending on the current mode of operation:

• *Weight Display Mode (lb or kg annunciator on)*: Pressing the **ZERO** key will set the weight display to zero and turn on the ZERO annunciator if the displayed weight is within ± 4% of scale capacity.

• *Count Mode (COUNT annunciator on)*: Pressing the **ZERO** key while in the Count mode will reset the count quantity to zero.

• *Accumulator Mode (ACCUM annunciator on)*: Pressing the **ZERO** key while in the Accum mode will reset the contents of the currently selected accumulator to zero.

PRINT Pressing the **PRINT** key will transmit RS-232 data to an optional printer, recording time, date, weight, piece count and ID or part number. Refer to the Thermal Label Formats section of this manual and Figure No. 12 for typical print formats.

SAMPLE The **SAMPLE** key is used to weigh a known number of pieces to be added or removed from the scale in preparation for a new counting operation. The **SAMPLE** key is also used to change the sample quantity. Pressing the **SAMPLE** key repeatedly will cause the sample size to step through pre-established sample sizes of 5, 10, 25, 50 and 100 pieces. In this manner sample quantities other than the first one requested by the scale can be used for counting operations. Sample quantities may also be entered using the numeric keypad in any quantity desired.

COUNT The **COUNT** key is pressed after removing or adding the requested sample, and will place the scale in the COUNT mode and start the counting operation.

ACCUM Pressing the **ACCUM** key will cause the scale to display the contents of the accumulator (the number of pieces accumulated since the last time the accumulator was zeroed) for the currently selected identification (ID) number.

+ (plus) The + (plus) key is used to add the current piece count value to the accumulator of the currently selected identification (ID) number. The ACCUM annunciator will flash to indicate the accumulation has taken place.

- (minus) The - (minus) key is used to substract the current piece count value from the accumulator of the currently selected identification (ID) number. The ACCUM annunciator will flash to indicate the subtraction has taken place.

ID Pressing the **ID** key will cause the scale to display the currently selected identification (ID) number and allow the entry of a new ID number.

LOCAL SCALE Pressing this key while displaying any weight information will select the instrument platform (LOCAL) for sampling, counting or weighing operations.

KEY FUNCTIONS, Cont.

NET GROSS — Pressing this key will toggle the weight display between the Net and Gross weight display modes. **NOTE:** If a valid tare weight has not been entered, pressing this key will toggle between Net and Gross modes (illuminating the appropriate annunciator) with no change on the display.

TARE — The **TARE** key is used to display the current tare weight (or zero if no tare has been entered) and/or using the numeric keypad, to enter a new tare weight. It is also used when entering a tare under a specific indentification (ID) number.

TIME DATE — Pressing this key will allow the entry of hours-minutes-seconds (6 digits) followed by the entry of the month-day-year (6 digits). **NOTE:** The time and date formats are selected during setup of the counting scale.

lb/kg — Pressing this key will toggle the weighing units between pounds (lb) and kilograms (kg). **NOTE:** The currently selected weighing unit is indicated by illuminating either the lb or kg annunciator (LED).

REMOTE SCALE — Pressing this key while displaying any weight will select the optional external scale (REMOTE) for sampling, counting or weighing operations. The Remote Scale annunciator (LED) will illuminate to indicate the external (REMOTE) scale is in use. **NOTE:** The REMOTE scale cannot be selected until it has first been enabled in Setup and then calibrated.

ENTER — The **ENTER** key is used to signal the completion of the data entry process and starts the scale processing the data entered.

0 through 9 — These keys are used to enter numeric data during setup and calibration as well as during normal operations. **NOTE:** The 1 and 0 keys have dual functions. They are used to enter numeric data during setup and calibration as well as during normal operations and are also used to answer Yes (1=YES) or No (0 = NO) to various prompts.

• — This is the decimal point key used to enter a decimal point where required when entering numeric data.

CE — The **CE** key is used to perform different functions depending on the current mode of operation:

Data Entry: The **CE** key is used to clear an incorrect entry from the display without processing the data. If an incorrect entry is made, press the **CE** key and re-enter the correct data. **NOTE:** The **CE** key must be pressed before the **ENTER** key to ensure the data is not procesed.

Sample Mode (SAMPLE annunciator on): Pressing the **CE** key while in the Sample mode during the initial Add display will reset the Add value to 5. This display indicates the number of sample pieces to be added to (or removed from) the scale platform.

NOTE: An invalid key entry will produce a long tone and no change on the display.

RESET FUNCTION

A hidden key (under the Cardinal *bird* emblem) is provided to be used as an reset function to abort the current operation and return the scale to the weight display mode. This allows the operator to start the operation again from the beginning.

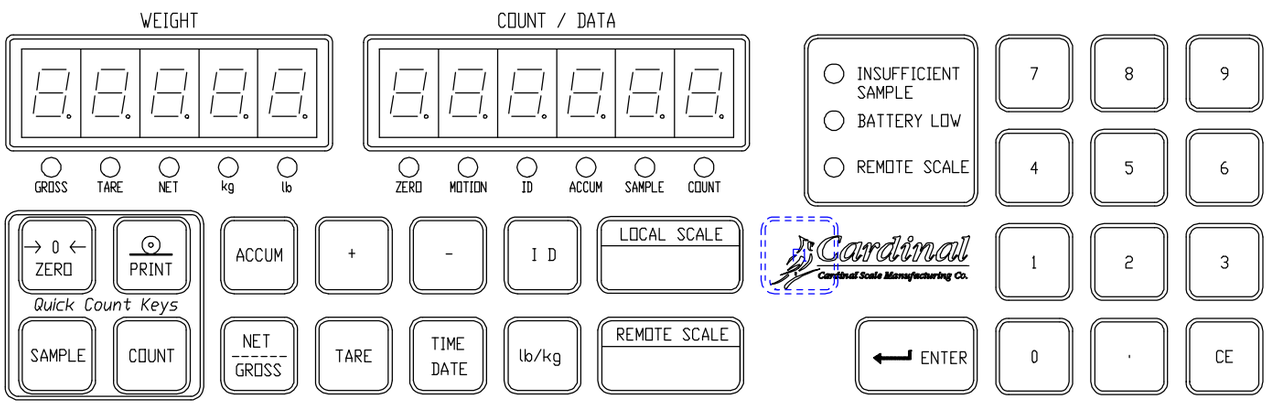


Figure No. 6

ANNUNCIATORS

The annunciators are turned on to indicate that the scale is in the mode corresponding to the annunciator label or that the status indicated by the label is active. It will be helpful to refer to the scale keyboard or Figure No. 6 when reading this section. The following describes the functions of each annunciators.

GROSS
The GROSS annunciator is turned on to show that the weight displayed is the gross weight. Gross weight may be displayed only when in the weight mode and a zero tare weight (or no tare weight) value is stored. Note that the GROSS annunciator is only active when the display is in the weight mode as shown by the illumination of the lb or kg annunciator.

TARE
The TARE annunciator is turned on to show that the scale is in a weight mode in which a known tare (container) weight may be keyed in via the numeric keypad, or in a mode that will display the current TARE weight.

NET
The NET annunciator is turned on to show that the weight displayed is the net weight. Net weight is determined by subtracting the stored tare weight from the gross or scale weight. The tare weight, usually the weight of the container, is entered using the tare key. Note that the NET annunciator is only active when a zero tare weight or tare weight value is stored and the display is in the weight mode as shown by the illumination of the lb or kg annunciator.

kg
The kg annunciator is turned on to show that the weight displayed is in kilograms. The **lb/kg** key may be used to select kilogram as the weighing units.

lb
The lb annunciator is turned on to show that the weight displayed is in pounds. The **lb/kg** key may be used to select pounds as the weighing units.

ZERO
The ZERO annunciator is turned on to show that the scale gross weight is within ± ¼ of a division of true zero (center-of-zero).

ANNUNCIATORS, Cont.

MOTION
The MOTION annunciator shows that the scale weight is unstable. An unstable weight reading may be caused by motion on the scale platform. Accumulation of piece counts, Zero and printing cannot take place when the MOTION annunciator is illuminated.

ID
The ID annunciator is used to show the status of the Identification Number mode. During operation, the ID annunciator will be ON (not flashing) to indicate that an ID number is active. When the scale is in the ID ADD, EDIT or DELETE modes of operation, the ID annunciator will be flashing.

ACCUM
The ACCUM annunciator shows that the display is in the Accumulator mode and that the value displayed is the current contents of the accumulator. Individual counts are adjusted via the (+) and (-) keys or optionally, any count may be entered using the numeric keypad. Note, a flashing ACCUM annunciator indicates that the current count has been added to the accumulator (count annunciator is also lit).

SAMPLE
The SAMPLE annunciator shows that the display is in the Sample mode and that the value displayed is the sample quantity requested in pieces.

COUNT
The COUNT annunciator shows that the display is in the Count mode and the value displayed is the count quantity of either the pieces removed from the scale platform (reverse counting) or the number of pieces added to the scale platform (normal counting). The count value is determined by dividing the net or gross weight (as selected) by the average piece weight.

INSUFFICIENT SAMPLE
The INSUFFICIENT SAMPLE annunciator is located between the display and the numeric keypad and shows that the sample selected is too small to calculate an accurate piece weight. If a counting function is continued by pressing the **COUNT** key a second time without increasing the sample size, the INSUFFICIENT SAMPLE annunciator will flash. Note that increasing the sample size by the amount indicated prior to pressing the **COUNT** key a second time, will turn off the INSUFFICIENT SAMPLE annunciator and result in an accurate piece weight.

BATTERY LOW
The BATTERY LOW annunciator is used with the battery operation and will flash slowly to indicate that the internal battery requires charging. If continued use furthers drains the battery, the annunciator will stop flashing and stay on continuously. No change in operation will occur until just before the battery voltage drops to a level where operation is affected. At this level, the scale will automatically turn itself off. Note that when the scale is charging the battery, BATTERY LOW annunciator will flash until charging has been completed.

REMOTE SCALE
The REMOTE SCALE annunciator is illuminated when the optional remote scale platform has been selected for use. The remote scale is selected by pressing the **REMOTE SCALE** key.

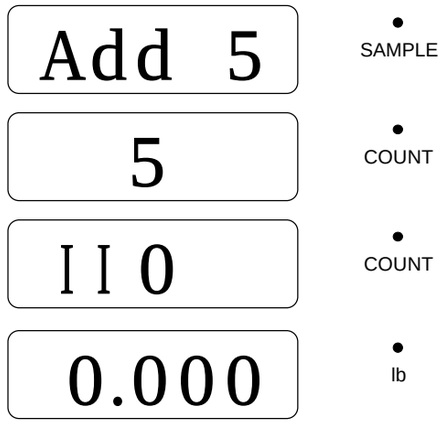
POWER ON

The Power Switch is located on the right side panel towards the front of the scale. Place the power switch in the on position. The scale will perform a brief lamp test. This test consists of illuminating all display segments and annunciator LED's for approximately three (3) seconds to allow the operator to make a visual verification that the display is operational. After completion of the lamp test, the scale will display the model number and software revision level, then the weight display will show zero weight, indicating the scale is ready for use.

OPERATION WITHOUT ID

Standard Sampling and Counting

1. With the scale on and warmed up (on for approximately 10 minutes) and in the Weight mode (Count display is blank) press the **SAMPLE** key.
2. Add the number of pieces indicated on the count display and press the **COUNT** or **ENTER** key.
3. Add the pieces to be counted and read the total count.
4. Press the **ENTER** key to complete the counting operation and return to the Weight mode.



Automatic Average Piece Weight Re-Computation

Immediately after a standard sampling operation, if a quantity of pieces, less than the original sample size is added to the scale platform, a new average piece weight will be calculated automatically. This new average piece weight is based on a larger sample than that used initially therefore improving the accuracy of the count.

