



CARDINAL[®]

**HSDC SERIES
DIGITAL HANGING SCALE
BATTERY OPERATED
Operation Manual**

TABLE OF CONTENTS

Introduction	1
Specifications	1
Battery Installation	2
Scale Operation	3
Tare Weight Entry	4
Display Codes	5
Calibration	6
Setup Review	10
Sealing	10
Do's And Don'ts	10
In Case Of Difficulty	11

Serial Number _____
Date Of Purchase _____
Purchased From _____

Retain This Information For Future Use

WARNING! This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient the receiving antenna.
2. Relocate the instrument with respect to the receiver.
3. Move the instrument away from the receiver.
4. Plug the instrument into a different outlet so that the instrument and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402; Stock No. 004-000-00345-4.

INTRODUCTION

Congratulations on selecting a Cardinal Series HSDC digital hanging scale. This precision weighing instrument is designed to provide years of trouble-free operation while maintaining a high degree of weighing accuracy. This manual contains information on the proper care and use of this instrument.



Before using the instrument, read this manual and pay special attention to all "Warning" Symbols.

NOTICE

All rights reserved. Reproduction or use of editorial or pictorial content, in any manner, without written, expressed permission is prohibited. No patent liability is assumed with respect to the use of the information contained herein.

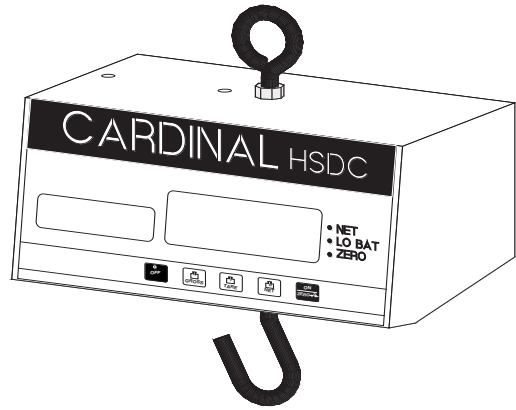
While every precaution has been taken in the preparation of this book, the Seller assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein. All instructions and diagrams have been checked for accuracy and ease of application; however, success and safety in working with tools depends to a great extent upon individual accuracy, skill and caution. For this reason, the Seller is not able to guarantee the result of any procedure contained herein. Nor can they assume responsibility for any damage to property or injury to persons occasioned from the procedures. Persons engaging the procedures do so entirely at their own risk.

SPECIFICATIONS

Capacity see table
Graduation size see table
Tare/Rezero capacity 4% or 100% of scale capacity
Operating temperature ... -10½ to +40½C,
14½ to 104½F
Storage temperature -10½ to +60½C,
14½ to 140½F
Display type 4 digit, 1" high LCD
Battery requirements 6 each "C" size alkaline
Weight 5 lb
Ultimate safe overload 200%

SPECIFICATIONS, Cont.

Model	Capacity	Graduation
HSDC-200	200 lb	200 x 0.1 lb
HSDC-100	100 lb	99.95 x 0.05 lb
HSDC-50	50 lb	50 x 0.02 lb
HSDC-20	20 lb	20 x 0.01 lb
HSDC-500	500 lb	500 x 0.2 lb
HSDC-100KG	100 kg	99.95 x 0.05 kg
HSDC-50KG	50 kg	50 x 0.02 kg
HSDC-20KG	20 kg	20 x 0.01 kg



