PS1000/PS2000

Floor Scale

User Instructions

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Table of Contents

Chapter 1 General Information and Warnings 3
- About this Manual 3
  - Text Conventions 3
  - Special Messages 3
- Warnings 4
- EMC Compliance 4
- Routine Maintenance 5
- Cleaning the Indicator 5
- Sharp Objects 5

Chapter 2 Specifications 6
- Scale Platform 6
  - Capacity 6
  - Dimension 6
  - Options 6
- Scale Indicator 6
  - Power Supply 6
  - Dimension 7
  - Display 7
  - Keypad 7
  - Environment 7
  - Load Cell Excitation 7
  - Communication 7

Chapter 3 Introduction 8
- Indicator Mounting 8
- Front Panel 8
- Display 9
- Keyboard 10
- Navigating the Weigh Mode 11
  - Power the Indicator 11
  - Enter or Exit the HOLD Mode 11
  - Zero 11
  - Tare 11
  - Clear Tare Weight 11
  - Output Data (Print) 12
  - Change Weight Unit 12
- Hold Function 14
  - Access the Hold Mode 14

Chapter 4 Setup Mode 15
- Entering the Setup Menu 15
- Navigating the Setup Menu 15
- Setup Menu Parameters 16
- Relationship of Capacity and P7, P8 and P9 Settings 21
- Exit the Setup Menu 24

Chapter 5 Calibration 25
- Calibration Mode 25
- Display ADC Code or Working Voltage Value 26

Chapter 6 Serial Communication 28
- Com Port 1 28
- Protocol 28
- Transaction String 28

Commands and Response 30

Chapter 7 Troubleshooting 33
Display Characters 33
Display Symbols 34
Error Messages and Troubleshooting 34

1 General Information and Warnings

1.1 About this Manual

This manual is divided into chapters by the chapter number and the large text at the top of a page. Subsections are labeled as shown by the 1 and 1.1 headings shown above. The names of the chapter and the next subsection level appear at the top of alternating pages of the manual to remind you of where you are in the manual. The manual name and page numbers appear at the bottom of the pages.

1.1.1 Text Conventions

The keys used to interface with the PS-500 are located on the front panel of the indicator. The keystrokes are shown in **BOLD** incased between brackets. (e.g. **[ZERO]**)

Displayed messages appear in LCD format (e.g. SETUP) type and reflect the case of the displayed message.

1.1.2 Special Messages

Examples of special messages you will see in this manual are defined below. The signal words have specific meanings to alert you to additional information or the relative level of hazard.

CAUTION!
This is a Caution symbol.
Cautions give information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.

ELECTRICAL WARNING!
THIS IS AN ELECTRICAL WARNING SYMBOL.
ELECTRICAL WARNINGS MEAN THAT FAILURE TO FOLLOW SPECIFIC PRACTICES OR PROCEDURES MAY RESULT IN ELECTROCUTION, ARC BURNS, EXPLOSIONS OR OTHER HAZARDS THAT MAY CAUSE INJURY OR DEATH.

NOTE: This is a Note symbol. Notes give additional and important information, hints and tips that help you to use your product.

1.2 Warnings

- Read all operating instructions carefully before use.
- Avoid lengthy exposure to extreme heat or cold. Your scale works best when operated at normal room temperature. Always allow the scale to acclimate to a normal room temperature before use.
- Allow sufficient warm up time. Turn the scale on and wait for a few minutes if possible. This will give the internal components a chance to stabilize before weighing.
- These electronic scales are precision instruments. Do not operate near an in-use cell phone, radio, computer or other electronic device. These devices emit RF and can cause unstable scale readings.
- Avoid using in heavy vibration and airflow conditions.
- Read the weight shortly after loading. The output of the loadcell and A/D may be a little influenced after weight sits for a long time.

DANGER: FOR YOUR PROTECTION, ALL MAINS (110V OR 230V) EQUIPMENT USED WHERE DAMP OR WET CONDITIONS MAY OCCUR MUST BE SUPPLIED FROM A CORRECTLY FUSED SOURCE AND PROTECTED BY AN APPROVED GROUND FAULT PROTECTION DEVICE (RCD, GFCI ETC).