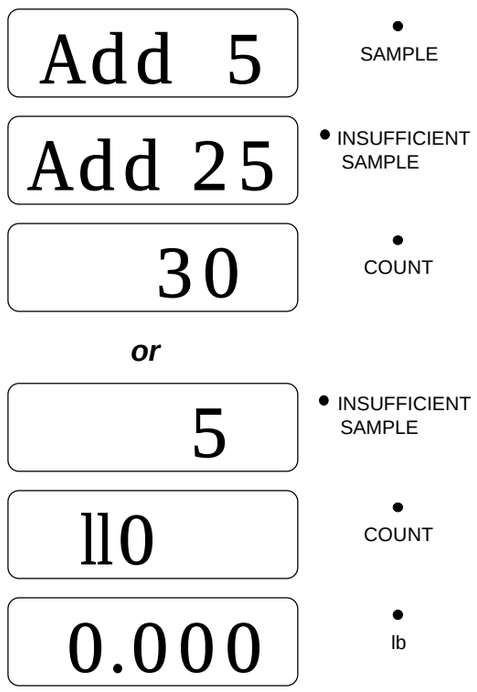
NOTE: The automatic recomputation of the average piece weight occurs only once for each new sample. Note also that the recalculation of the average piece weight will not take place if the quantity of pieces added is equal to or greater than the original sample quantity, nor will it take place if the display mode is changed before the pieces are added.

Counting With an Insufficient Sample

1. With the scale on and warmed up (on for approximately 10 minutes) and in the Weight mode (Count display is blank) press the **SAMPLE** key.
2. Add (or remove) the number of pieces indicated on the count display and press the **COUNT** or **ENTER** key.
3. If the sample weight is too small, the INSUFFICIENT SAMPLE annunciator will flash and the display will show the number of pieces to be added or removed.
4. Add or remove the number of pieces requested and press the **COUNT** or **ENTER** key ***or*** if Manual Count Override***** is enabled, press the **COUNT** key to force a count function. Note that if the pieces <u>are</u> <u>not</u> added or removed, the INSUFFICIENT SAMPLE annunciator will continue to flash to show the out-of-tolerance count.

   NOTE: If the Manual Count Override is not enabled and less than the displayed number of pieces are added or removed when requested to add additional pieces, the counting operation will terminate and the scale will return to the weight display.
5. Add or remove the pieces to be counted and read the count.
6. Press the **ENTER** key to complete the counting operation and return to the Weight mode.

**** Refer to Calibration and Setup section***



OPERATION WITHOUT ID, Cont.

Adjusting the Sample Quantity

1. Press the **SAMPLE** key. Press the **SAMPLE** key again to step to the next sample quantity.

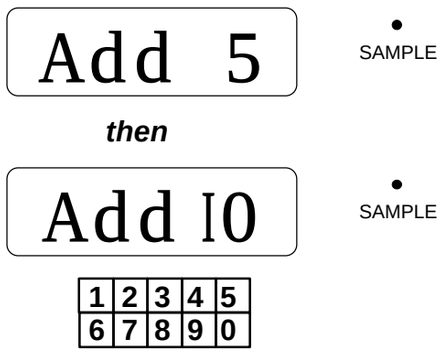
   Note, pressing the **SAMPLE** key repeatedly will cause sample quantity to step in the following sequence: 5, 10, 25, 50, 100, 5, 10, etc. ***OR***

3. Using the numeric keypad, key-in any desired sample value, then press the **COUNT** or **ENTER** key.

4. Add or remove indicated sample quantity and press the **COUNT** or **ENTER** key.

5. Add or remove the pieces to be counted and read total the count.

6. Press the **ENTER** key to complete the counting operation and return to the Weight mode.



Counting Out From a Container

1. Place the filled container on the scale platform and press the **SAMPLE** key.

2. Remove the number of pieces shown on the display and press the **COUNT** or **ENTER** key.

3. Press the **ZERO** key to zero the count, then remove the pieces from the container and read the total number removed.

4. Press the **ENTER** key to complete the counting operation and return to the Weight mode.

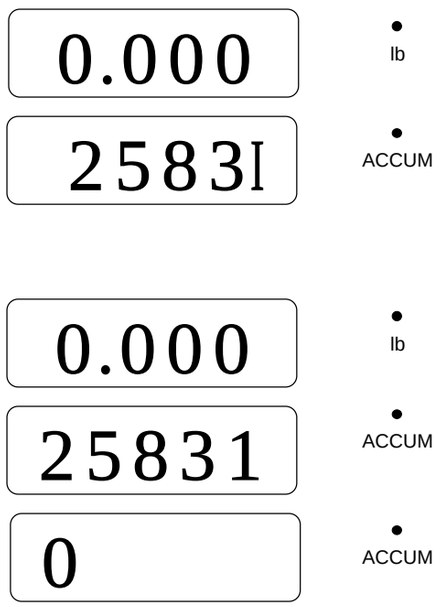
Accumulator

Displaying the Accumulator.

With scale in the Weight mode (Count display is blank) or in the Count mode (COUNT annunciator ON), press the **ACCUM** key (ACCUM annunicator illuminates) to display the contents of the accumulator. Press the **ACCUM** key again to return to the previous display or press the **SAMPLE** key to go to the sample display.

Clearing the Accumulator.

With scale in the Weight mode (Count display is blank) or in the Count mode (COUNT annunciator ON), press the **ACCUM** key (illuminating the ACCUM annunicator) to display the contents of the internal accumulator. Press the **ZERO** key to reset the accumulator to zero, then press the **ACCUM** key to return to the previous display.



OPERATION WITHOUT ID, Cont.

Accumulator, Cont.

Manually Adding to the Accumulator.

1. With the display showing the current count (COUNT annunciator ON), press the + key to add to (or the **-** key to subtract from) the displayed count of the accumulator.

2. The ACCUM annunciator will flash to show that the adjustment to the accumulator has taken place and will continue to flash until all pieces are removed from platform and the display returns to zero in preparation for the next counting operation.

3. Press the **ENTER** key to complete the counting operation and return to the Weight mode.

NOTE: Additional accumulator adjustments <u>can not</u> take place until the next counting operation has been completed.

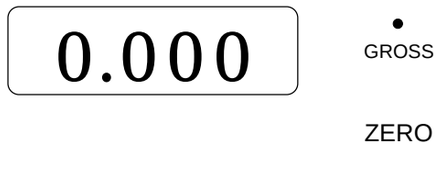
Weight Display

***Displaying Weight*.**

Press the **ENTER** key. The display will show the weight on the scale platform. The GROSS and lb or kg annunciator will illuminate to indicate which unit of weight has been selected and that the scale is in the Weight mode. Note, the count display will be blank.

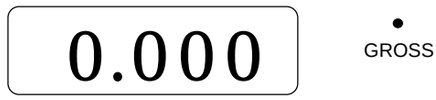
***Zero the Weight Display*.**

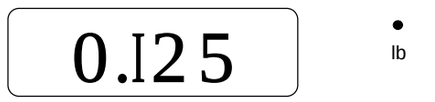
With the display in the Gross Weight mode (GROSS annunciator illuminated), press the **ZERO** key. The weight display will return to zero. The ZERO annunciator will illuminate, indicating a center-of-zero gross weight condition.



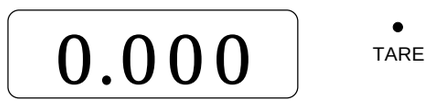
Push Button Tare

1. With the display in the Gross Weight mode (GROSS annunciator illuminated and the Count display blank), place the empty container on the scale platform.

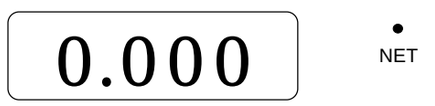




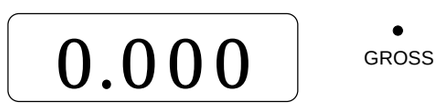
2. Press the **TARE** key, then the **ENTER** key. The weight display will change to zero and the NET annunciator illuminates, indicating net weight is being displayed. The empty container's weight has been entered as "tare weight".



3. To return to a zero tare, simply remove all material from the scale platform and press the **TARE** key, then the **ENTER** key, which will reset the the tare weight to zero.



4. Press the **NET/GROSS** key, to return to the Gross weight mode. Note, the selection of Gross weight mode is indicated by illumination of the GROSS annunciator.

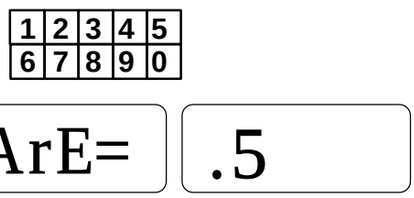


OPERATION WITHOUT ID, Cont.

Tare Weight Entry

1. With the scale in the Gross Weight mode (GROSS annunciator illuminated and the Count display blank), press the **TARE** key. The display will show zero or the previously entered tare (if any) and the TARE annunciator will turn on.

2. Using the numeric keypad, enter the desired tare (container) weight. Note: When entering tare values, a maximum of 4 digits can be entered and that the numbers advance from right to left in the display. The number of leading or trailing zeros required to obtain your desired tare entry is dependent upon the DIVISION VALUE selected in the calibration procedure.



   For example:

   Division Value: 0.001
   Desired Tare Value: 0.50lb
   Key Sequence: • 5

   Division Value: 0.01
   Desired Tare Value: 1.5lb
   Key Sequence: 1 • 5

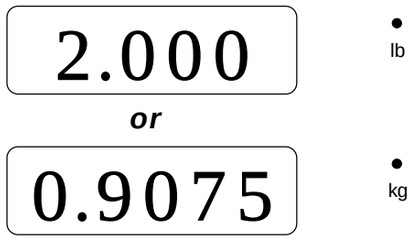
3. After the desired tare value has been entered, press the **ENTER** key. The display will show the Net weight (Gross minus tare) and the NET annunciator will illuminate.

4. Proceed with the counting or weighing operation.

Metric Conversion

To change weighing units, simply press the lb/kg key to toggle between pounds and kilograms.

Note that either the lb or kg annunciator will illuminate to indicate which weighing unit is selected.



OPERATION USING ID(S)

This section describes the various operating procedures of the Digital Counting scale using the ID mode. The ID (identification number) function may be thought as a catalog of stored values for up to 300 separately identifiable counting operations. Those values, stored under an assigned ID number, are: the TARE WEIGHT[1] (if used), the UNITS (Average Piece Weight) and the ACCUMULATED COUNT of a counting operation. They are accessed by entering the assigned ID number.

[1] A TARE WEIGHT value can be stored for both the Local and Remote scale, allowing the operator to use a small container for the sample and a pallet, tote or the shipping box for the final item count. If required, the stored Tare weight value for an ID can be added or updated before or during a Count or Sample operation.

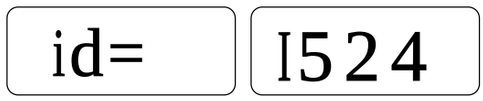
OPERATION USING ID(S), Cont.

Adding ID Numbers

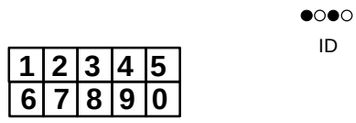
NOTE: If a stored tare weight is desired for an ID, it is recommended to select the scale (Local or Remote) and place the empty container to be used for the tare on the appropriate scale before pressing the ID key in step 1.

1. With the counting scale on, and in the Weight mode (the Count display is blank), press the **ID** key.

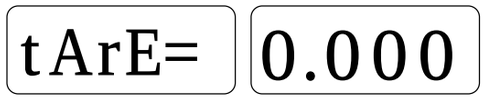
2. The ID annunciator will flash and the weight display will show id=. **NOTE:** If this is the first ID to be added, the count display will be blank, otherwise the current active ID number will be shown in the count display.