BATTERY INSTALLATION

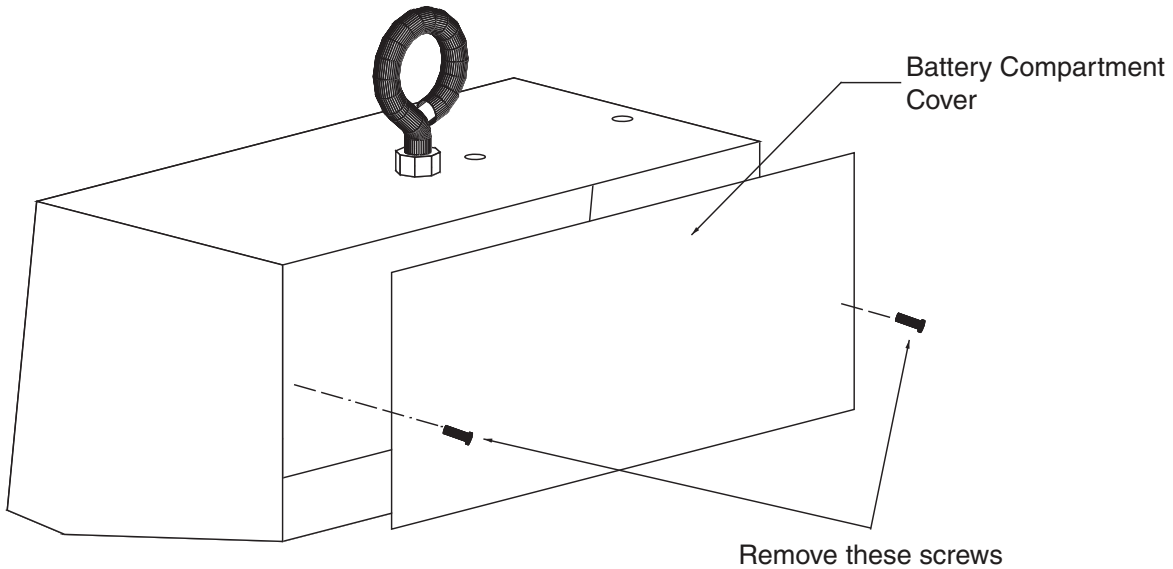
Before weighing operations can begin it will be necessary to install the batteries in the HSDC hanging scale. This same procedure should also be followed when battery replacement becomes necessary. Make certain that only "C" size alkaline batteries are used as replacements.



NOTE! Exposure of batteries to high temperatures (above 140° F) will decrease their capacity resulting in shorter operation time.

Step 1

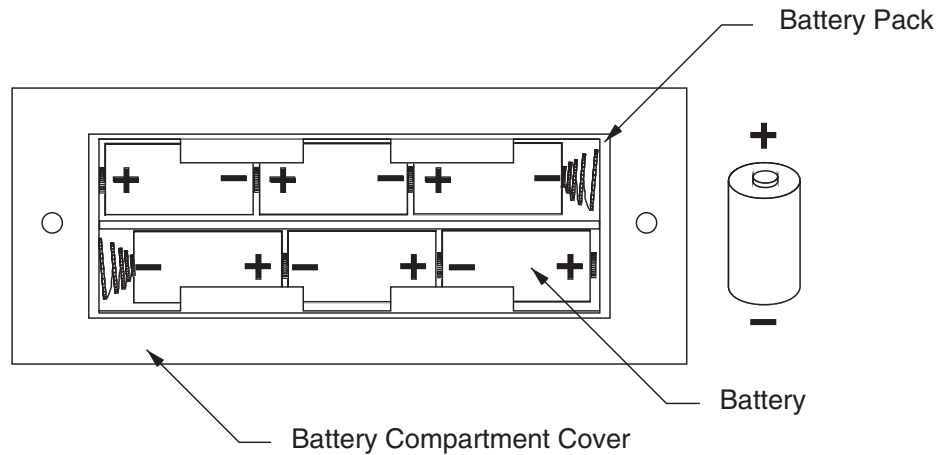
Using a screwdriver, remove the two retaining screws from the back of the instrument. Remove the battery compartment cover.



Step 2

Remove the old batteries, if present. Insert six new "C" cells making certain that each cell is correctly positioned. Refer to the next diagram for proper battery placement.

BATTERY INSTALLATION, Cont.



Step 3

Replace the battery compartment cover and retaining screws.



NOTE! If the HSDC scale fails to operate after battery replacement check to make certain that each of the six cells has been installed correctly. One cell installed backward will prevent the scale from operating.