DANGER: RISK OF ELECTRICAL SHOCK. BE SURE TO UPLUG THE INDICATOR BEFORE REMOVING THE COVER OR OPENING THE UNIT. REFER TO QUALIFIED SERVICE PERSONNEL FOR SERVICE.

1.3 EMC Compliance

The following warning may be applicable to your machine.

CAUTION!
This is a Class A product.
In a domestic environment this product may cause radio interference in which the user may be required to take adequate measures.

United States

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada.

1.4 Routine Maintenance

IMPORTANT: This equipment must be routinely checked for proper operation and calibration.
Application and usage will determine the frequency of calibration required for safe operation.

Always turn off the machine and isolate from the power supply before starting any routine maintenance to avoid the possibility of electric shock.

1.5 Cleaning the Indicator

Table 1.1 Cleaning DOs and DON'Ts

DO	DO NOT
Wipe down the outside of standard products with a clean cloth, moistened with water and a small amount of mild detergent	Attempt to clean the inside of the indicator
	Use harsh abrasives, solvents, scouring cleaners or alkaline cleaning solutions
Spray the cloth when using a proprietary cleaning fluid	Spray any liquid directly on to the display window

1.6 Sharp Objects

Do not use sharp objects such as screwdrivers or long fingernails to operate the keys.

2 Specifications

2.1 Scale Platform

2.1.1 Capacity

- PS1000: 500 kg x 0.2 kg / 1,000 lb x 0.5 lb
- PS2000: 1000 kg x 0.5 kg / 2,000 lb x 1.0 lb

2.1.2 Dimension

- PS1000: 55.75” L x 20.25” W x 2.5” H
  - 1416 mm (L) x 514 mm (W) x 64 mm (H)
- PS2000: 59” L x 30” W x 2.5” H
  - 1498 mm (L) x 762 mm (W) x 64 mm (H)

2.1.3 Options

- Table top stand
- Floor stand

2.2 Scale Indicator

- Input signal range: 0mV - +30mV
- Sensitivity: >0.2µV/grad
- Internal Resolution: Approximately 520,000 counts
- Display Resolution: can be selected between 500-100,000
- System Linearity: within 0.01% of Full Scale
- Calibration Method: Software calibration with long-term storage in EEPROM

2.2.1 Power Supply

- Alkaline batteries: 4 AAA size cells (20 hour battery life)
- AC adapter: 6VDC, 500mA with central negative

- Work current: .25mA
  - (when voltage in 5Vdc-8Vdc and not include loadcell consumption)

2.2.2 Dimension

- 6.5” L x 3.2” H x 1.2” W
  - 164 mm (L) x 762 mm (W) x 64 mm (H)

2.2.3 Display

- 5-digit,7-segment, 0.625" (16mm) LCD

2.2.4 Keypad

- 4 push button keys

2.2.5 Environment

Working temperature	5° to 35°C
Storage temperature	-10°C to 70°C
Humidity	≤95% RH without condensation

2.2.6 Load Cell Excitation

Because more than one load cell can be used on a scale, the following are required for the load cell set to be used with this indicator.

Voltage	4.4VDC
Max. Current	55mA (can power 4-350 ohm loadcells)
Signal connection	4 or 6 lead with sense leads
Max Sensitivity	0.3mV/V to +3mV/V (must be fit to >0.2μV/display grad)
Input Resistor	≥80 Ω
Output Resistor	<10 KΩ