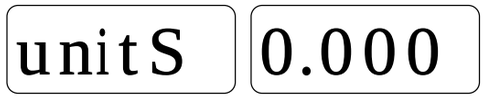
3. Key-in up to a 12 digit identification number and press the **ID** key. Note, that when entering an ID number, the digits start displaying on the left side of the count display and proceed to the right. When an ID greater than 6 digits is used, the digits will automatically scroll off the left side of the count display to show the additional digits on the right as they are entered.



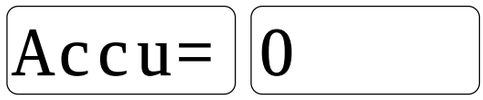
4. The display will change to TARE= and show the current tare weight (the weight of the empty container). Press the **ENTER** key if the current scale weight is to be used for the tare ***or*** using the numeric keypad, key-in the tare and press the **ENTER** key. Note, entering a 0 (zero) for tare and pressing the **ENTER** key will select no tare.



5. The display will change to UNITS. If the Average Piece Weight is known, use the numeric keypad to key-in the value and press the **ENTER** key *OR* if the average piece weight isn't known press the **ENTER** key.



6. The display will change to ACCU= and show the current value of the accumulator associated with the ID number. If the displayed value is to remain unchanged, press the **ENTER** key *OR* using the numeric keypad, key-in the desired accumulator value and press the **ENTER** key.



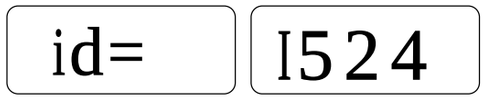
7. The ID annunciator will stop flashing and stay on, indicating the ID has been stored and is now the current active ID. Counts will accumulate from this point.

8. Repeat the above steps for all ID numbers to be added. When completed, proceed to the "Standard Sampling and Counting" section of this manual.

Deleting ID Numbers

1. With the counting scale on, and in the Weight mode (the Count display is blank), press the **ID** key.

2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.

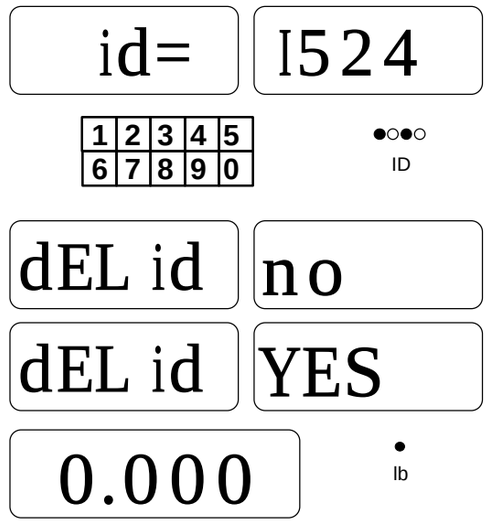


NOTE: If 7 to 12 digit ID numbers have been used, press the "-" (minus) key to scroll the number displayed to the right and the "+" (plus) key to scroll the number displayed to the left to view the complete ID number.

OPERATION USING ID(S), Cont.

Deleting ID Numbers, Cont.

3. If the current ID is to be deleted, key-in the displayed number and press the **ID** key *OR* if another ID is to be deleted, key-in that ID number and press the **ID** key.
4. The weight display will change to **delid** and the count display will change to **no**.
5. Press the **YES/1** key to toggle the count display to **yes**, then press the **ENTER** key to delete the ID.
6. The ID number entered and its associated accumulator will be deleted. The ID annunciator will stop flashing and remain off and the scale will return to the Weight mode.

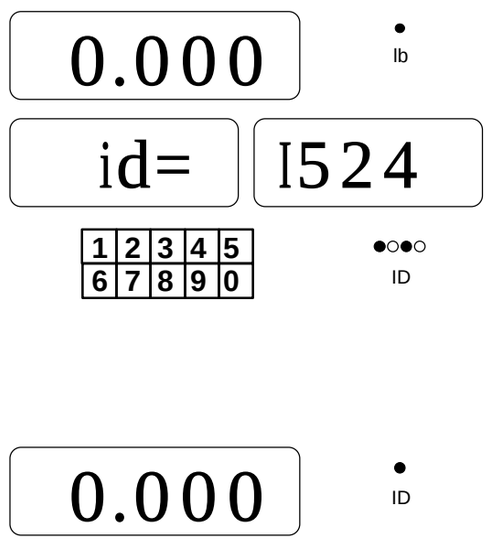


Selecting The ID Number

1. With the counting scale on, and in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show **id**=, and the count display will show the current active ID.
3. If the current ID is to be used, press the **ENTER** key ***OR*** if another ID is to be used, using the numeric keypad, key-in the desired identification number and press the **ENTER** key.

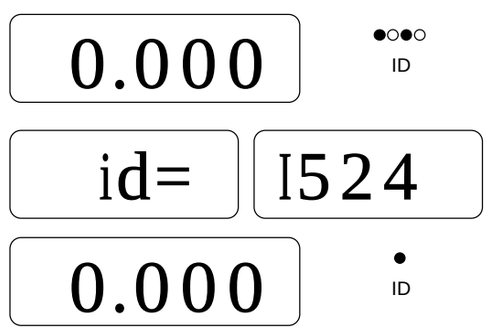
NOTE: If the ID does not exist, the scale will beep and return to the weight mode.

5. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.



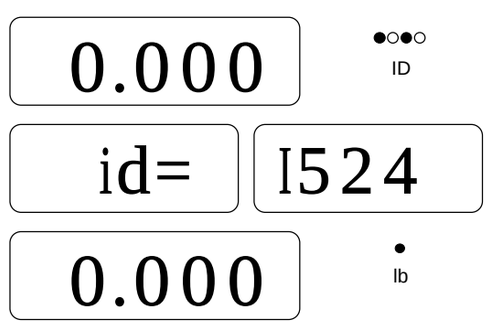
Verifying Active (Current) ID Number

1. With the counting scale on, and in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show **id**=, and the count display will show the current active ID.
3. Press the **ENTER** key. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.



Turning Off The Active (Current) ID Number

1. With the counting scale on, and in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show **id**=, and the count display will show the current active ID.
3. Press the **CE** key, then the **ENTER** key.
4. The ID annunciator will stop flashing and remain off and the scale will return to the Weight mode.



OPERATION USING ID(S), Cont.

Operation With Stored Tare Weight Values

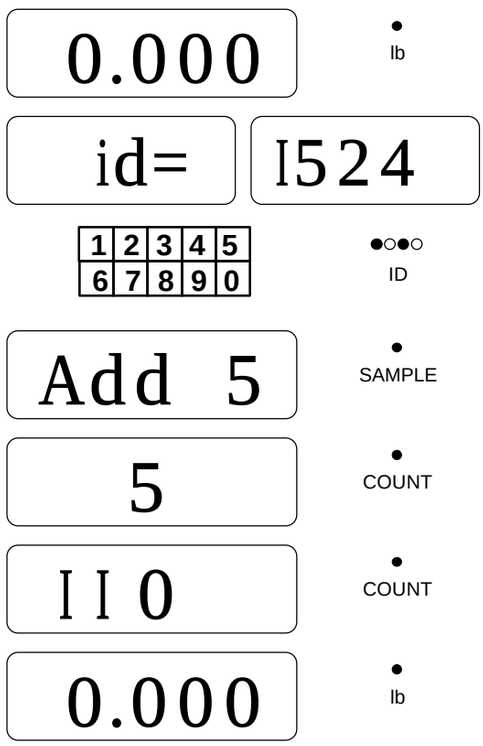
The Digital Counting Scale can store separate Tare weight values for each ID for both the Local and Remote scale. This allows the operator to use a smalll container for sampling and a larger container such as a pallet, tote or the shipping box for the final item count.

The TARE WEIGHT value can be programmed (stored) when first adding an ID or it can be added to the ID before or during a Count or Sample operation. Note, that if an ID has a stored Tare weight value and the Tare weight is updated during a Count or Sample operation, the updated value will become the stored Tare Weight value.

NOTE: *When an ID is selected that has a stored Tare weight, the scale will automatically switch to the Net mode operation when the* ***SAMPLE*** *key or the* ***COUNT*** *key is pressed and display a negative weight (the Tare) if the container is not on the scale.*

Standard Sampling and Counting

1. With the counting scale on, unloaded, warmed up (on for approximately 10 minutes), and in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.
3. If the current ID is to be used, press the **ENTER** key ***OR*** if another ID is to be used, using the numeric keypad, key-in the desired identification number and press the **ENTER** key.
4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.
5. Press the **SAMPLE** key.
6. Add or remove the number of pieces indicated on the display and press the **COUNT** or **ENTER** key.
7. Add the pieces to be counted and read the total count.
8. Press the **ENTER** key to complete the counting operation and return to the Weight mode.



Automatic Average Piece Weight Re-Computation

Immediately after a standard sampling operation, if a quantity of pieces less than the original sample size is added to the scale platform, a new average piece weight will be calculated automatically. This new average piece weight is based on a larger sample than that used initially therefore improving the accuracy of the count.

NOTE: The automatic recomputation of the average piece weight occurs only once for each new sample. Note also that the recalculation of the average piece weight will not take place if the quantity of pieces added is equal to or greater than the original sample quantity, neither will it take place if the display mode is changed before the pieces are added.

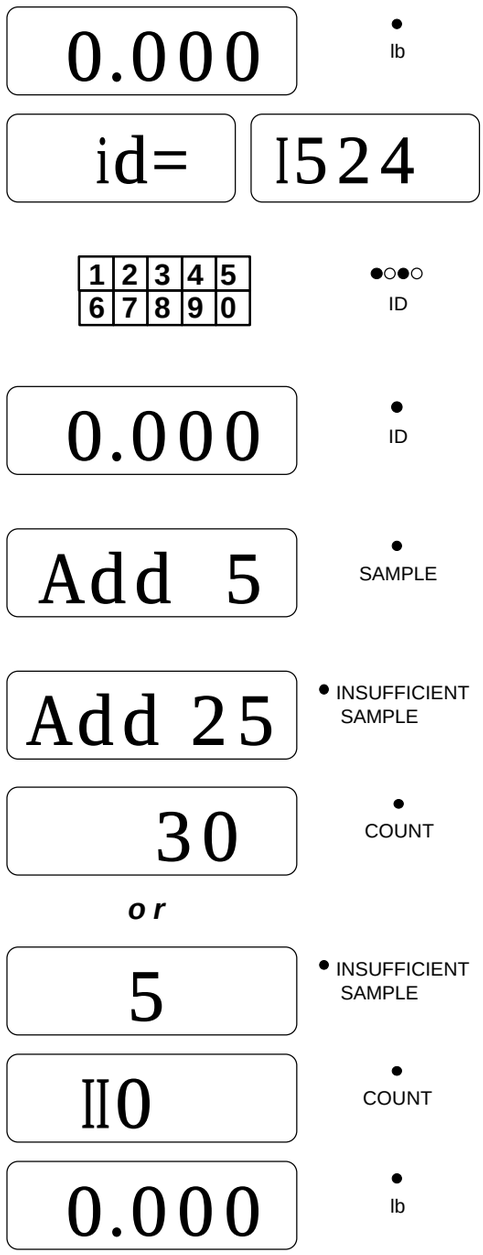
OPERATION USING ID(S), Cont.