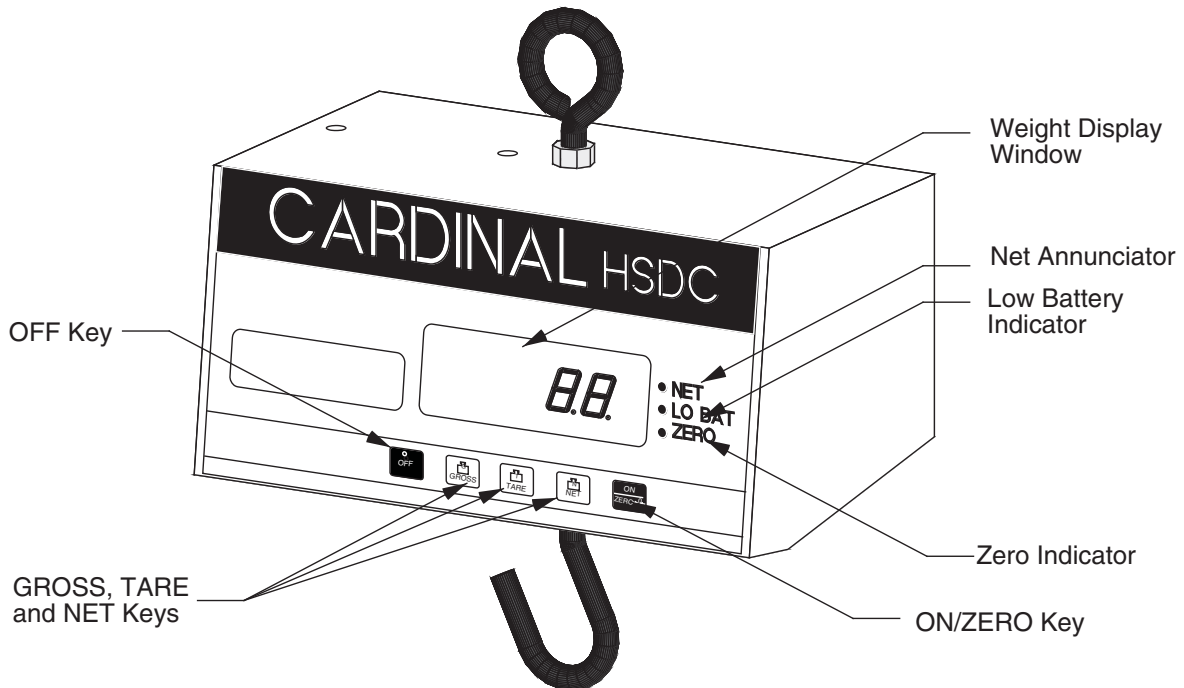
SCALE OPERATION

Before weighing operations can begin it will be necessary to install batteries in the scale. Refer to the battery installation section of this manual for additional information.

Hang the scale from a support that is strong enough to support the weight of the scale PLUS the weight of the material that is to be weighed.

Hang the load receiving element on the hook on the bottom of the scale and press the **ON/ZERO** key. Look at the weight display. If the display does not indicate zero weight, press the **ON/ZERO** key again to reset the display to zero.

Place the material to be weighed in the receiving element and read the weight in the scale display. Refer to the figure below for the identification of scale components:



SCALE OPERATION, Cont Scale Component Identification



Press to turn the scale off. The auto-shutoff feature will turn the scale off automatically after a preselected time of inactivity (no motion).



Press to place the scale in the gross weight display mode (net indicator off).



Press to enter a new tare weight value equal to the current scale weight. The scale will automatically enter the net weight display mode (net indicator on).



Press to enter the net weight display mode without entering a new tare weight value (net annunciator on).



Press to turn the scale on. If on, press to zero the weight display up to the preset zero limit (4% or 100% of the scale capacity).



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.

Annunciators

- **NET** Illuminated to indicate the scale is in the net weight mode. If it is off, it indicates that the scale is in the gross weight mode.
- **LO BAT** Illuminated to signal that the batteries should be replaced.
- **ZERO** Illuminated to show that the scale weight is within 1/4 graduation of the center of zero.