2.2.7 Communication

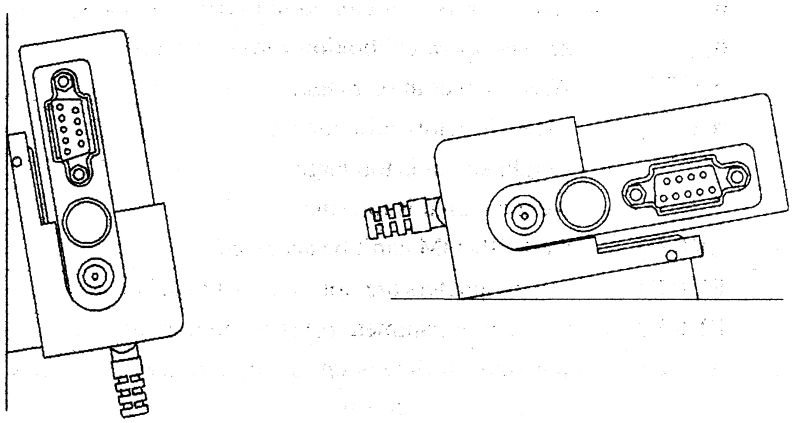
Mode	Full-duplex or only output mode can be selected
Baud Rate	Selectable: 1200-2400-4800-9600-19200 bps
Data Format	7 data bits, even or odd parity, 1 stop bit 8 data bits, non-parity, 1 stop bit
Protocol	7 selected protocols (one compatible with NCI standard SCP-01)
Output Data	gross weight, net weight, tare weight, indicator displaying weight, weighing unit etc.

3 Introduction

This chapter introduces indicator mounting, display and keypad operation in normal weigh mode.

3.1 Indicator Mounting

The PS-500 is supplied with an ABS plastic bracket. Wall mount vertically or bench mount horizontally depending on your needs.



3.2 Front Panel

The front panel incorporates the display and keypad.

3.3 Display

The PS-500 indicator utilizes a 7 segment LCD (Liquid Crystal Display) providing the weight and system information.

Arrows will illuminate to designate the current mode.

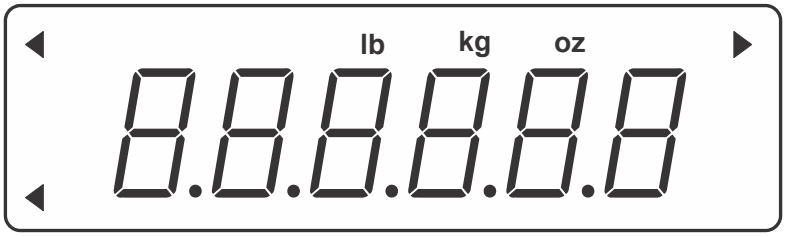


Figure 3.1 PS-500 Display

Table 3.1 LCD Display Annunciators and Definitions

Display Symbol	Description
ZERO ◀	The scale is at zero point and the gross weight is 0.
HOLD ▶	The scale is in HOLD mode. The current live weight is being displayed when the arrow flashes. The current weight is locked when the arrow does not flash.
NET ◀	Indicates net mode and the tare weight is not 0.
lb	Indicates the current unit of measure is lb.
oz	Indicates the current unit of measure is oz.
kg	Indicates the current unit of measure is kg.

3.4 Keyboard

The keyboard consists of four keys, some of which have multiple functions.

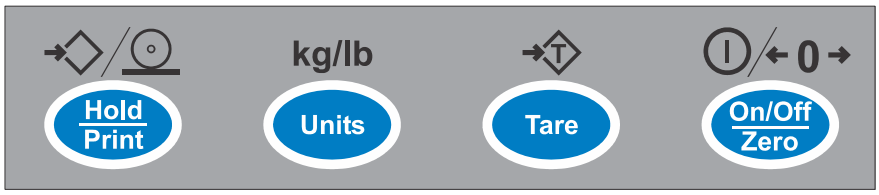


Figure 3.2 SBI-521 Keypad

Table 3.2 Function of the Keys (Normal Working Mode)

Key	Function
Hold Print	If this key is only set for HOLD (P2=0), press to enter or exit the HOLD mode.
	If this key is only set for PRINT (P2=1), press to output the data according to P4 setting.
←	If this key is only set for HOLD and PRINT (P2=2), press to output data according to P4 setting and hold the current weight.
Units	Choose weighing units; lb, kg, lb:oz
	Note: The weighing units that can be used are restricted by display division, and calibration weight unit (restricted by P8, P9, and P10)
↑	For example, if the calibration unit is kg; calibration display resolution is 50kg (that means: P8=5, P9=0, P10=0). If the UNIT key is pressed to choose weighing units, lb or lb:oz are not allowed to choose since the display resolution of 100lb or 2000oz is not available to this indicator.
Tare	Tare function
	This function can be activated only when the scale is in stable mode and the gross weight is not a negative value.
↵	
On/Off Zero	Power on
	Zero function: When the weight is within zero range, it will activate as ZERO function and clear the tare weight. When the weight is not within the zero setting range (P13), the scale will show 0----- (zero point is over the setting range) or 0_____ (zero is below the setting range).
⮌	Power off
	ignore modification
	Prepare to exit from current working mode

3.5 Navigating the Weigh Mode

3.5.1 Power the Indicator

Turn the indicator on or off with the **[ON/OFF]** key.