Counting With an Insufficient Sample

1. With the counting scale on, unloaded, warmed up (on for approximately 10 minutes), and in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash and the weight display will show id=, and the count display will show active ID.
3. If the current ID is to be used, press the **ENTER** key ***OR*** if another ID is to be used, using the numeric keypad, key-in the desired identification number and press the **ENTER** key.
4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.
5. Press the **SAMPLE** key, then add the number of pieces indicated on the display and press the **COUNT** or **ENTER** key.
6. If the sample weight is too small, the INSUFFICIENT SAMPLE annunciator will flash and the display will show the number of additional pieces to be added.
7. Add or remove the pieces requested, then press the **COUNT** or **ENTER** key ***or*** if Manual Count Override***** is enabled, press the **COUNT** or **ENTER** key to force a count function. If the pieces <u>are</u> <u>not</u> added or removed, the INSUFFICIENT SAMPLE annunciator will continue to flash to show the out-of-tolerance count.

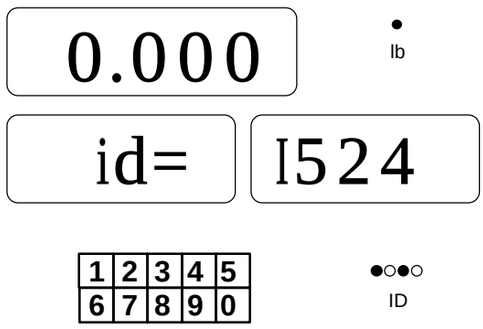
   NOTE: If the Manual Count Override is not enabled and less than the displayed number of pieces are added or removed when requested to add additional pieces, the counting operation will terminate and the scale will return to the Weight mode.
8. Add or remove the pieces to be counted and read the count.
9. Press the **ENTER** key to complete the counting operation and return to the Weight mode.

   **** Refer to Calibration and Setup section***



Adjusting the Sample Quantity

1. With the scale in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.
3. If the current ID is to be used, press the **ENTER** key ***OR*** if another ID is to be used, using the numeric keypad, key-in the desired identification number and press the **ENTER** key.
4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.



OPERATION USING ID(S), Cont.

Adjusting the Sample Quantity, Cont.

5. Press the **SAMPLE** key. Press the **SAMPLE** key again to step to the next sample quantity. Note that pressing the **SAMPLE** key repeatedly will cause the sample quantity to step in the following sequence:

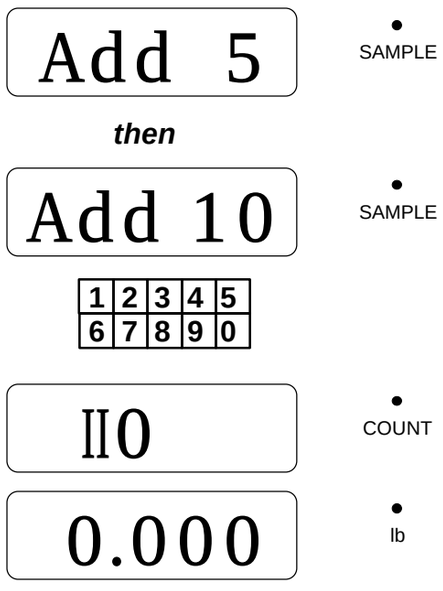
   5, 10, 25, 50, 100, 5, 10, etc. ***OR***

6. Using the numeric keypad, key-in any desired sample value, then press the **ENTER** key.

7. Add or remove the indicated sample quantity and press the **COUNT** or **ENTER** key.

8 Add or remove the pieces to be counted and read the total count.

9. Press the **ENTER** key to complete the counting operation and return to the Weight mode.



Counting Out From a Container

1. With the scale in the Weight mode (the Count display is blank), press the **ID** key.

2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.

3. If the current ID is to be used, press the **ENTER** key ***OR*** if another ID is to be used, using the numeric keypad, key-in the desired identification number and press the **ENTER** key.

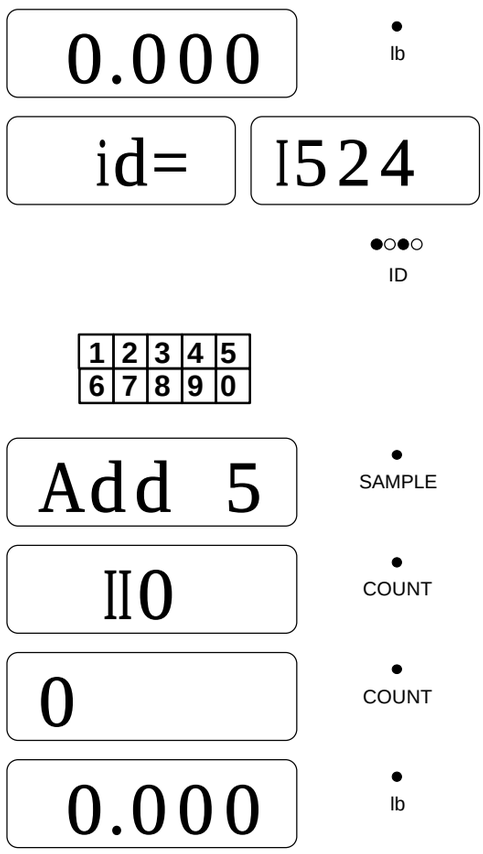
4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.

5. Place the filled container on the scale platform and press the **SAMPLE** key.

6. Remove the number of pieces shown on the display and press the **COUNT** or **ENTER** key.

7. Press the **ZERO** key to zero the count, then remove the pieces from the container and read the total number removed.

8. Press the **ENTER** key to complete the counting operation and return to the Weight mode.

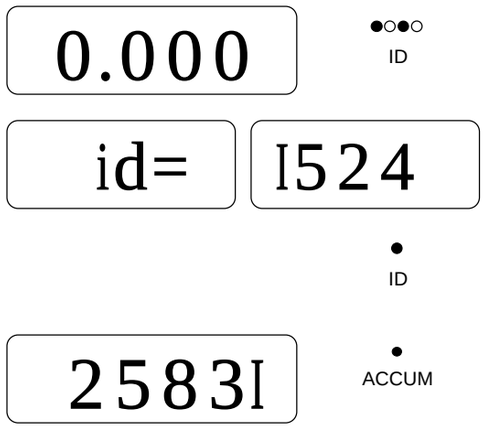


OPERATION USING ID(S), Cont.

Accumulators

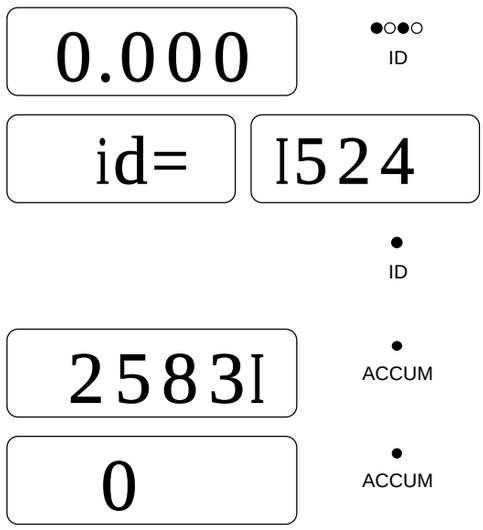
Displaying the Accumulator for the Active ID.

1. With scale in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID. Press the **ENTER** key.
3. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.
4. Press the **ACCUM** key to display the contents of the accumulator. The ACCUM annunicator will illuminate.
5. Press the **ACCUM** key to return to the Weight mode.



Clearing the Accumulator for the Active ID.

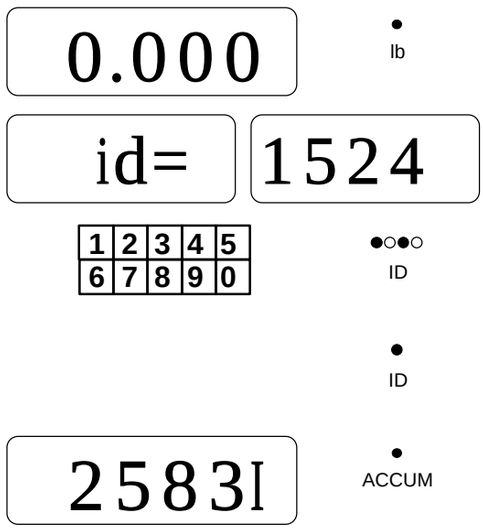
1. With scale in Weight mode (the Count display is blank), press the ID key.
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID. Press the **ENTER** key.
3. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.
4. Press the **ACCUM** key (illuminating the ACCUM annunicator) to display the contents of the accumulator for the ID entered.
5. Press the **ZERO** key to reset the accumulator to zero.
6. Press the **ACCUM** key to return to the Weight mode.



Displaying the Accumulator for a Non-Active ID.

NOTE: *The following steps change the Non-Actve ID to the Active ID to Display the Accumulator.*

1. With scale in the Weight mode (the Count display is blank), press the **ID** key.
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.
3. Using the numeric keypad, key-in the desired identification number and press the **ID** key.
4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.
5. Press the **ACCUM** key to display the contents of the accumulator. The ACCUM annunicator will illuminate.
6. Press the **ACCUM** key to return to the Weight mode.



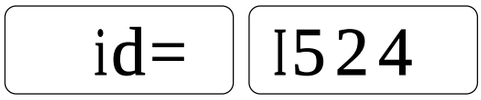
OPERATION USING ID(S), Cont.

Clearing the Accumulator for a Non-Active ID.

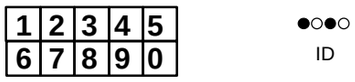
NOTE: *The following steps change the Non-Actve ID to the Active ID to Clear the Accumulator.*

1. With scale in Weight mode (the Count display is blank), press the ID key.

2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.



3. Using the numeric keypad, key-in the desired identification number and press the **ENTER** key.



4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.

5. Press the **ACCUM** key to display the contents of the accumulator. The ACCUM annunicator will illuminate.

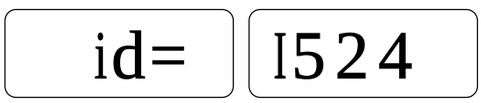
6. Press the **ZERO** key to reset the accumulator to zero.

7. Press the **ACCUM** key to return to the Weight mode. manual accumulator Adjustment

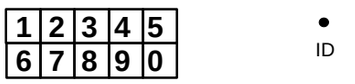
***Adding to the Accumulator for the Active ID*.**

1. With scale in the Weight mode (the count display is blank), press the **ID** key.

2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID. Press the **ENTER** key.

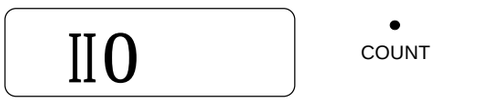


3. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.



4. Press the **SAMPLE** key, then add or remove the number of pieces indicated on the display.

5. Press the **COUNT** or **ENTER** key, add or remove the pieces to be counted and read the total count.



6. With the display showing the current count (COUNT annunciator ON) press the + key to add to (or the **-** key to subtract from) the displayed count of the accumulator. The ACCUM annunciator will flash to show that the adjustment to the accumulator has taken place and will continue to flash until all pieces are removed from platform and the display returns to zero in preparation for the next counting operation.

7. Press the **ENTER** key to return to the Weight mode.

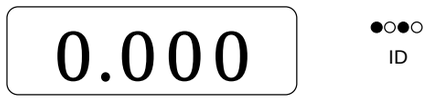
NOTE: Additional accumulator adjustments <u>can</u> <u>not</u> take place until the next counting operation has been completed.

OPERATION USING ID(S), Cont.

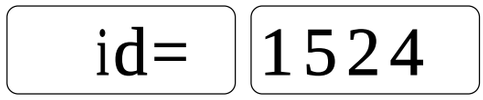
Adding to the Accumulator for a Non-Active ID.

NOTE: *The following steps change the Non-Actve ID to the Active ID to ADD to the Accumulator.*

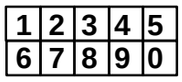
1. With scale in the Weight mode (the Count display is blank), press the **ID** key.



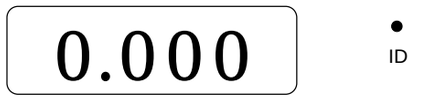
2. The ID annunciator will flash, the weight display will show id=, and the count display will show the current active ID.