TARE WEIGHT ENTRY

The HSDC has an automatic tare feature that allows you to enter tare weight up to the three least significant digits of the scale capacity. This tare weight feature is often used to subtract the empty container weight or other unwanted fixed weight values from the weight reading. See the **PUSH BUTTON TARE** setup mode section to activate this feature.

The following table lists the maximum tare weight allowed for each model of the HSDC scale.

<u>MODEL</u>	<u>CAPACITY</u>	<u>MAXIMUM TARE WT</u>
HSDC-500	500 lb X 0.2 lb	99.8 lb
HSDC-200	200 lb x 0.1 lb	99.9 lb
HSDC-100	99.95 lb x 0.05 lb	9.95 lb
HSDC-50	50 lb x 0.02 lb	9.98 lb
HSDC-20	20 lb x 0.01 lb	9.99 lb
HSDC-100KG	99.95 kg x 0.05 kg	9.95 kg
HSDC-50KG	50 kg x 0.02 kg	9.98 kg
HSDC-20KG	20 kg x 0.01 kg	9.99 kg

TABLE 1

TARE WEIGHT ENTRY, Cont.

Pressing the **TARE** key will cause the currently displayed gross weight to be stored as the new tare weight and cause the scale to enter the net weight display mode. The net weight display mode is indicated by turning on the net annunciator. For example, on a HSDC-20, if the displayed gross weight is 2.00 lb and you press the **TARE** key, the 2.00 lb would be entered as the new tare weight. The scale would then enter the net weight mode and subtract the 2.00 lb tare value from the gross weight displaying a net weight of 0.00 lb. If you added another 2.00 lb to the platform, the display would indicate 2.00 lb of net weight. Pressing the **GROSS** key would return the scale to the gross weight display 4.00 lb. NOTE: Remember the scale will only weigh to its maximum capacity. Any combination of NET plus TARE weights over the scale capacity will result in a overload condition and display *oL*. For example, using the HSDC-20 from above, with tare weight of 2.00 lb, adding 19.00 lb to the platform will cause an overload condition. This is because 2.00 lb tare weight plus 19.00 lb load weight equals 21.00 lb gross weight, which exceeds the capacity of the scale.

DISPLAY CODES

During operation of the HSDC hanging scale you may encounter a special display message. The following lists display codes and their meaning.

DISPLAY	MEANING
<i>- oL -</i>	Scale overloaded, remove excess load to resume operation.
<i>UnSt</i>	Motion is present when attempting to power-up, zero the weight display or enter a tare value.
<i>UnLd</i>	The weight on the scale exceeds the zero range on power-on. Remove the load.
<i>LoAd:</i>	The scale load is less than the zero range on power-on.
<i>- oF -</i>	Attempting to display a negative number less than -999.
<i>[ALb</i>	Indicates that the scale has not been calibrated or has been interrupted during the calibration process.
<i>Err</i>	Disallowed keyboard entry: attempted to zero with the weight outside the zero range.

CALIBRATION

Your HSDC hanging scale has been calibrated prior to shipment and should not require re-calibration before it is placed in service. A regular check of the instrument's calibration should be made to ensure that its weighing accuracy is maintained.

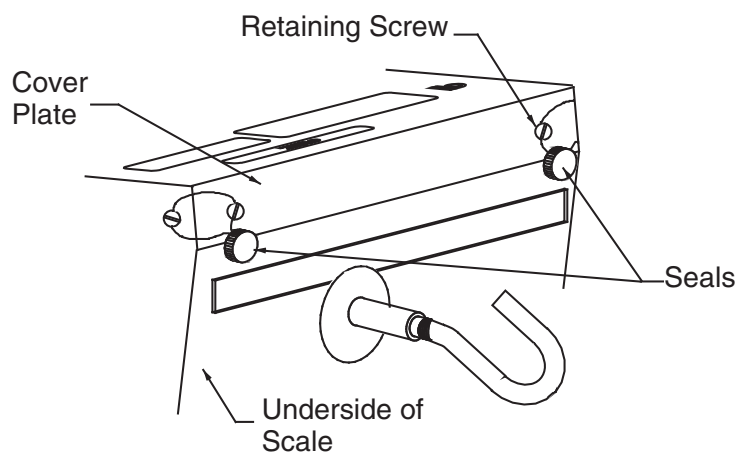
To check the calibration of your HSDC hanging scale, you must have a calibrated test weight or weights equal to the scale's capacity. Begin by making certain that the scale is unloaded and that the display is indicating zero weight. Load the scale with the test weight(s) and observe the weight display. If the displayed weight is not within +/- two graduations of the total test weight value calibration may be necessary. Note that a qualified scale technician should be consulted before any attempt at calibration is made.