3.5.2 Enter or Exit the HOLD Mode

Press the **[HOLD]** key.

3.5.3 Zero

When the weight is stable and within the zero range, press the **[ZERO]** key to set a new zero point. Refer to Table 3.3 for zero limitations.

3.5.4 Tare

When the gross weight is larger than zero and the scale is stable, press the **[TARE]** key. The indicator will show a net weight of zero and the arrow to the right of NET will be illuminated. Refer to Table 3.3 for tare limitations.

3.5.5 Clear Tare Weight

Remove any weight on platform and wait until the scale is stable. Press the **[TARE]** key.

Table 3.3 Zero and Tare Limitations

Standard	Weight on platform	Data in TARE memory unit	key function	
			Tare key	Zero key
USA	≤0	no	No action	Zero
		yes	Clear the tared weight	
	>0	no	Tare	
		yes		
Canada	≤0	no	No action	Zero
		yes	Clear the tared weight	
	>0	no	Tare	
		yes	No action	

Standard	Weight on platform	Data in TARE memory unit	key function	
			Tare key	Zero key
Europe	≤0	no	No action	Zero
		yes	Clear the tared weight	Zero and clear the tared weight
	>0	no	Tare	Zero
		yes		Zero and clear the tared weight
None (same with Europe)	≤0	no	No action	Zero
		yes	Clear the tared weight	Zero and clear the tared weight
	>0	no	Tare	Zero
		yes		Zero and clear the tared weight

3.5.6 Output Data (Print)

When scale is stable press the **[PRINT]** key.

3.5.7 Change Weight Unit

Press the **[UNIT]** key to select kg, lb or lb:oz. Note: under some conditions lb:oz is not available. Please refer the following tables.

Table 3.4 Use kg as Primary Unit

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.0001kg	0.0001kg	0.0002lb	Not available
0.001kg	0.001kg	0.002lb	Not available
0.01kg	0.01kg	0.02lb	0.5oz
0.1kg	0.1kg	0.2lb	Not available
1kg	1kg	2lb	Not available
10kg	10kg	20 lb	Not available
0.0002kg	0.0002kg	0.0005 lb	Not available
0.002kg	0.002kg	0.005 lb	0.1 oz
0.02kg	0.02kg	0.05 lb	1 oz
0.2kg	0.2kg	0.5 lb	Not available
2kg	2kg	5 lb	Not available
20kg	20kg	50 lb	Not available
0.0005kg	0.0005kg	0.001 lb	Not available

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.005kg	0.005kg	0.01 lb	0.2 oz
0.05kg	0.05kg	0.1 lb	2oz
0.5kg	0.5kg	1 lb	Not available
5kg	5kg	10 lb	Not available
50kg	50kg	Not available	Not available

Table 3.5 Use lb as Primary Unit

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.0001lb	Not available	0.0001lb	Not available
0.001 lb	0.0005 kg	0.001 lb	Not available
0.01 lb	0.005 kg	0.01 lb	0.2 oz
0.1 lb	0.05 kg	0.1 lb	2 oz
1 lb	0.5 kg	1 lb	Not available
10 lb	5 kg	10 lb	Not available
0.0002 lb	0.0001 kg	0.0002 lb	Not available
0.002 lb	0.001 kg	0.002 lb	Not available
0.02 lb	0.01 kg	0.02 lb	0.5 oz
0.2 lb	0.1 kg	0.2 lb	Not available
2 lb	1 kg	2 lb	Not available
20 lb	10 kg	20 lb	Not available
0.0005 lb	0.0002 kg	0.0005 lb	Not available
0.005 lb	0.002 kg	0.005 lb	0.1 oz
0.05 lb	0.02 kg	0.05 lb	1 oz
0.5 lb	0.2 kg	0.5 lb	Not available
5 lb	2 kg	5 lb	Not available
50 lb	20 kg	50 lb	Not available

3.6 Hold Function

HOLD function can be used to freeze a displayed number. In this mode, the scale can capture a dynamic number, hold a stable number, or average a unstable number and then HOLD (freeze) this number temporarily for the user to view or record.

