

Model PC-500 Portion Control Scale



Technical Manual

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Section 1. Unpacking and Installation

Unpacking:

Before unpacking your Doran scale, please read the instructions in this section. Your new scale is a durable industrial product, but it is also a sensitive weighing instrument. Normal care should be taken when handling and using this product. Improper handling or abuse can damage the scale and result in costly repairs that may not be covered by the warranty. If you notice any shipping damage, notify the shipper immediately. Carefully remove the scale from the shipping carton. Be sure to retain all shipping materials in case the scale must be shipped elsewhere.

Installation:

Place the scale on a stable flat surface. Verify that the bubble level located left of the scale display shows that the scale is level. Adjust the four feet to obtain a level condition (bubble level centered).

Electrical Connections:

An optional transformer is available for 115 or 230 VAC operation. See section 3 for installation instructions.

Be sure the AC power is not excessively noisy – this can occur if large inductive loads, such as solenoids or motors, are on the same power line. Subjecting electronics to problematic AC power lines may result in damage not covered by the warranty. Also be sure that the power outlet and transformer are not exposed to water while the scale is plugged in.

Care & Cleaning:

With reasonable care, this product will last for many years. Here are some tips to care for your PC-500 Portion Control Scale.

! DO NOT drop the scale.

! DO NOT immerse the scale.

! DO NOT drop objects on the scale.

- Hand clean with a damp cloth using mild detergent.
- Do not wash the scale in a dishwasher – the removable platter is dishwasher safe.
- Do not use strong solvents or abrasive cleaners as this can damage the touch panel or other plastic parts.
- Do not overload the scale.
- Do not use sharp objects to press any of the buttons.
- Always use the PC-500 on a stable, vibration-free surface for best weighing results.
- Do not lift the scale by the weighing platform.

- To ensure the scale retains its IP66 rating, keep the battery compartment fully installed and keep the rubber plug on the battery compartment in place.

Section 2. Scale Operations Guide

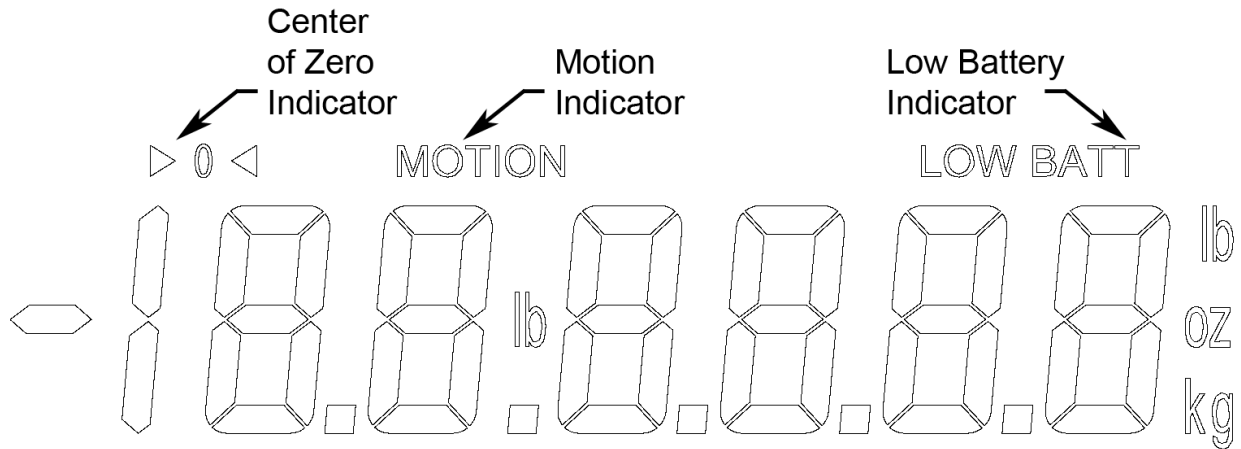


Fig. 1 Display

Display Functions:

The Model PC-500 controls consist of ON/OFF, UNITS and ZERO buttons located under the main LCD display. The display is used to provide weight indications and operator messages describing scale operation.