NOTE! This scale is provided with a means of attaching a seal to prevent access to the calibration switch.

Calibration Procedure

- Step 1. Remove the seals (if present) from the calibration cover plate, then remove the two retaining screws and cover plate.



- Step 2. Hang the scale from a suitable support and attach the load receiving device. Press the **OFF** key. Using a straightened paper clip, press and hold the calibration switch while pressing the **ON/ZERO** key. Release the calibration switch when the display shows
- net = -

- Step 3. Refer to the following steps and enter the required setup parameters.

INTERVAL

- net = Press the NET key to show the current setting. Then press the **ON/ZERO** key to select the desired value: 1-2-5. Press the **NET** key to save.

CALIBRATION, Cont.

DECIMAL POINT

dpp = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to select the desired value:

0=XXXX	1=XXX.X
2=XX.XX	3=X.XXX

Press the **NET** key to save.

CAPACITY

CAP = Press the **NET** key to show the current capacity setting. Then press the **ON/ZERO** key to advance the flashing digit from 0 through 9 (200_0). Select the value then press the **TARE** key to advance to the next digit location (200_0). Repeat the process until the capacity has been entered. Press the **NET** key to save.

WEIGHING UNITS

Unit = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to select the desired value: 1-2 where 1=Pounds Only and 2=Kilograms Only. Press the **NET** key to save it.

(Please note, although selection 3 will display and can be selected, it is **INVALID** for the HSDC scale.)

CALIBRATION WEIGHT

Load = Press the **NET** key to show the current calibration weight. Then press the **ON/ZERO** key to advance the flashing digit of calibration weight from 0 through 9 (150_0). Select the value then press the **TARE** key to advance to the next digit location (150_0). Repeat the process until the calibration weight has been entered. Place this amount of calibration test weights on the scale, then press the **NET** key. The display will show - - - - then:

Unload Remove the test weights and press the **NET** key. The display will show - - - - then proceed to the next prompt.

ZERO TRACKING RANGE

trA = Press the **NET** key to show the current division setting. Values of 0 through 9 and 0.5 are valid for the zero tracking range. Press the **ON/ZERO** key to step through and select 0.5 as the division value, then press the **NET** key to save. If a zero tracking range division of 0 through 9 is desired, first press the **ON/ZERO** key to select 0, then press the **TARE** key to advance to the next digit location and press the **ON/ZERO** key to select 0 through 9 divisions. Press the **NET** key to save.

4% ZERO TRACKING LIMIT

trL = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to toggle between yes and no. **YES** = 4% limit, **NO** = 100% limit. Press the **NET** key to save. (NOTE: 4% limit is for Canadian use)

POWER UP ZERO

PUD = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to toggle between yes and no. **YES** = enable, **NO** = disable. Press the **NET** key to save.

FILTERING

FLt = Press the **NET** key to show the current level of filtering. Then press the **ON/ZERO** key to select the desired value:

0=no filtering	1=minimal filtering
2=moderate filtering	3=custom filtering

Press the **NET** key to save setting.

If you select level 3 then:

F = Press **NET** to show current filter weight setting. Press **ON/ZERO** to select filter weight level (1 through 99,-99 being the greatest filtering and 1 the least). Press the **NET** key to save setting.