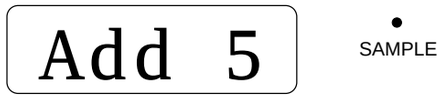
3. Using the numeric keypad, key-in the desired identification number and press the **ENTER** key.



4. The ID annunciator will stop flashing and stay on, and the scale will return to the Weight mode.



5. Press the **SAMPLE** key, then add or remove the number of pieces indicated on the display.



6. Press the **COUNT** or **ENTER** key, add or remove the pieces to be counted and read the total count.

7. With the display showing the current count (COUNT annunciator ON) press the + key to add to (or the **-** key to subtract from) the displayed count of the accumulator. The ACCUM annunciator will flash to show that the adjustment to the accumulator has taken place and will continue to flash until all pieces are removed from platform and the display returns to zero in preparation for the next counting operation.

8. Press the **ENTER** key to return to the Weight mode.

NOTE: Additional accumulator adjustments <u>can</u> <u>not</u> take place until the next counting operation has been completed.

CALIBRATION and SETUP

This scale was calibrated at the factory and should not require adjustment. In the event that the scale should need recalibration, the following describes the Calibration of the Digital Counting Scale. A qualified technician should perform this function to maintain the instrument's high degree of accuracy.

Before beginning calibration, the following equipment is required:

Calibrated test weights (Full capacity for all models*, e.g. 5 lbs for 5 lb, . . . 100 lbs for 100 lb)*
Small Flat Blade screwdriver *(to remove calibration sealing screw)*

If sealing wires require breaking for purposes of calibration, proper procedures under National Institue of Standards and Technology Handbook 44 must be adhered to.

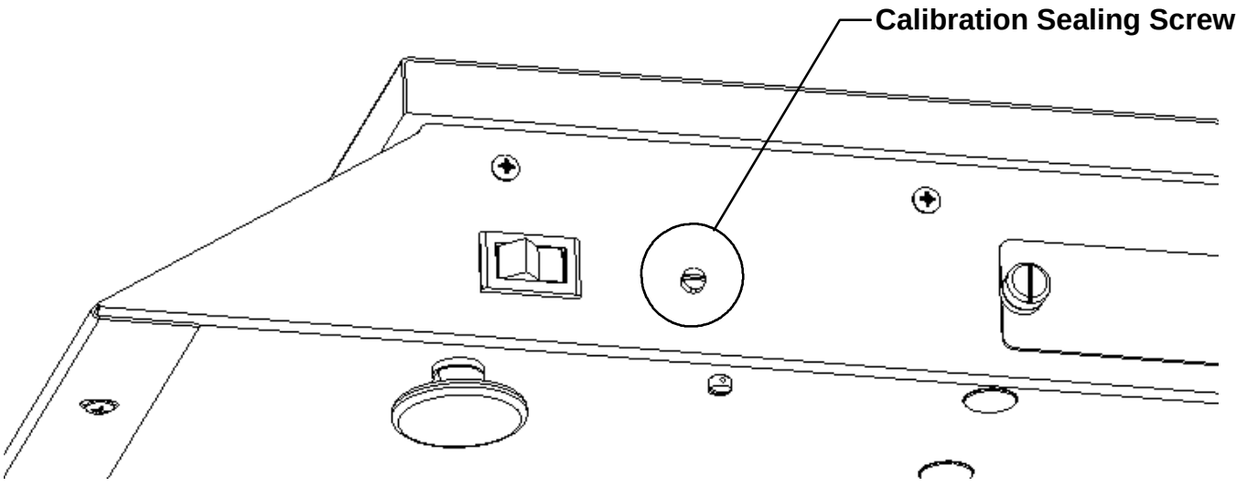


Figure No. 7

CALIBRATION PROCEDURE - LOCAL SCALE

1. With the scale power off, remove the calibration sealing screw on the right side panel, see Figure No.7.
2. With the screw removed, place the power switch in the ON position. The scale will perform a brief lamp test. This test consists of illuminating all display segments and annunciator LED's for approximately three (3) seconds to allow the operator to make a visual verification that the display is operational. After completion of the lamp test, the scale will display the model number and software revision level, then the weight display will change to SCALE.
3. Select the LOCAL scale by pressing the **LOCAL SCALE** key.
4. The weight display will change to LOAD and the count display will change to **xxxxxx**. Note that **xxxxxx** is the capacity of the scale and the load required to calibrate the scale. This will vary depending on the capacity of the scale and the units of measurement selected.
5. Press the **lb/kg** key to select the units of measurement for calibration. Note that the "lb" or "kg" annunciator will be illuminated to indicate which unit of measurement has been selected and the count display will show the corresponding load.
6. Press the **+** key to cycle up through or the **-** key to cycle down through the folowing capacity values: 5, 10, 20, 50, 100 for pounds (lb) or 2, 5, 10, 20, 40 for kilograms (kg).

CAUTION: The capacity value selected must match the load cell installed in the scale. Proper operation of the scale may be inhibited and the warranty *will be voided* if the required load cell is not used. Refer to the Load Cell Table in the Parts Identification section of this manual for the required load cell for the capacity selected.

7. Place the required calibrated test weight on the scale platform, wait about 5 seconds for the scale to stabilize, then press the **ENTER** key to start calibration.

CALIBRATION and SETUP, Cont.

CALIBRATION PROCEDURE - LOCAL SCALE, CONT.

8. The display will start to fill with dashes from the left of the weight display and proceed to the right of the count display. When finished, the unit will display UNLOAD on the count display.
9. Remove the weight from the scale, wait about 5 seconds for the scale to stabilize, then press the **ENTER** key to finish calibration.
10. The display will start to fill with dashes from the left of the weight display and proceed to the right of the count display. When finished, the display will change to calib doNE.
11. If operational setup is required (or a remote scale is to be used) proceed to the Operational Setup procedure.
12. If only calibration was required and the LOCAL (integral) scale is the only scale, turn the scale off and replace the calibration sealing screw on the right side panel of the scale. Place the power switch in the ON position. The scale is now ready for use.

OPERATIONAL SETUP

The Operational Setup of the Digital Counting Scale is accomplished entirely by using the scale keypad and can easily be performed using one of the following methods:

Calibration Method *(sealing screw REMOVED)*

At the completion of the Calibration procedure (Local or Remote scale), the display will change to calib doNE. Press the **ENTER** key. The weight display will show SCALE. Press the **ENTER** key again. The weight display will change to scal2, the first setup prompt. The scale is now ready to begin setup.

Operation Method *(sealing screw INSTALLED)*

With the scale power off, apply power by placing the power switch in the ON position. While the weight display is showing 2240 or 2241 (the model number) and the count display is showing **xx r?.?** (the capacity and the software revision level), press the **ENTER** key. The weight display will change to the first setup prompt, scal2. The scale is now ready to begin setup.

During the setup process it will be necessary to enter operational parameters using the counting scale's keypad. Pressing the **ENTER** *key will cause the data entered or displayed to be retained and the setup process will advance to the next prompt.* ***NOTE:*** *If an incorrect entry is made, pressing the* **CE** *key will clear the display and allow re-entering the correct data.*

ZERO TRACKING

The display will show 0trac, the prompt to enable or disable the automatic Zero Tracking feature and display the current setting. This feature, when enabled will automatically maintain the center-of-zero within one division. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

FOUR PERCENT ZERO RANGE LIMIT

The display will show 4 Pct, the prompt to select whether a 4% limit be placed on the push button zero and display the current setting. If enabled, the push button zero is limited to 4% of the scale capacity. If disabled, the push button zero will operate up to the full capacity of the scale. Press the **YES/1** key to enable or **NO/0** to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

UNITS OF MEASUREMENT

The display will show units, the prompt to select the Units of Measurement and display the current setting. To change the setting, use the keypad to select a new value (1 to 3) for the units, then press the **ENTER** key to save the setting and proceed to the next prompt.

1 = Pounds (lb) only 2 = Kilograms (kg) only 3 = Pounds/Kilograms (lb/kg)

CALIBRATION and SETUP, Cont.

OPERATIONAL SETUP, Cont.

SCALE 2 (Optional remote scale)

The display will show **scal2**, the prompt to enable or disable the optional remote scale and display the current setting. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt. **NOTE:** The REMOTE scale cannot be used until it has been calibrated (refer to the Calibration Procedure - Remote Scale section).

AUTO LOCAL-TO-REMOTE SWITCH

The display will show **a sut**, the prompt to enable or disable the Auto Switching from the sample scale to the bulk scale for counting operations and display the current setting. This feature, when enabled will use the integral (local) scale for the sample then automatically switch to the bulk (remote) scale for counting with the acceptance of the sample. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

AUTO RECALL OF LAST AVERAGE PIECE WEIGHT

The display will show **a RcL**, the prompt to enable or disable the Auto Recall of the Average Piece Weight on power up and display the current setting. This feature, when enabled will automatically recall the last average piece weight after turning the scale on. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

AUTO ACCUMULATION

The display will show **a acc** , the prompt to enable or disable Auto Accumulation of counts and display the current setting. This feature, when enabled will automatically accumulate the counts after a counting operation. If disabled, the operator must press the **ACCUM** key to accunulated the counts. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

BEEPER

The display will show **beepr**, the prompt to enable or disable the internal beeper and display the current setting. This feature, when enabled will sound the beeper each time a key is pressed and when an error occurs. If disabled, the beeper will only sound when an error occurs. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

STORE ID

The display will show **str id**, the prompt to enable or disable the Identification Number (ID) feature and display the current setting. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

12 HOUR CLOCK

The display will show **12 hr**, the prompt to enable or disable the 12 Hour clock feature and display the current setting. This feature, when enabled will select the 12 hour time format for printing the time on tickets. Note that an "a" for am or an "p" for pm will not print on the ticket. If disabled, the time will be in the 24 hour (military) time format. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

NOTE: The 12 Hour Clock feature only affects how the time is printed on tickets. The time is set using the 24 hour (military) format whether the 12 Hour clock feature is enable or disabled.

CALIBRATION and SETUP, Cont.

OPERATIONAL SETUP, Cont.

EUROPEAN DATE

The display will show **europ**, the prompt to enable or disable the European Date format and display the current setting. This feature, when enabled will print the date on tickets in the European (International) format of day/month/year (DD/MM/YYYY). If disabled, the date on the tickets will print in the month/day/year (MM/DD/YYYY) format. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

MANUAL COUNT OVERRIDE

The display will show **n cnt**, the prompt to enable or disable the Manual Count Override and display the current setting. This feature, when enabled will allow a counting operation to continue while the Insufficient Sample annunciator is illuminated. If disabled, the counting operation can not be contiuned until additonal sample pieces are placed on the scale platform. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

PRINTER OUTPUT

The display will show **prntr**, the prompt to enable or disable the Printer output and display the current setting. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

If printer output is enabled, additional setup prompts (TICKET FORMAT and PRINT BARCODE) will be displayed. If printer output is disabled, the setup procedure will advance to the UNITS OF MEASUREMENT prompt.

TICKET FORMAT

If Printer Output was enabled, then the display will show **ticfr**, the prompt to select the format for ticket printing and display the current setting. The available formats are:

1 = Vertical Printing (The printed line is parallel with the print head)

2 = Horizontal Printing (The printed line is at right angle to the print head)

3 = Generic Text Printer (ASCII text ouptut with CR/LF control codes only)

To change the setting, on the numeric keypad press the **YES/1** key to select the vertical format, the **2** key to select the horizontal format or the **3** key to select the Generic Text Printer. Press the **ENTER** key to save the setting and proceed to the next prompt.

NOTE: The maximum number of digits in an ID number is dependent upon the Ticket Format selected. When using format 1, the maximum is 10 digits. When using format 2, the maximum length of an ID number is 12 digits.