Basic Weighing:

1. Select the desired weighing units by pressing the UNITS button.
2. Empty the scale platter and press ZERO to zero the scale. The center of zero annunciator will activate, indicating an accurate zero has been achieved.
3. Place an item on the scale platter and wait for the MOTION indicator to go out.
4. Read the weight on the display.

Units Select:

Press the UNITS button to change weight display units from lb - oz - kg - g - lb:oz.

Low Battery:

When the batteries need to be changed, the "LOW BATT" indicator illuminates.

Power:

The PC-500 is powered by six (6) D alkaline batteries or an optional AC wall transformer. Turn the scale on or off by pressing ON/OFF.

Automatic Sleep Function:

The PC-500 has a feature called "Auto Shut-down" that turns the scale off after a preset time of no activity. This helps conserve battery life. The preset time is selectable from 1 minute to 60 minutes or it can be disabled so the scale remains on continuously. The default setting is 5 minutes.

Section 3. Setup and Calibration Guide

Optional AC Power Connection:

The optional AC transformer has a power cord which plugs into the power jack located under the battery compartment cover. *WARNING: Installing this option incorrectly will allow water to enter the scale and void the scale warranty.*

To install this option:

1. Remove the battery compartment cover
2. Open the rubber plug in the battery compartment cover
3. Feed the AC jack and some cord through the rubber plug
4. Connect the AC jack to the Power socket inside battery compartment
5. Replace the battery compartment cover, leaving some slack on the AC cord
6. Then push the rubber plug completely back into place, creating a seal around the AC cord. *NOTE: Regularly check the rubber plug to ensure a proper seal is attained.*

Optional RS-232 Connection:

The PC-500 has a standard RS-232 output. To use this feature, the optional RS-232 cable is required. *WARNING: Installing this option incorrectly will allow water to enter the scale and void the scale warranty.*

To install this option:

1. Remove the battery compartment cover
2. Open the rubber plug in the battery compartment cover
3. Feed the RS-232 cable jack and some cord through the rubber plug
4. Connect the jack to the RS-232 connector inside battery compartment
5. Replace the battery compartment cover, leaving some slack on the RS-232 cord
6. Then push the rubber plug completely back into place, creating a seal around the AC cord. *NOTE: Regularly check the rubber plug to ensure a proper seal is attained.*

Optional Remote Zero Switch:

The PC-500 has an optional remote zero switch. To use this feature, the optional Zero Switch is required. *WARNING: Installing this option incorrectly will allow water to enter the scale and void the scale warranty.*

To install this option:

7. Remove the battery compartment cover
8. Open the rubber plug in the battery compartment cover
9. Feed the Remote Zero jack and some cord through the rubber plug
10. Connect the jack to the Remote Switch connector inside battery compartment
11. Replace the battery compartment cover, leaving some slack on the RS-232 cord
12. Then push the rubber plug completely back into place, creating a seal around the AC cord. *NOTE: Regularly check the rubber plug to ensure a proper seal is attained.*

Calibration and Parameter Setup:

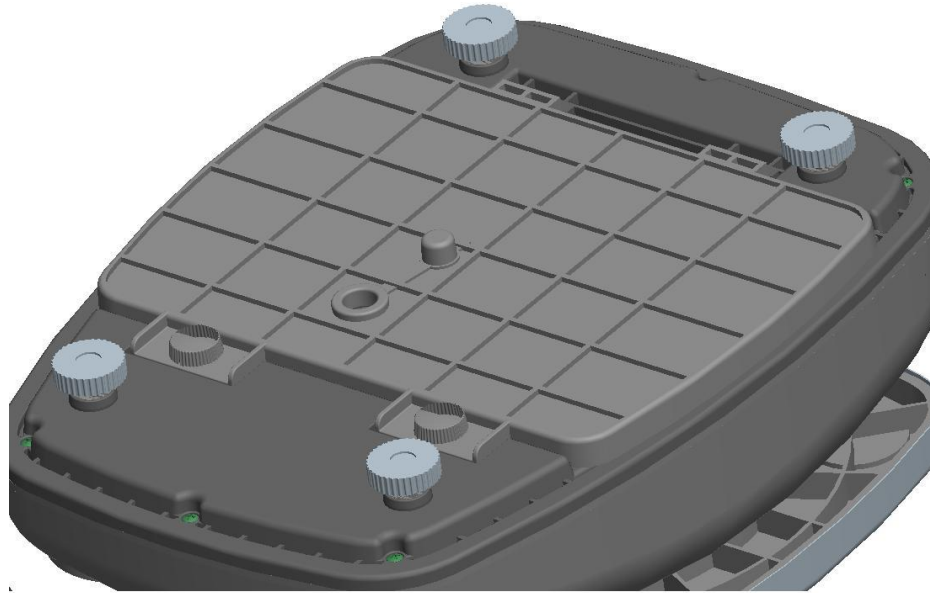


Fig. 2 Battery Compartment

1. After turning on the PC-500, turn the scale over. If the battery compartment has a lead and wire seal, you will require the assistance of a state certified scale technician to retain legal for trade status. Remove the battery compartment, and push the cal switch. The scale will enter the Setup/Calibration mode.
2. Turn the scale upright, and the scale will display “0.0 2.5” (or “0.0 5.0” or “0.0 10” depending on the scale resolution.). Press the UNITS button twice. The scale should now display “CAL 0”.
3. Remove all weight from the scale platter. Press ZERO. Wait for the scale to count down from “7” to “0”. If the scale detects motion, the count down will restart. When finished, the display will display “CAL F5”.

NOTE: If “r 0 Error” appears on the display, the calibration zero is out of range. Press ZERO to clear this error. Refer to the Calibration Troubleshooting section for additional information.

4. Place full capacity on the platter and press ZERO. Wait for the scale to count down from “1” to “0”. If the scale detects motion, the count will restart. When finished, the scale will return to the weigh mode.

NOTE: If “5PnL” or “5PnH” appears on the display, the calibration span is out of range. Verify that the calibration weight is correct and repeat the calibration. Refer to the Calibration Troubleshooting section for additional information.

5. Replace the battery compartment and tighten knobs.

Calibration Troubleshooting:

The following table shows the acceptable “Raw Counts” for no load and full load. “Raw Counts” can be viewed through the last setup parameter. Refer to Section 4, Parameter Setup, for more information regarding parameter viewing. If the scale’s raw counts are not within the ranges specified in the following table, contact a Doran certified scale technician or Doran’s Technical Assistance department at 800-262-6844.

Acceptable “Raw Counts” for no load	Acceptable “Raw Counts” for full load
-8,000 – 100,000	30,000 – 242,000

Section 4. Parameter Setup

The PC-500 has adjustable setup parameters which control the scale's operation.

Entering and Exiting Setup Mode:

Quick Setup:

Quick Setup is recommended for customer use as this setup mode allows the non-meteorological parameters to be modified and will not affect scale calibration. To enter the front-panel setup mode, perform the following steps:

1. Turn off the scale.
2. Press and hold the UNITS button.
3. Press and hold the ON/OFF button for approximately one second.
4. Release both buttons.

The scale will now be in the Quick Setup mode as indicated by "Hd OF".

Full Setup:

The Full Setup mode is recommended for authorized technician use only. To enter the complete setup menu, perform the following steps:

1. Turn on the PC-500.
2. Turn the scale over and remove the battery compartment cover.
3. Press the calibration switch.

The scale should enter the Setup/Calibration mode as indicated by "d w 2.5", "d w 5.0", or "d w 10", (depending on the scale's resolution.)

Scrolling Through Parameters:

The parameters are accessed by pressing the UNITS button. Pressing this button will cause the scale to step to the next parameter on the list.