CALIBRATION, Cont

BREAKPOINT

b = Press **NET** to show the current break point setting. Press **ON/ZERO** to select break point setting (1 through 99). Press the **NET** key to save setting.

MOTION RANGE

UnS = Press the **NET** key to show the current motion range in divisions. Then press the **ON/ZERO** key to select the number of digits to change before motion: 0 through 9. Press the **NET** key to save.

SAMPLE RATE

Sr = Press the **NET** key to show the current sample rate setting. Values of 1 through 12 are valid for the sample rate. Press the **ON/ZERO** key to select 1 through 9 samples per second, then press the **NET** key to save. If a sample rate of 10 through 12 is desired, first press the **ON/ZERO** key to select 0 through 2, then press the **TARE** key to advance to the next digit location and press the **ON/ZERO** key to select 10 through 12 samples per second. Press the **NET** key to save.

AUTOMATIC SHUTOFF

Ash = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to disable the feature or to select the number of minutes of inactivity before turning off the scale. 0 = disable, 1 to 9 = minutes of inactivity before shutoff. Press the **NET** key to save it.

SLEEP MODE

SLP = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to disable the feature or to select the number of minutes at zero before going to sleep. 0 = disable, 1 to 9 = minutes of inactivity before sleeping. Press the **NET** key to save it.

PUSH BUTTON TARE

Pbt = Press the **NET** key to show the current setting. Then press the **ON/ZERO** key to toggle between yes and no. YES = enable, NO = disable. Press the **NET** key to save.

The display will display the software revision number and then the gross weight. The setup and calibration process has been completed and the scale is ready to weigh. Place the test weight back on the scale to verify calibration.

CALIBRATION, Cont

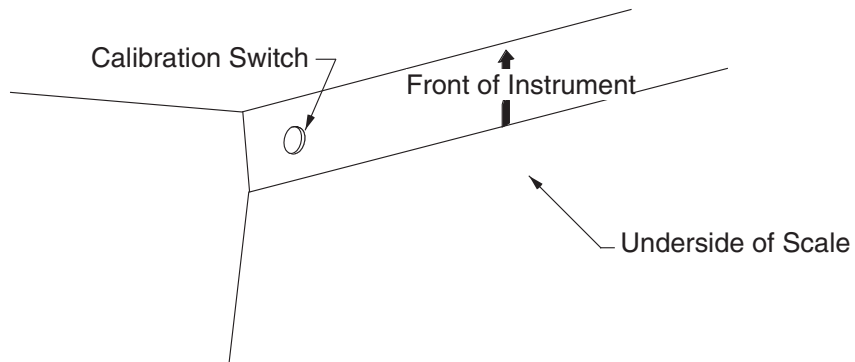


Table 1 -- Setup Settings for HSDC Models

Model HSDC	500	200	100	50	20	100kg	50kg	20kg
<i>int</i> =	2	1	5	2	1	5	2	1
<i>dpp</i> =	1	1	2	2	2	2	2	2
<i>cap</i> =	5000	2000	9995	5000	2000	9995	5000	2000
<i>unt</i> =	1	1	1	1	1	1	1	1
<i>trA</i>	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<i>trL</i> =	no	no	no	no	no	no	no	no
<i>pud</i> =	no	no	no	no	no	no	no	no
<i>flL</i> =	1	1	1	1	1	1	1	1
<i>unS</i> =	1	1	1	1	1	1	1	1
<i>sr</i> =								
<i>ash</i> =	2	2	2	2	2	2	2	2
<i>slp</i> =	1	1	1	1	1	1	1	1
<i>pbt</i> =	y	y	y	y	y	y	y	y

trL = YES is for Canadian use

Skip if *flL* = 1 or 2

End of Calibration Section. Go to Setup Review/Fine Span.

SETUP REVIEW

The HSDC allows several operational parameters to be reviewed and changed as necessary without having to break the calibration seal and enter the setup and calibration mode. The setup review allows changes to be made to the power up zero setting, the automatic shutoff and sleep mode delay times, push button tare.