The HOLD function can be used in normal weighing mode, counting mode and percent weighing mode. After entering HOLD mode, the speed of A/D converter can be increased to 80Hz (if USER-HOLD-AD.H.SPD is set to YES) from original 10Hz for some dynamic weighing applications.

It is possible to weigh restless weighing samples such as live animals or moving objects within the hold function. The indicator provides special mode settings to accommodate weight movements.

3.6.1 Access the Hold Mode

To enter the HOLD mode, press the **[HOLD]** key while in the normal weighing mode.

4 Setup Mode

To set up the indicator, you must first enter the appropriate menu mode. The front panel keys become directional navigators to move around in the menus. See Table 4.1 for details.

4.1 Entering the Setup Menu

1. Press and hold the **[ON/OFF/ZERO]** and **[UNIT]** keys unit SETUP is displayed.

1a. This indicator offers 19 different setup parameters.

4.2 Navigating the Setup Menu

1. Once SETUP is displayed, use the **[UNIT]** key to change the flashed digits and use the **[HOLD/PRINT]** key to shift the flashed position.

The parameter will be designated in the following format:

PN.x or PNN.xx - P is parameter; N or NN is the parameter number; x or xx is the choice within the parameter. Refer to Table 4.2 for parameters and the options for each parameter.

2. Use the **[TARE]** key to confirm the entry, save the data and go to the next parameter.

Table 4.1 Key Functions in the Setup Mode

Key	Function
Hold / Print ←	Move cursor from right to left.
Units ↑	Scroll selected digit (0 - 9).
Tare ↵	Cycles through the parameters. Confirm parameter choice selection.
On/Off / Zero ⮌	Exit from setup mode to normal work mode.

4.3 Setup Menu Parameters

This section provides more detailed descriptions of the selections found in the Setup Menu.

The menu table shows the options and default parameter in LCD display format to coinside with the actual display.

Table 4.2 Parameter Choices and Explanations

SubMenu1	Option	Default	Parameter Description	Comment
P1	00-15	05	Auto off time	**00** = no auto off **01-15** = auto off time in minutes. The scale will automatically turn off after specified time when there has been no flucuation of weight.
P2	0-2	2	Hold key function	**0** = only HOLD function **1** = only PRINT function **2** = HOLD and PRINT function. Short press for Print function and long press for Hold function.
P3	0-2	2	Hold mode function	**0** = no hold function **1** = hold larger weight reading **2** = auto release hold function when weigh is below 10d and auto hold new stable weigh (more than 10d)
	3-50			**3-50** = unchangeable reading when the variety is within ±3-50d
P4	0-7	2	Output of print data	**0** = no RS232 function. Will not transmit or receive data. **1** = output display data when PRINT is pressed and weight reading is stable. <LF><weight reading, minus sign, decimal point, unit><CR><EXT> **2** = output gross, tare and net weight and weigh unit when PRINT pressed. <LF><Gross:weight reading, minus sign, decimal point, unit><CR><EXT> <Tare:weight reading, decimal point, unit><CR><EXT> <Net:weight reading, minus sign, decimal point, unit><CR><EXT> **3** = continuously output displayed weight reading and unit. No data will be received. Output format same as choice 1. **4** = continuously output gross, tare, net weight and weigh unit. No data will be received. Output formats same as choice 2. **5** = output display data and weigh unit one time when scale is stable. Output format same as choice 1. **6** = output gross, tare, net weight and weigh unit one time when scale become stable. Output formats same as choice 2. **7** = Bio-RS232 data output, compatible to NCI-SP1