Changing a Parameter:

Once the desired parameter has been found, it may be adjusted. Press and release "ZERO" to step through the individual options. When you have stepped through all of the parameters, the scale will return to the weigh mode.

Saving Parameter Changes:

To exit the setup mode, press and release the UNITS button until the scale returns to the weighing mode. At this time the parameter changes will be saved. Setup information is not saved until the PC-500 exits the setup mode. A power failure while in the Setup Mode will cause changes to be lost.

Changing Start up Units:

The scale will "power-up" with the same units that it was using when it was last turned off.

Legal for Trade Restrictions:

The Legal for Trade mode disables the lb:oz mode and forces several parameters to specific settings.

Section 5. Setup Menu Explained

Resolution Setup Menu

RES	Select Scale Capacity (lbs)
2.5	# of scale displayed divisions is 2500. Use this resolution for NTEP applications.
5.0	# of scale displayed divisions is 5000.
10	# of scale displayed divisions is 10000. (default for 2lb scales.)

Capacity Setup Menu

CAP	Select Scale Capacity (lbs)
5	Scale capacity set to 5 pounds
10	Scale capacity set to 10 pounds
25	Scale capacity set to 25 pounds
50	Scale capacity set to 50 pounds

Calibration Menu(s)

CAL	Zero Calibration Point
0	Press ZERO to calibrate zero point

CAL	Span Calibration Point
FS	Full scale calibration
	Apply full capacity to the scale. NOTE: This parameter is only visible after a zero calibration is performed.

Reset All Parameters to Default Settings?

RES	Default parameters?
n	No. Parameters are not defaulted.
y	Yes. Set all parameters to their default values when UNITS is pressed.

NOTE: The Legal for Trade mode disables certain options and selections listed above. These items have been indicated by an asterisk (*).

Auto Off Mode

Ro ↑	Auto Off Mode The amount of time before the scale will shut off, if not in use. (Stays on if plugged in.)
oF	Off. Scale will run continually
60	60 minutes
30	30 minutes
20	20 minutes
10	10 minutes
5	5 minutes
4	4 minutes
3	3 minutes
2	2 minutes
1	1 minute

Operation Mode

oP	Sets the scale for Legal for Trade mode
5t	Standard mode. NOT legal for trade.
44	Handbook 44. Legal for trade.

Auto Zero Tracking

zt *	# of displayed divisions that are automatically zeroed from displayed zero, while the scale is stable.
oF	Zero tracking is disabled
0.5	1/2 division
3.0	3 divisions
1.0	1 division

Motion Aperture

nnR *	# of displayed divisions that must change before motion is detected.
1	1 division
3	2 divisions
5	3 divisions

NOTE: The Legal for Trade mode disables certain options and selections listed above. These items have been indicated by an asterisk (*).

↑ Indicates non-metrological parameters available from the quick setup mode.

Start Up Zero

500 *	Controls the start-up zero point
00	Scale will NOT zero on power up. Calibrated zero is loaded on power-up.
FS	Scale will zero up to 100% of scale capacity on power-up.
20	Scale will zero up to 20% of scale capacity on power-up. (Legal for Trade Setting)

Data Output

d.o. ↑	Controls when information is transmitted from the scale through the serial port
C.P.	Continuous data transmission. Transmits data each time the display is updated. Readings that occur when the scale is in motion are identified by the abbreviation "MOT." following the weight data.
A.1	Auto Print 1 transmits the first scale reading after the scale leaves motion. The reading must be stable and must be a valid reading before it can be sent.
A.2	Auto Print 2 transmits the first stable scale reading above 1% of scale capacity. In Auto Print 2, no further readings will be sent until the scale returns to within 1% of displayed zero.
A.5	Auto Print 2 transmits the first stable scale reading above 0.1% of scale capacity. In Auto Print 2, no further readings will be sent until the scale returns to within 0.1% of displayed zero.
t.d.	Transmits data when the "W" command is received through the serial port. The scale must be stable and the weight must be valid (no error codes displayed) before data is printed.