PRINT BARCODE

If Printer Output was enabled, and Ticket Format 1 or 2 was chosen, then the display will show **barco**, the prompt to enable or disable printing barcode on the ticket and display the current setting. To change the setting, press the **YES/1** key to enable or the **NO/0** key to disable, then press the **ENTER** key to save the setting and proceed to the next prompt.

NOTE: Barcode printing is available only when Ticket Format 1 or 2 have been selected. Ticket Format 3 (Generic Text Printer) does not support bardocde.

CALIBRATION and SETUP, Cont.

OPERATIONAL SETUP, Cont.

COUNT ACCURACY

The display will show **C acr**, the prompt to select the Count Accuracy percentage and display the current setting. This refers to the set-point for the INSUFFICIENT SAMPLE annunciator. There are two pre-selected values, .1 and .5 percent. If the weight of a sample is less than .1% or .5% of the gross capacity of the scale, (.1 lb or .5 lb for a 100 lb capacity scale) sample accuracy is not guaranteed. The Insufficient Sample annunciator will illuminate, and the scale will calculate the minimum additional number of pieces required to raise the sample weight to the .1% or .5% preset and display the quantity.

To change the setting, use the numeric keypad to key-in a new value (1 or 5, *with no decimal*) for the count accuracy, then press the **ENTER** key to save the setting and proceed to the next prompt.

AUTO SHUTOFF

The display will show **a off**, the prompt to enable or disable the Auto Shutoff feature and display the current setting. This feature, when enabled will automatically turn the scale off after a select period of inactivity to prolong battery life. To turn the instrument back on you must toggle the power switch from the ON position to the OFF position and then back to the ON position.

To change the setting, using the numeric keypad, key-in the number of minutes (1 through 9, *time approximate*) of inactivity before turning the scale off, then press the **ENTER** key to save the setting and proceed to the next prompt. Note, that entering a zero (0) disables the Automatic Shutoff feature.

DISPLAY INTENSITY

The display will show **brite**, the prompt to adjust the display intensity and display the current setting. This feature allows the display intensity (brightness) to be adjusted to compensate for lighting conditions at the scale's location. Also, when operating from the battery, lowering the display intensity decreases the load on the battery, increasing operating time before recharging is required. To change the setting, use the numeric keypad to key-in a new value (1 to 3) for the display intensity, then press the **ENTER** key to save the setting and proceed to the next prompt.

1 = DIM 2 = NORMAL (default setting) 3 = HIGH

CLEAR MEMORY

The display will show **clr r**, the prompt to enable the Clear Memory operation and display the current (default) setting NO. This operation, when enabled will clear all ID's and associated accumulators from the scale memory. The Clear Memory operation is performed after turning the scale OFF and back ON with YES selected for the setup prompt. After clearing memory, the setup prompt will automatically return to NO, the default setting.

NOTE: The Clear Memory operation <u>does</u> <u>not</u> clear the Calibration or Setup information from the scale. The Calibration and Setup data are stored in non-volatile memory (NOVRAM) and can only be changed using their respective procedures.

To enable the Clear Memory operation, press the **YES/1** key, then press the **ENTER** key to save the setting and proceed to the next prompt.

CALIBRATION and SETUP, Cont.

OPERATIONAL SETUP, Cont.

PRINT SETUP

The display will show **prset**, the prompt to enable printing a record of the scale's current Operational Setup and display the current (default) setting NO. This operation, when enabled and with a printer connected to the printer port will print a summary of the Operational Setup.

To print the summary, press the **YES/1** key, then press he **ENTER** key. The summary will begin to print immediately after pressing the **ENTER** key. Upon completion of printing, the setup prompt will automatically return to NO, the default setting and then proceed to the next prompt.

Please note, that in order to print the Operational Setup, a serial dot matrix printer and 8½" x 11" paper must be used ***NOT*** the thermal label printer used for printing labels. The serial dot matrix printer must have a RS232 serial interface configured for 9600 baud, 8 data bits, No parity and 1 stop bit (9600,8,N,1).

SETUP DONE

If Setup was performed using the Calibration Method *(sealing screw REMOVED)*, the display will change to **setup doNE** when completed. Place the power switch in the OFF position and replace the calibration sealing screw on the right side panel of the scale. Return the power switch to the ON position. The scale will power up to the Weight Display mode and is now ready for use.

When using the Operation Method *(sealing screw INSTALLED)*, at the completion of Setup, the scale will return to Weight Display mode and is ready for use.

CALIBRATION PROCEDURE - REMOTE SCALE

If sealing wires require breaking for purposes of calibration, proper procedures under National Institue of Standards and Technology Handbook 44 must be adhered to.

1. With the scale power off, remove the calibration sealing screw on the right side panel, see Figure No.7.
2. With the screw removed, place the power switch in the ON position. The scale will perform a brief lamp test. This test consists of illuminating all display segments and annunciator LED's for approximately three (3) seconds to allow the operator to make a visual verification that the display is operational. After completion of the lamp test, the scale will display the model number and software revision level, then the weight display will change to **SCALE**.
3. Select the REMOTE scale by pressing the **REMOTE SCALE** key.

NOTE: The REMOTE scale cannot be selected until it has first been enabled in Setup (refer to Operational Setup section).

4. The weight display will change to **cap** = (capacity).
5. Key-in the scale capacity (max 6 digits) and press the **ENTER** key.
6. The display will change to **int** = (interval or division).
7. Key-in the interval (division value) (max 4 digits) then press the **ENTER** key. The following values are allowable for the interval: 1, 2, 5, .1, .2, .5, .01, .02, .001, .002, .005, .0001, .0002 and .0005.

CALIBRATION and SETUP, Cont.

CALIBRATION PROCEDURE - REMOTE SCALE, Cont.

NOTE: When selecting the interval, the total number of divisions can not exceed 10,000 divisions. To calculate the total number of divisions, divide the capacity of the scale by the interval. For example:

10 lb (*scale capacity*) ÷ .001 (*interval*) = 10,000 (*divisions*).

8. The weight display will change to **units** (units), the prompt to select the Units of Measurement. Press the **lb/kg** key to select the units of measurement for calibration. Note that the "lb" or "kg" annunciator will be illuminated to indicate which unit of measurement has been selected and the count display will show the corresponding load.
9. The weight display will change to **LOAD**. Place a known calibrated test weight on the Remote scale platform, key-in the weight (max 6 digits), wait about 5 seconds for the scale to stabilize, then press the **ENTER** key to start calibration.
10. The display will start to fill with dashes from the left of the weight display and proceed to the right of the count display. When finished, the unit will display **UNLOAD** on the count display
11. Remove the weight from the scale, wait about 5 seconds for the scale to stabilize, then press the **ENTER** key to finish calibration.
12. The display will start to fill with dashes from the left of the weight display and proceed to the right of the count display. When finished, the display will change to **calib doNE**.
13. Turn the scale off, then replace the calibration sealing screw on the right side panel of the scale.
14. The scale is now ready for use ***OR*** the Operational Setup procedure (if required).

CALIBRATION SEAL INSTALLATION

If your Digital Counting Scale is used in a commercial application it must be tested and sealed by your local weights and measurement official. The scale is designed to accept a lead and wire security seal to prevent unauthorized access to the calibration adjustments. Refer to the Figure No. 8 for details on the installation of the seal.

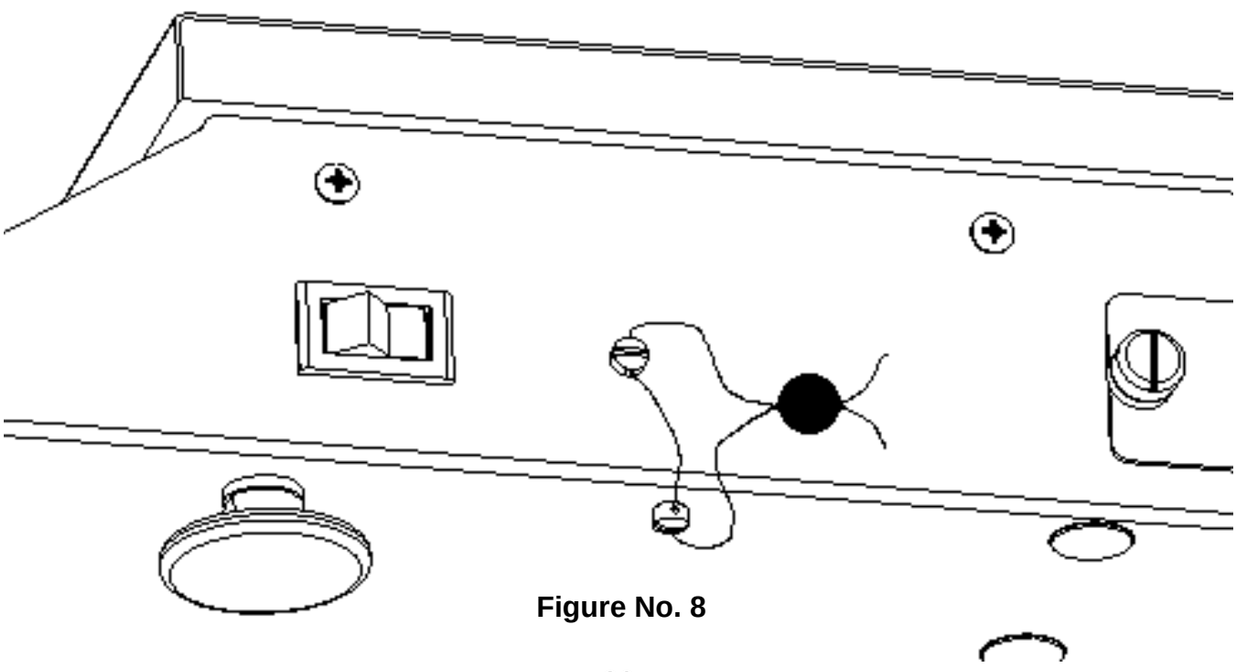


Figure No. 8

SAMPLING AND COUNT ACCURACY

This section describes certain conditions that determine the accuracy of a parts counting operation and procedures you can follow to assure optimum performance of your Digital Counting Scale. Accurate counts depend upon the following conditions:

- Functional accuracy of the scale.
- Individual part weight variance.
- Determination of parts sampling quantities.
- Variance of container weights in tare operations.

ACCURACY OF THE SCALE (Refer to Figure No. 9)

TYPICAL CONDITION ACCURACY - on a stable surface, applied load less than 70% of scale capacity, with no air currents or vibrations present, using parts with weight variance less than 1%; the total weight of all parts in the sample must be:

0.2% (1/500) of scale capacity for 99.5% accuracy
0.1% (1/1000) of scale capacity for 99% accuracy.

WORST CASE ACCURACY - on an unstable surface, applied load near 100% of scale capacity, with air currents or vibrations present, using parts with weight variance less than 1%; the total weight of all parts in the sample must be:

0.5% (1/200) of scale capacity for 99.5% accuracy

Counting accuracy will be greater than 99.5% when the total weight of all parts in the sample exceeds 0.5% of scale capacity.