SubMenu1	Option	Default	Parameter Description	Comment
P5	0-4	3	Baud rate for RS-232	**0** = 1200 bps **1** = 2400 bps **2** = 4800 bps **3** = 9600 bps **4** = 19200 bps
P6	0-2	0	RS-232 protocol	**0** = 8NO **1** = 7O1 **2** = 7E1
P7	00-31	9	Scale resolution select	Refer to Table 4.3 for resolution choices and values.
P8	0-2	1	Calibration division size	Refer to Table 4.4 and Table 4.5 **0** = 1 **1** = 2 **2** = 5
P9	0-5	1	Decimal point in calibration	Refer to Table 4.4 and Table 4.5 **0** = 1 **1** = 0.1 **2** = 0.01 **3** = 0.001 **4** = 0.0001 **5** = 10
P10	0-1	1	Calibration unit	Refer to Table 4.4 and Table 4.5 **0** = kg **1** = lb
P11	0-6	6	Weigh units enable	**0** = only kg **1** = only lb **2** = only lb:oz **3** = kg or lb **4** = kg or lb:oz **5** = lb or lb:oz **6** = kg, lb, or lb:oz
P12	0-7	3	Power on zero range	**0** = calibration zero -point +1%FS **1** = calibration zero -point +2%FS **2** = calibration zero-point +5%FS **3** = calibration zero-point +10%FS **4** = calibration zero-point +20%FS **5** = calibration zero-point +50%FS **6** = calibration zero-point +100%FS **7** = no limitation
P13	0-7	2	Zero range for **[ZERO]** key	**0** = power-on zero-point +1%FS **1** = power-on zero-point +2FS **2** = power-on zero-point +5%FS **3** = power-on zero-point +10%FS **4** = power-on zero-point +20%FS **5** = power-on zero-point +50%FS **6** = power-on zero-point +100%FS **7** = no limitation
P14	0-2	2	Weight signal within power on zero point range	**0** = current weight **1** = calibration zero-point **2** = switch off zero point and power off tare weight as current tare weight

SubMenu1	Option	Default	Parameter Description	Comment
P15	0-3	1	Weight signal not within power on zero point range	**0** = current weight **1** = calibration zero-point **2** = switch-off zero-point **3** = continuously display 0-----
P16	0-8	8	Zero tracking range	Choose the zero tracking range as per the stability of weighing system accuracy. **0** = 0d, no tracking **1** = +0.25d **2** = +0.5d **3** = +1d **4** = +1.5d **5** = +2d **6** = +3d **7** = +4d **8** = +5d
P17	0-3	2	Data filter intensity	The larger the digit data filter intensity is stronger and the speed of data updating is lower. **0** = very weak **1** = weak **2** = middle **3** = strong
P18	0-9	1	Range of weight stability checking	**0** = +0.5d **1** = ±1d **2** = +2d **3** = +3d **4** = +4d **5** = +5d **6** = +6d **7** = +7d **8** = +8d **9** = +9d
P19	0-9	1	Overload limit range	**0** = FS+0d **1** = FS+9d **2** = 101%FS **3** = 102%FS **4** = 105%FS **5** = 110%FS **6** = 120%FS **7** = 150%FS **8** = 200%FS **9** = no limitation

Table 4.3 Calibration Resolution (P7)

Parameter Choice	Calibration Resolution	Parameter Choice	Calibration Resolution
00	500	**16**	7500
01	600	**17**	8000
02	750	**18**	10000
03	800	**19**	12000
04	1000	**20**	15000
05	1200	**21**	20000
06	1500	**22**	25000
07	2000	**23**	30000
08	2400	**24**	35000
09	2500	**25**	40000
10	3000	**26**	50000
11	3500	**27**	60000
12	4000	**28**	70000
13	5000	**29**	75000
14	6000	**30**	80000
15	7000	**31**	100000

Table 4.4 Calibration Units (kg) per P8, P9 and P10

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.0001kg	0.0001kg	0.0002lb	Not available
0.001kg	0.001kg	0.002lb	Not available
0.01kg	0.01kg	0.02lb	0.5oz
0.1kg	0.1kg	0.2lb	Not available
1kg	1kg	2lb	Not available
10kg	10kg	20 lb	Not available
0.0002kg	0.0002kg	0.0005 lb	Not available
0.002kg	0.002kg	0.005 lb	0.1 oz
0.02kg	0.02kg	0.05 lb	1 oz
0.2kg	0.2kg	0.5 lb	Not available
2kg	2kg	5 lb	Not available
20kg	20kg	50 lb	Not available
0.0005kg	0.0005kg	0.001 lb	Not available