Data Format

For. ↑	Format of transmitted data from the serial port
F0	Basic data format.
2P	Basic dual print format. Includes metric weight.
F1	Legacy data format. <u>Output NOT Legal for Trade.</u>
5P	Basic format for an Eltron SSP printer. Call Doran for details.

Baud Rate

b.r. ↑	Serial port transmission rate
12	1200 Baud (bits per second)
24	2400 Baud (bits per second)
48	4800 Baud (bits per second)
96	9600 Baud (bits per second)

lb Units Enabled

↑	Enables/Disables pounds
0n	lb is enabled.
0f	lb is disabled.

lb:oz Units Enabled

↑	Enables/Disables pounds:ounces
0n	lb:oz is enabled.
0f	lb:oz is disabled.

oz Units Enabled

↑	Enables/Disables ounces
0n	oz is enabled.
0f	oz is disabled.

kg Units Enabled

↑	Enables/Disables kilograms
0n	kg is enabled.
0f	kg is disabled.

g Units Enabled

↑	Enables/Disables grams
0n	g is enabled.

g	g is disabled.
---	----------------

Startup Units

Units	Determines scale startup units
↑ lb	Scale starts up in lb.
lb:oz *	Scale starts up in lb:oz.
oz	Scale starts up in oz.
kg	Scale starts up in kg.
g	Scale starts up in g.

Raw Counts

#####	Raw counts from A/D converter
↑	View these numbers if calibration is unsuccessful. Refer to Section 3 for interpretation of these numbers. Press UNITS to exit.

Section 6. Data Communications

Introduction to data communications:

Basic understanding of serial data communications is needed when setting up the PC400 to communicate with a printer or PC.

When setting up a serial communications system, there are two concerns which affect the configuration of that system. These are:

- Baud Rate
- Data Bits and Parity

The baud rate determines how fast the data is sent from the scale. The sending and receiving units must be set to the same baud settings. Typical values are 1200, 2400, 4800 and 9600.

The PC400 is factory set for eight bits, no parity and one stop bit also known as 8n1. The receiving units must be set to 8n1 for proper communications.

“F0” Example (Negative weight, in motion)

☺ - 2.452 lb MOT.♪☐

“F0” Print String Definition for Each Weight Unit:

Pounds

STX | POL | WEIGHT | SP | lb | SP | ST | CR | LF

Ounces

STX | POL | WEIGHT | SP | oz | SP | ST | CR | LF

Kilograms

STX | POL | WEIGHT | SP | kg | SP | ST | CR | LF

Grams

STX | POL | WEIGHT | SP | g | SP | SP | ST | CR | LF

Pounds-ounces

STX | POL | WEIGHTLB | SP | lb | POL | WEIGHTOZ | SP | oz | SP | ST | CR | LF

STX and ☺ = ASCII 02.

POL = minus sign for negative weight or a space for a positive weight.

WEIGHT = 6 character field plus decimal if needed.

WEIGHTLB = pound portion of lb-oz weight.

WEIGHTOZ = ounce portion of lb-oz weight. (WEIGHTLB and WEIGHTOZ total 5 characters plus decimal)

SP = ASCII space.

ST = MOT. if in motion or a space if stable.

CR and ♪ = Carriage return.

LF and ☐ = Linefeed.

| = Separator, not printed.

“F1” Example (Negative weight, in motion)

☺ - 2.452 LBM♪☐

“F1” Print String Definition for Each Weight Unit:

Pounds

STX | POL | WEIGHT | SP | LB | ST | CR | LF

Ounces

STX | POL | WEIGHT | SP | OZ | ST | CR | LF

Kilograms

STX | POL | WEIGHT | SP | KG | ST | CR | LF

Grams

STX | POL | WEIGHT | SP | G | SP | ST | CR | LF

Pounds-ounces

STX | POL | WEIGHTLB | SP | LB | POL | WEIGHTOZ | SP | OZ | SP | ST | CR | LF

STX and ☺ = ASCII 02.