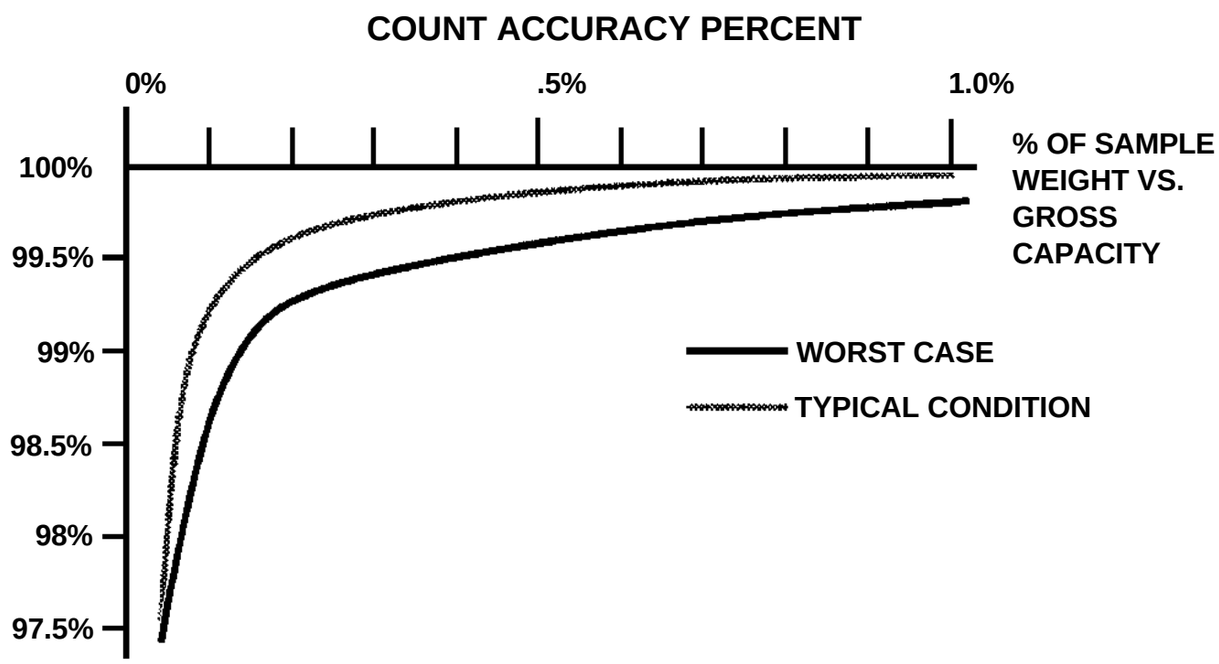


Figure No. 9

SAMPLING AND COUNT ACCURACY, Cont.

INDIVIDUAL PART WEIGHT VARIANCE

For a given sample quantity, as the total weight of all parts in the sample increases, the average per-piece weight of the sample used becomes representative of the average per-piece weight of the group of parts to be counted. The errors caused by part weight variance are reduced with larger sample quantities. With knowledge of the typical percentage of variartion in per-part weight of items to be counted, refer to the graph in Figure No. 10 to determine the sample quantity needed to obtain a desired percentage of counting accuracy.

NOTES:

- As your need for counting accuracy increases, the size of your samples must also increase.
- As individual uniformity of your parts decreases, sample size must increase.
- Manual counting errors may occur if samples larger than necessary are used.
- Because of variation of individual container weights, be certain to "tare off" each container by placing the empty container on the scale and pressing the **ZERO** key before proceeding with the count operation.

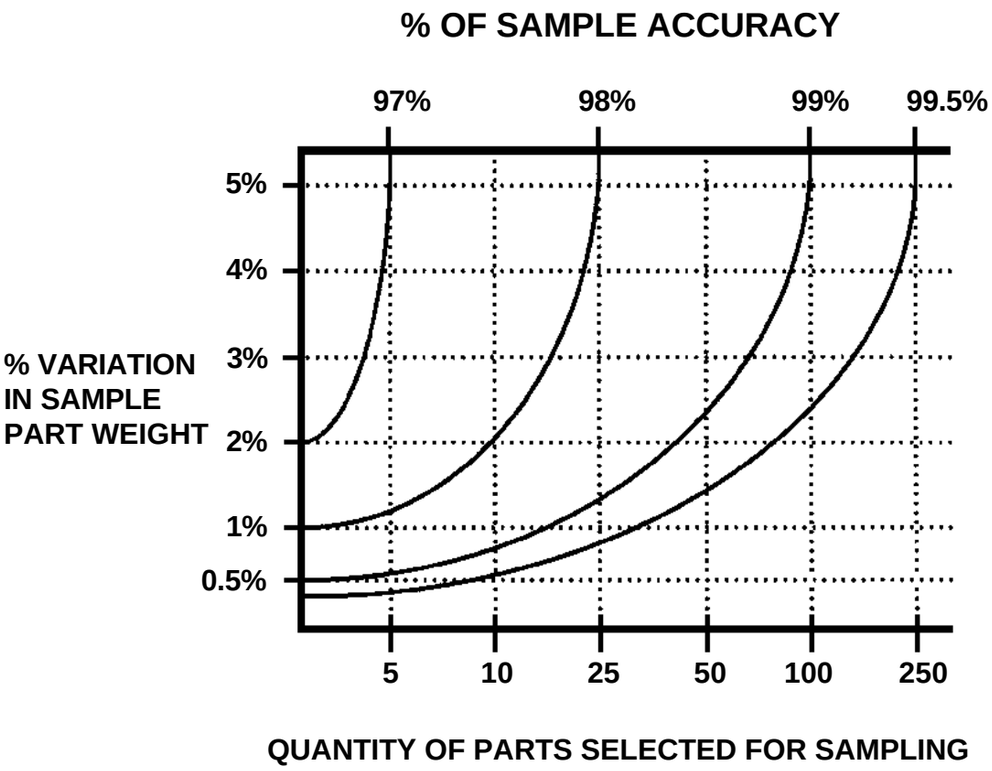


Figure No. 10

1. Select the typical % of variation in the sample part-weight on the left-hand side of the graph.

2. Follow the selected curve to the right and upward to the % of sample accuracy.

3. Read down vertically from the % of accuracy to the corresponding minimum quantity of parts required for sampling to obtain the desired minimum % of count accuracy.

ERROR AND STATUS DISPLAYS

The Digital Counting Scale is equipped with a diagnostic software program that tests various portions of the instrument's circuitry and verifies proper operation. Should a problem be detected, an error or status message will be displayed alerting the operator to that condition. The following lists these errors and status displays and their meaning:

Display	Meaning
bel 0	Indicates the scale is attempting to display a negative weight greater than 4 digits
ocap	Indicates the scale weight capacity or counting capacity (999,999) has been exceeded.
full	Indicates there is no more space available for accumulator storage.
CALiB	Indicates improper stored calibration data, calibration is necessary.
faila	The analog to digital circuit has failed. Consult scale serviceman.

BEFORE YOU CALL FOR SERVICE

The Digital Counting Scale has been designed to provide you with years of trouble-free operation. In spite of this, troubles sometimes happen. Before calling for service assistance you should make some initial checks to verify that a problem does exist. The following describes several types of symptoms along with suggested remedies.

Problem	Possible Solutions
Display does not turn on	AC Operation: Is the AC power cord fully inserted into the wall receptacle? Check wall receptacle for proper AC power. Try another electrical appliance in the same receptacle, does it work? Check the circuit breaker. Has there been power failure. Battery operation: Check if battery is installed and installed correctly. Is battery discharged - replace or recharge.
Incorrect weight displayed	Has the instrument been calibrated? Insure that the scale platform isn't touching an adjacent object. Have proper operation procedures been followed?
Scale will not display weight	Refer to Error and Status Display section and make certain that the faila message is not displayed. If so, perform the calibration sequence.

CARE AND CLEANING

1. **DO NOT** submerge scale in water, pour or spray water directly on instrument.
2. **DO NOT** use acetone, thinner or other volatile solvents for cleaning.
3. **DO NOT** expose equipment to temperature extremes.
4. **DO NOT** place equipment in front of heating/cooling vents.
5. **DO** clean the indicator with a damp soft cloth and mild non-abrasive detergent.
6. **DO** remove power before cleaning with a damp cloth.
7. **DO** provide clean AC power and adequate protection against lightning damage.
8. **DO** keep the surroundings clear to provide clean and adequate air circulation.

OPTIONAL BATTERY PACK OPERATION

The Digital Counting Scale can operate from a readily available Sealed Lead-Acid Camcorder type battery (*not included*). If you wish to operate the scale from a battery, you must first obtain and install a CAM-350 Type 12 volt 2000 mAh (2.0 Ah) battery before operations can begin. The battery is contained inside the instrument and is easy to install. Access is via a removable panel on the right side of the scale (See Figure No. 11). The scale will operate with a "fully charged" battery for approximately ten (10) hours and is easily recharged with the scale's built-in charger.

NOTE: The battery can be purchased from the Cardinal Scale Parts Department (p/n 6800-0018) or ordered from the following companies online:

- **www. planetbattery.com**
- **www.ebatts.com**
- **www.discountcell.com**
- **www.mobilizenow.com**

Installation

1. Unplug the AC power cord from the back of the scale.
2. Loosen the retaining thumbscrew securing the Battery Access Cover to the side of the scale and position the cover towards the rear of the scale, exposing the battery access opening.
3. Make certain the (**+**) plus polarity markings of the battery pack are positioned up (toward the platter).
4. While holding the cover open, slide the battery into the opening until you feel resistance and the battery in almost flush with the side panel of the scale (See Figure No. 11).
5. Close the Battery Access Cover and finger-tighten the thumbscrew, securing the battery in place.

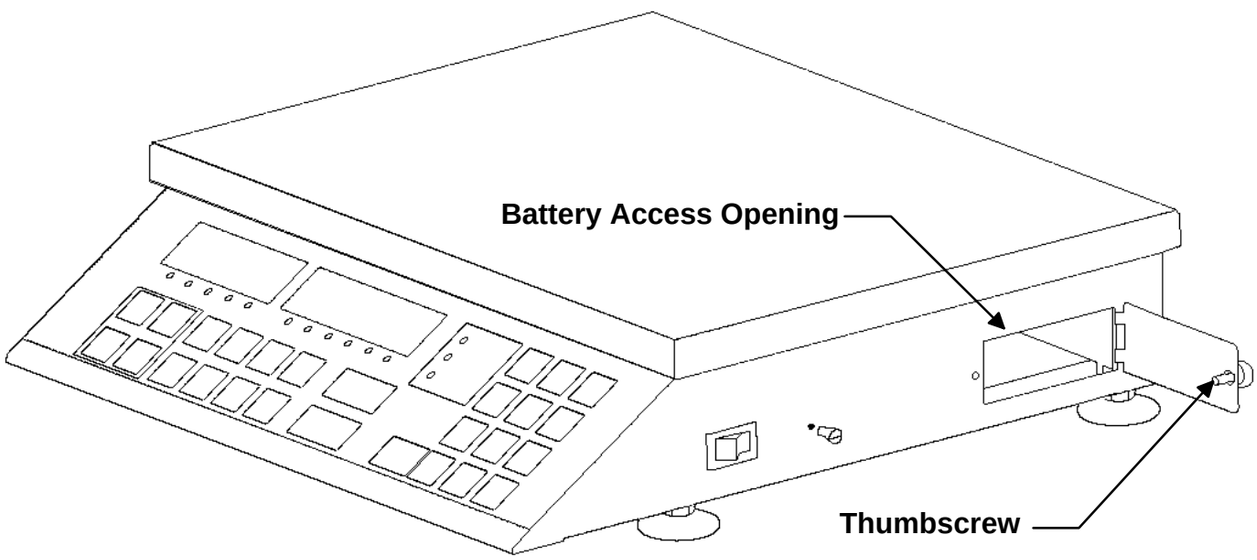


Figure No. 11

Battery Pack Removal

1. Unplug the AC power cord from the back of the scale.
2. Loosen the retaining thumbscrew securing the Battery Access Cover to the side of the scale and position the cover towards the rear of the scale, exposing the battery access opening.
3. An internal spring will push the battery partially out of the opening. Grasp the end of the battery and slide it out of the opening.
4. Close the Battery Access Cover and finger-tighten the thumbscrew.

OPTIONAL BATTERY PACK OPERATION, Cont.