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.005kg	0.005kg	0.01 lb	0.2 oz
0.05kg	0.05kg	0.1 lb	2oz
0.5kg	0.5kg	1 lb	Not available
5kg	5kg	10 lb	Not available
50kg	50kg	Not available	Not available

Table 4.5 Calibration Units (lb) per P8, P9 and P10

Calibration Division Value	Display Division Value		
	kg	lb	lb:oz
0.0001lb	Not available	0.0001lb	Not available
0.001 lb	0.0005 kg	0.001 lb	Not available
0.01 lb	0.005 kg	0.01 lb	0.2 oz
0.1 lb	0.05 kg	0.1 lb	2 oz
1 lb	0.5 kg	1 lb	Not available
10 lb	5 kg	10 lb	Not available
0.0002 lb	0.0001 kg	0.0002 lb	Not available
0.002 lb	0.001 kg	0.002 lb	Not available
0.02 lb	0.01 kg	0.02 lb	0.5 oz
0.2 lb	0.1 kg	0.2 lb	Not available
2 lb	1 kg	2 lb	Not available
20 lb	10 kg	20 lb	Not available
0.0005 lb	0.0002 kg	0.0005 lb	Not available
0.005 lb	0.002 kg	0.005 lb	0.1 oz
0.05 lb	0.02 kg	0.05 lb	1 oz
0.5 lb	0.2 kg	0.5 lb	Not available
5 lb	2 kg	5 lb	Not available
50 lb	20 kg	50 lb	Not available

4.4 Relationship of Capacity and P7, P8 and P9 Settings

Table 4.6 Capacity Unit is kg or lb (Count by 1)

Resolution set by P7	Division set by P8 (P8 = 0) and P9					
	0.0001	**0.001**	**0.01**	**0.1**	**1**	**10**
500	0.0500	0.500	5.00	50.0	500	5000
600	0.0600	0.600	6.00	60.0	600	6000
750	0.0750	0.750	7.50	75.0	750	7500
800	0.0800	0.800	8.00	80.0	800	8000
1000	0.1000	1.000	10.00	100.0	1000	10000
1200	0.1200	1.200	12.00	120.0	1200	12000
1500	0.1500	1.500	15.00	150.0	1500	15000
2000	0.2000	2.000	20.00	200.0	2000	20000
2400	0.2400	2.400	24.00	240.0	2400	24000
2500	0.2500	2.500	25.00	250.0	2500	25000
3000	0 .3000	3.000	30.00	300.0	3000	30000
3500	0.3500	3.500	35.00	350.0	3500	35000
4000	0.4000	4.000	40.00	400.0	4000	40000
5000	0.5000	5.000	50.00	500.0	5000	50000
6000	0.6000	6.000	60.00	600.0	6000	60000
7000	0.7000	7.000	70.00	700.0	7000	70000
7500	0.7500	7.500	75.00	750.0	7500	75000
8000	0.8000	8.000	80.00	800.0	8000	80000
10000	1.0000	10.000	100.00	1000.0	10000	100000
12000	1.2000	12.000	120.00	1200.0	12000	120000
15000	1.5000	15.000	150.00	1500.0	15000	150000
20000	2.0000	20.000	200.00	2000.0	20000	200000
25000	2.5000	25.000	250.00	2500.0	25000	250000
30000	3.0000	30.000	300.00	3000.0	30000	300000
35000	3.5000	35.000	350.00	3500.0	35000	350000
40000	4.0000	40.000	400.00	4000.0	40000	400000
50000	5.0000	50.000	500.00	5000.0	50000	500000
60000	6.0000	60.000	600.00	6000.0	60000	600000
70000	7.0000	70.000	700.00	7000.0	70000	700000
75000	7.5000	75.000	750.00	7500.0	75000	750000
80000	8.0000	80.000	800.00	8000.0	80000	800000
100000	10.0000	100.000	1000.00	10000.0	100000	1000000