POL = minus sign for negative weight or a space for a positive weight.

WEIGHT = 6 character field plus decimal if needed.

WEIGHTLB = pound portion of lb-oz weight.

WEIGHTOZ = ounce portion of lb-oz weight. (WEIGHTLB and WEIGHTOZ total 5 characters plus decimal)

SP = ASCII space.

ST = M if in motion or a space if stable.

CR and ♪ = Carriage return.

LF and ☐ = Linefeed

| = Separator, not printed.

“2P” Example (Negative weight, in motion)

☺ - 2.452 lb MOT.♪☐

☺ (- 1112 g MOT.)♪☐

The dual print mode provides the PC400 with the ability to print the current scale reading followed by the equivalent value in grams.

The weight is first printed using the “F0” format. Then the weight is recalculated in grams and is sent as a second line of text. The gram data follows the “F0” data format except where parentheses are placed after the STX character and before the carriage return & line feed.

“SP” Example (Negative weight, in motion)

FR"L1"☐

? ☐

- 1.052☐

lb☐

GS☐

MOT. ☐

- 0.478☐

kg☐

P1,1☐

“SP” Print String Definition for Each Weight Unit:

Pounds

FR"L1" | LF | ? | LF | POL | WEIGHT | LF | lb | LF | GS | LF | ST | LF | POL | WEIGHT2 | LF | kg | LF | P1,1 | LF

Ounces

FR"L1" | LF | ? | LF | POL | WEIGHT | LF | oz | LF | GS | LF | ST | LF | POL | WEIGHT2 | LF | kg | LF | P1,1 | LF

SP, kilograms

FR"L1" | LF | ? | LF | POL | WEIGHT | LF | kg | LF | GS | LF | ST | LF | POL | WEIGHT2 | LF | kg | LF | P1,1 | LF

Grams

FR"L1" | LF | ? | LF | POL | WEIGHT | LF | g | SP | LF | GS | LF | ST | LF | POL | WEIGHT2 | LF | kg | LF | P1,1 | LF

Pounds - ounces

FR"L1" | LF | ? | LF | POL | WEIGHTLB | SP | lb | POL | WEIGHTOZ | LF | oz | LF | GS | LF | ST | LF | POL | WEIGHT2 | LF | kg | LF | P1,1 | LF

POL = minus sign for negative weight or a space for a positive weight.

WEIGHT = 6 character field plus decimal if needed.

WEIGHT2 = Kilogram weight. 6 character field plus decimal if needed.

WEIGHTLB = pound portion of lb-oz weight.

WEIGHTOZ = ounce portion of lb-oz weight. (WEIGHTLB and WEIGHTOZ total 5 characters plus decimal)

SP = ASCII space.

ST = MOT. if in motion or four (4) spaces if stable.

CR and ␣ = Carriage return.

LF and ☐ = Linefeed

| = Separator, not printed.

Remote Scale Commands:

The scale will respond to the following single letter ASCII commands.

“W” initiates transmission of current weight data (if scale is stable).

“U” changes the displayed weight units.

“Z” zeroes the scale (if in motion, scale will wait until stable, then zero.)

Section 7. Specifications

Resolution:	2500d, 5000d or 10000d
Power Supply:	Six (6) D cell alkaline batteries 1,000 hour battery life Optional Wall Transformer output: 12VDC, 300mA Positive (-) center
Display:	0.66" high LCD
Displayed units:	lb, oz, kg, g and lb-oz
Capacities:	5,10 and 25 and 50 lbs
Printer Interface:	Bi-directional RS-232
Controls:	ON/OFF, ZERO and UNITS buttons
Construction:	Plastic body with 304 Stainless Steel Platter

Section 8. Troubleshooting

General problem resolution:

Problem:	What to Do or Check:
Weight reading will not repeat or scale does not return to zero when weight is removed.	Make sure that the scale platter is not rubbing or touching the scale cover. Verify that there is nothing caught in the platform, under or around the load cell or spider.
Scale overloads early	Verify scale calibration is correct. If problem persists, recalibrate the scale.
Scale will not come to zero when the ZERO button is pressed.	Make sure that the scale is becoming stable (Motion annunciator is off.) After pressing the zero button, the scale should zero as soon as it becomes stable. If problem persists, there may be a problem with the touch panel or motherboard.
Weight readings don't seem to be correct.	Verify the scale calibration with an accurate test weight. If the readings are not correct, recalibrate.
Scale drifts off zero.	Check for air currents and/or vibration around the scale. If that is the cause, it may be necessary to set the AZT and nNA parameters to wider settings to compensate (see the parameter section.) Verify that no mechanical restrictions exist, i.e. platter rubbing, something caught under or around the load cell.
Bubble level cannot be centered.	Place scale on level surface. If problem persists, replace the bubble level and recalibrate.
Scale shuts itself off or will not turn on.	Check the AO (Auto Off) parameter. Increase shut off time if necessary. Batteries may need replacement or may be inserted improperly.

Error Messages:

Error Message:	What to do or check:
ldg 0	<p>The scale is attempting to zero on power-up.</p> <p>This message will remain until the scale is stable. Air currents or vibration may be the cause. If problem persists, the pcb or load cell may be damaged.</p> <p>NOTE: This message will not appear if parameter Suo = no.</p>
ov-Ld	<p>The scale is in overload. The load on the scale platform exceeds the scale capacity by more than 105%.</p> <p>Remove excess weight from scale platform. If problem persists, recalibrate.</p> <p>If problem still persists, the motherboard or load cell may need to be replaced.</p>
95-ol	<p>The scale is in gross overload. The load exceeds the scale rating and might result in damage to the scale.</p> <p>Remove excess weight immediately. If problem persists, recalibrate.</p> <p>If problem still persists, the motherboard or load cell will need to be replaced.</p>
Err 0	<p>Load on the scale exceeds 20% upon scale start up. Remove excess weight. This error only occurs when the Start Up Zero Su0 parameter is set to 20. Change this parameter to F5 to allow for automatic start up zeroing up to 100% of capacity.</p> <p>If this does not solve the problem, check the load cell connection.</p>
Ad of	<p>Verifying load cell wiring connections. Ensure the load cell connector on the motherboard is seated properly.</p>
Er EP	<p>The setup parameters loaded in nonvolatile memory have become corrupted.</p> <p>Verify scale parameters and calibrate.</p>

<p>Er</p>	<p>The calibration zero is out of range. Error is displayed after a ZERO calibration attempt. Press zero to clear this error.</p> <p>Refer to the analog setup section for additional information. Motherboard or load cell may need to be replaced.</p>
<p>SPnL</p>	<p>Raw counts for the span calibration is too low. Refer to the “Calibration Troubleshooting” section for raw count ranges.</p>
<p>SPnH</p>	<p>Raw counts for the span calibration is too high. Refer to the “Calibration Troubleshooting” section for raw count ranges.</p>

Limited One Year Warranty

Doran Scales, Inc. warrants its products to be free from defects in material and workmanship for a period of one (1) year from date of shipment. Any product found to be defective within this time period may be returned to Doran's factory, freight prepaid, with prior return authorization and proof of purchase showing date of original sale, for repair or replacement at no charge.

Doran's liability under this warranty is limited to the repair or replacement of the defective product and in no event shall Doran Scales, Inc. be liable for consequential or indirect damages to equipment or personnel. Nor shall Doran Scales, Inc. be liable for damages to equipment or for personal injury caused by misuse, overload, accidental damage, alteration, improper installation, or unauthorized opening of the equipment. Under no circumstances will Doran Scales, Inc. be responsible for any indirect or consequential damages due to errors in weighing or failure of a Doran Scales, Inc. product to perform properly.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. THIS WARRANTY CONSTITUTES DORAN'S EXCLUSIVE WARRANTY. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

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