To enter the setup review mode, simply turn the HSDC off, then press and hold any key other than **ON/ZERO** or the **OFF** keys and press the **ON/ZERO** key. The display will prompt for the power up zero selection. Refer to the instructions listed in the Calibration Procedure section of this manual for information on how to change these parameters.

The parameters in the setup review will be processed in the following sequence:

POWER UP ZERO
AUTOMATIC SHUTOFF TIME
SLEEP MODE TIME
PUSH BUTTON TARE

Fine Span

The span can be fine-adjusted while the indicator is on by pressing and holding the calibration switch and pressing the **ON/ZERO** or **NET** key:

Calibration Switch + **ON/ZERO** = increase
Calibration Switch + **NET** = decrease

Go to Sealing Instructions

SEALING INSTRUCTIONS

To attach the seals, first make certain the two cover plate retaining screws are snug then thread the seal wires through the hole in the screw heads as shown in the calibration section of this manual.

DO'S and DON'TS

1. DO hang the scale from a support that is strong enough to support the weight of the scale plus the weight of the material to be weighed. The more rigid the support the better.
2. DON'T shock load your HSDC hanging scale with weights greater than 10 percent of the scale's capacity by throwing the weight on the scale.
3. DO replace batteries as soon as the weight display shows the low battery signal.
4. DON'T hose down or submerge the scale in any liquid.
5. DO use only a damp cloth and mild detergent to clean the outside of the scale.
6. DON'T disassemble the scale. There are no user-serviceable components within the scale.

DO'S AND DON'TS, Cont.

7. DO use only high quality Alkaline "C" size replacement batteries.
8. DON'T use sharp objects to press the keys. Use only your finger tip.
9. DO check scale calibration regularly to ensure that the high degree of weighing accuracy is maintained.
10. DON'T modify or replace the loading hook or hanging eye with lower capacity parts.
11. DO remove loads which produce the over capacity (-oC-) display as soon as possible.

IN CASE OF DIFFICULTY

Your HSDC hanging scale has been designed to provide years of trouble free service. Should you encounter a problem with your scale refer to the chart below before contacting your scale technician.

Problem	Possible Cause/Solution
1. Scale seems dead	A. Batteries improperly installed, make certain each of the six batteries is correctly installed.
No display	B. Batteries are discharged completely, replace with fresh batteries.
2. Incorrect weight display	A. Scale not at zero prior to applying weight, remove load and reset to zero by pressing ON/ZERO key.
	B. Scale is not calibrated. Refer to Calibration Section of this manual.
	C. Scale in net mode. Press the GROSS key.

If you are unable to resolve the difficulty, contact the Cardinal Scale representative from whom you purchased the scale. He will be able to provide you with information concerning the return and repair of your scale. Make certain that you obtain a return authorization number prior to returning the scale. This number should appear on the shipping carton and all correspondence referencing the repair. Failure to obtain a return authorization number will result in unnecessary delay.

STATEMENT OF LIMITED WARRANTY

WARRANTY TERMS

Cardinal Scale Manufacturing Company warrants the equipment we manufacture against defects in material and workmanship. The length and terms and conditions of these warranties vary with the type of product and are summarized below:

PRODUCT TYPE	TERM	MATERIAL AND WORKMANSHIP	LIGHTNING DAMAGE See note 9	WATER DAMAGE See note 7	CORROSION See note 4	ON-SITE LABOR	LIMITATIONS AND REQUIREMENTS
WEIGHT INDICATORS	90 DAY REPLACEMENT ----- 1 YEAR PARTS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
LOAD CELLS (Excluding Hydraulic)	1 YEAR	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D
HYDRAULIC LOAD CELLS (When purchased with Guardian Vehicle Scale)	LIFETIME	YES	YES	YES	YES	90 DAYS	1, 5, 6, 8 A, B, C, D
HYDRAULIC LOAD CELLS (When purchased separately)	10 YEARS	YES	YES	YES	YES	NO	1, 5, 6, 8, 9 A, B, C, D
VEHICLE SCALE (Deck and Below Excl. PSC Series)	5 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6 A, B, C, D, E
LSC SCALE (Deck and Below)	3 YEARS	YES	YES	YES	YES	90 DAYS	1, 2, 3, 5, 6, 11 A, B, C, D
GUARDIAN FLOOR SCALES	10 YEARS	YES	YES	YES	YES	NO	1, 2, 3, 5, 6, 9, 10 A, B, C, D
ALL OTHER CARDINAL PRODUCTS	1 YEAR	YES	YES	YES	YES	NO	1, 2, 5, 6 A, B, C, D, E
REPLACEMENT PARTS	90 DAYS	YES	YES	YES	YES	NO	1, 2, 4, 5, 6 A, B, C, D
SWIM AND 760 SERIES VEHICLE SCALES	1 YEAR	YES	YES	YES	YES	90 DAYS	1, 2, 5, 6 A, B, C, D
SOFTWARE	90 DAYS	YES	N/A	N/A	N/A	NO	1, 6 B, C, D
CONVEYOR BELT SCALES (including Belt-Way)	1 YEAR	YES	YES	YES	YES	NO	1, 2, 3, 5, 6 A, B, C, D, E, F



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APPLICABLE LIMITATIONS AND REQUIREMENTS

1. This warranty applies only to the original purchaser. The warranty does not apply to equipment that has been tampered with, defaced, damaged, or had repairs or modifications not authorized by Cardinal or has had the serial number altered, defaced or removed.
2. This warranty is not applicable to equipment that has not been grounded in accordance with Cardinal's recommendations.
3. This equipment must be installed and continuously maintained by an authorized Cardinal / Belt-Way dealer.
4. Applies only to components constructed from stainless steel.
5. This warranty does not apply to equipment damaged in transit. Claims for such damage must be made with the responsible freight carrier in accordance with freight carrier regulations.
6. Warranty term begins with date of shipment from Cardinal.
7. Only if device is rated NEMA 4 or better or IP equivalent.
8. Lifetime warranty applies to damages resulting from water, lightning, and voltage transients and applies only to the hydraulic load cell structure itself (does not include pressure transducers, rubber seals, o-rings, and associated wiring).
9. 10-Year prorated warranty on hydraulic load cells.
10. 1-Year warranty for scale structure.
11. PSC models' warranty coverage applies only to agricultural installations on farms up to 3,000 acres (LSC models not limited in this manner).
12. Load cell kits MUST be installed in accordance with Cardinal Scale instructions. Failure to follow these instructions will void the warranty.

EXCLUSIONS

- A.) This warranty does not include replacement of consumable or expendable parts. The warranty does not apply to any item that has been damaged due to unusual wear, abuse, improper line voltage, overloading, theft, fire, water, prolonged storage or exposure while in purchaser's possession or acts of God unless otherwise stated herein.
- B.) This warranty does not apply to peripheral equipment not manufactured by Cardinal. This equipment will normally be covered by the equipment manufacturer's warranty.
- C.) This warranty sets forth the extent of our liability for breach of any warranty or deficiency in connection with the sale or use of our product. Cardinal will not be liable for consequential damages of any nature, including but not limited to loss of profit, delays or expenses, whether based on tort or contract. Cardinal reserves the right to incorporate improvements in material and design without notice and is not obligated to incorporate said improvements in equipment previously manufactured.
- D.) This warranty is in lieu of all other warranties expressed or implied including any warranty that extends beyond the description of the product including any warranty of merchantability or fitness for a particular purpose. This warranty covers only those Cardinal products installed in the forty-eight contiguous United States and Canada.
- E.) This warranty does not cover paint coatings due to the variety of environmental conditions.
- F.) Do not cut load cell cables on load cells returned for credit or warranty replacement. Cutting the cable will void the warranty.
- G.) Software is warranted only for performance of the functions listed in the software manual and/or the Cardinal proposal.
- H.) The software warranty does not cover hardware. Warranties on hardware are provided from the hardware vendor only.
- I.) The software warranty does not cover interfacing issues to non-Cardinal supplied hardware.
- J.) The software warranty does not include automatic software upgrades unless purchased separately.



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