Discharging the Battery Pack

The battery pack is discharging when the scale is operated without the AC power cord plugged into a wall outlet. The Battery Low annunciator on the scale keypad serves to indcate the state of the battery pack.

When the scale is operating by battery power, and the battery pack has sufficient charge to power the scale, the Battery Low annunciator is off. If the battery becomes discharged while the scale is in use, the Battery Low annunciator will flash slowly to indicate the battery pack needs to be charged. When this occurs, the battery pack will have sufficient charge to power the scale for a short time, approximately (5) five minutes. If continued use further drains the battery pack, the Battery Low annunciator will stop flashing and stay on until the battery pack becomes severely discharged. When the battery pack is unable to power the scale, the scale will turn off automatically to prevent damaging the battery.

Due to the nature of batteries, shutting the scale off will cause the battery pack to recover slightly. If the scale is operated after turning itself off, it may run for a few minutes before the Battery Low annunciator begins to flash again. If the battery pack is too discharged to power the scale, it will not power up when the power switch is place in the ON position, but will illuminate the Battery Low annunciator for one minute to show the operator that a charge is needed before operations can continue.

If the battery pack has become severely discharged, the scale may not respond at all when turned on. This is a safety feature to prevent the scale from being powered up when the battery voltage is excessively low. Plug the scale into the AC wall outlet to charge the battery pack.

Charging the Battery Pack

The battery pack can be recharged with the built-in charger in the scale. The charger in the scale is a dual-level float charger. The first level does most of the charging rapidly, while the second level adds the remaining charge gradually. This type of charge profile greatly prolongs the life of the battery pack. Due to the sophisticated nature of the charger the battery pack can be left connected to the charge indefintely, without risk of damage.

When the battery pack installed in a scale needs to be charged, simply plug the AC power cord into a wall outlet and charging will begin. Note that operating the scale during charging only minimally affects the charge time of the battery pack. The scale can operate at a 100% duty cycle and will only prolong the charge time by less than 20%. Note too that charge time is dependent on the depth of the discharge and will vary from one application to the next, but will typically not exceed 10 hours even with the scale turned on.

While the battery pack is charging, the Battery Low annunciator will flash. It will continue to flash until the battery is fully charged. Upon reaching full charge, the annunciator will turn off. This gives the operator a visible indication of the charging status of the battery. Note that the Battery Low annunciator is only on when the scale is on. If the battery pack is charged with the scale off, the scale must be turned on to determine status of the battery.

OPTIONAL BATTERY PACK OPERATION, Cont.

Optimum Battery Pack Performance

The life of the battery pack depends greatly on the duty cycle of the scale, depth of discharge and operating temperature. The battery pack will normally provide eight (8) hours of continuous operation over an operating range of 14° to 104° F (-10° to +40° C). Several steps can be taken to optimize the performance and life of the battery pack.

1. Enable the Auto Shut-Off feature of the scale by entering a 1 (YES) when the scale prompts for Auto Off during Setup. (Refer to the Setup and Calibration section for an explanation of the setup feature). This selection will cause the scale to shut itself off after the period of inactivity selected in setup, thus preserving the battery pack.
2. If possible, plug the AC power cord into a wall outlet after each work shift to allow the battery pack to recharge. This will minimize the depth of discharge and greatly increase the number of cycles the battery pack can undergo.
3. If conditions permit, avoid charging and discharging the battery pack in extreme cold. Due to the chemistry of batteries, low temperatures decrease the capacity of the battery pack significantly causing a greater depth of discharge at colder temperatures than at room temperature. The battery pack will function without problems at temperatures as low as 14° F (-10° C) but will not last as many cycles as it would at room temperature.
4. Avoid storing the battery pack after discharging. If the battery pack is to be left for several days or more, make certain that it is charged before storage. The optimum environment for batteries is to charge while stored. The type of charger used in the scale will not damage batteries in any way even if the battery pack is left charging indefinitely.

THERMAL LABEL FORMATS

Ticket Format (1)

Ticket Format (2)

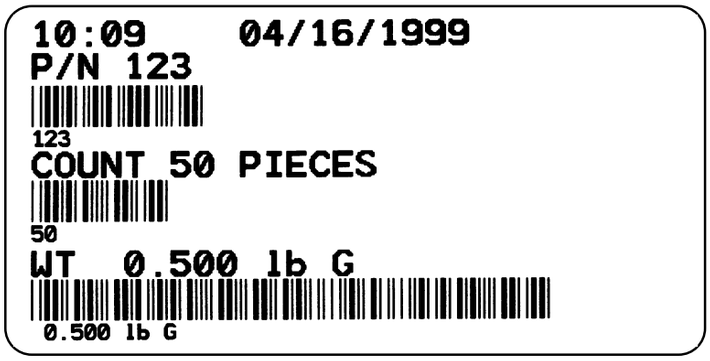


Figure No. 12

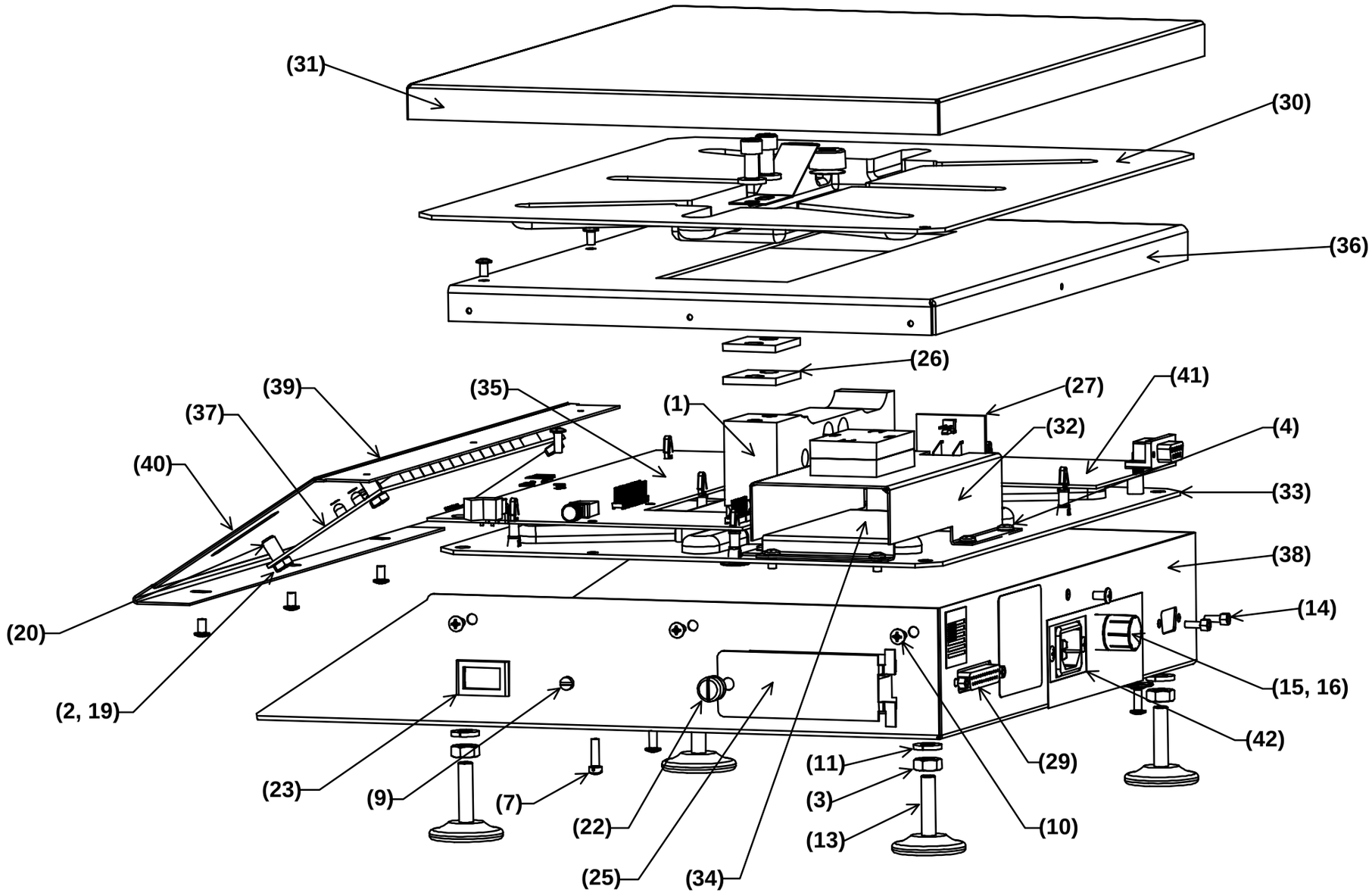
PARTS IDENTIFICATION

Item	Part Number	Description
1	See Table	LOAD CELL W/CABLE ASSEMBLY
2	6013-0039	#6-32 HEX NUT
3	6013-0045	¼ - 20 HEX NUT
4	6021-0654	#6-32 X .25 PAN HEAD MACHINE SCREW
5	6021-0665	#6-32 X .375 PAN HEAD MACHINE SCREW
6	6021-1020	#10-32 X .500 PAN HEAD MACHINE SCREW
7	6021-1197	#6-32 X .500 STAINLESS STEEL FILLISTER SCREW
8	6021-1401	¼ - 20 X .500 ZINC PLATED SOCKET HEAD CAP SCREW
9	6021-2071	#6-32 X .250 STAINLESS STEEL FILLISTER SCREW
10	6021-6007	#6-32 X .250 PAN HEAD MACHINE SCREW
11	6024-0039	¼ HELICAL LOCK WASHER
13	6540-1130	LEVELING FOOT
14	6610-2000	JACK SOCKET
15	6610-4019	1/4 ASB 3AG-1/4 ASB FUSE (***2240***)
15	6610-4012	1/8 ASB 3AG-1/8 ASB FUSE (***2241***)
16	6610-4046	FUSE HOLDER
19	6680-0004	#6 ZINC PLATED INTERNAL TOOTH LOCK WASHER
20	6680-0163	#6 X .375 SPACER
22	6680-1088	SELF CLINCHING LOW PROFILE PANEL FASTENER
23	6910-3026	BLACK SWITCH SNAP-IN FRAME
25	8526-B213-08	BATTERY DOOR
26	8526-B214-08	LOAD CELL SPACER
27	8526-B222-0A	BATTERY POWER BOARD
28	8526-B232-08	BATTERY COVER SPRING (not shown)
29	8526-B233-08	INTERNAL SERIAL CABLE ASSEMBLY
30	8526-C206-08	WEIGHBRIDGE
31	8526-C207-08	COMMODITY TRAY
32	8526-C210-08	TOP BATTERY GUIDE
33	8526-C211-08	BASE PLATE
34	8526-C212-08	BOTTOM BATTERY GUIDE
35	8526-D201-0A	CONTROLLER BOARD
36	8526-D203-08	DUST COVER
37	8526-D204-0A	DISPLAY AND KEYPAD INTERFACE
38	8526-D205-08	BASE ENCLOSURE
39	8526-D209-0A	FRONT PANEL
40	8526-D216-08	KEYPAD OVERLAY
41	8526-D217-0A	ANALOG BOARD
42	8544-B032-0A	LINE FILTER FILTER ASSEMBLY
	6800-0018	BATTERY: CAM-350 TYPE 12 VOLT 2000 mAh (*not shown*)

LOAD CELL TABLE

Scale Capacity	Load Cell Assembly
5 lb (2 kg)	2950-C114-1A
10 lb (5 kg)	2950-C114-1A
20 lb (10 kg)	2950-C116-2A
50 lb (20 kg)	2950-C119-1A
100 lb (50 kg)	2950-C120-4A

It should be noted that when replacing the load cell, the four (4) bolts holding the load cell to the scale base and the weighbridge to the load cell must be torqued to 80 in-lb +/- 5 in-lb.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