Table 4.7 Capacity Unit is kg or lb (Count by 2)

Resolution set by P7	Division set by P8 (P8 = 1) and P9					
	0.0002	**0.002**	**0.02**	**0.2**	**2**	**20**
500	0.1000	1.000	10.00	100.0	1000	10000
600	0.1200	1.200	12.00	120.0	1200	12000
750	0.1500	1.500	15.00	150.0	1500	15000
800	0.1600	1.600	16.00	160.0	1600	16000
1000	0.2000	2.000	20.00	200.0	2000	20000
1200	0.2400	2.400	24.00	240.0	2400	24000
1500	0.3000	3.000	30.00	300.0	3000	30000
2000	0.4000	4.000	40.00	400.0	4000	40000
2400	0.4800	4.800	48.00	480.0	4800	48000
2500	0.5000	5.000	50.00	500.0	5000	50000
3000	0.6000	6.000	60.00	600.0	6000	60000
3500	0.7000	7.000	70.00	700.0	7000	70000
4000	0.8000	8.000	80.00	800.0	8000	80000
5000	1.0000	10.000	100.00	1000.0	10000	100000
6000	1.2000	12.000	120.00	1200.0	12000	120000
7000	1.4000	14.000	140.00	1400.0	14000	140000
7500	1.5000	15.000	150.00	1500.0	15000	150000
8000	1.6000	16.000	160.00	1600.0	16000	160000
10000	2.0000	20.000	200.00	20000.0	20000	200000
12000	2.4000	24.000	240.00	2400.0	24000	240000
15000	3.0000	30.000	300.00	3000.0	30000	300000
20000	4.0000	40.000	400.00	4000.0	40000	400000
25000	5.0000	50.000	500.00	5000.0	50000	500000
30000	6.0000	60.000	600.00	6000.0	60000	600000
35000	7.0000	70.000	700.00	7000.0	70000	700000
40000	8.0000	80.000	800.00	8000.0	80000	800000
50000	10.0000	100.000	1000.00	10000.0	100000	1000000
60000	12.0000	120.000	1200.00	12000.0	120000	1200000
70000	14.0000	140.000	1400.00	14000.0	140000	1400000
75000	15.0000	150.000	1500.00	15000.0	150000	1500000
80000	16.0000	160.000	1600.00	16000.0	160000	1600000
100000	20.0000	200.000	2000.00	20000.0	200000	2000000

Table 4.8 Capacity Unit is kg or lb (Count by 5)

Resolution set by P7	Division set by P8 (P8 = 2) and P9					
	0.0005	**0.005**	**0.05**	**0.5**	**5**	**50**
500	0.2500	2.5000	25.00	250.0	2500	25000
600	0.3000	3.000	30.00	300.0	3000	30000
750	0.3750	3.750	37.50	375.0	3750	37500
800	0.4000	4.000	40.00	400.0	4000	40000
1000	0.5000	5.000	50.00	500.0	5000	50000
1200	0.6000	6.000	60.00	600.0	6000	60000
1500	0.7500	7.500	75.00	750.0	7500	75000
2000	1.0000	10.000	100.00	1000.0	10000	100000
2400	1.2000	12.000	120.00	1200.0	12000	120000
2500	1.2500	12.500	125.00	1250.0	12500	125000
3000	1.5000	15.000	150.00	1500.0	15000	150000
3500	1.7500	17.500	175.00	17500.0	17500	175000
4000	2.0000	20.000	200.00	20000.0	20000	200000
5000	2.5000	25.000	250.00	2500.0	25000	250000
6000	3.0000	30.000	300.00	3000.0	30000	300000
7000	3.5000	35.00	350.00	3500.0	35000	350000
7500	375.00	37.500	375.00	3750.0	37500	375000
8000	4.0000	40.000	400.00	4000.0	40000	400000
10000	5.0000	50.000	500.00	5000.0	50000	500000
12000	6.0000	60.000	600.00	6000.0	60000	600000
15000	7.5000	75.000	750.00	7500.0	75000	750000
20000	10.0000	100.000	1000.00	10000.0	100000	1000000
25000	12.5000	125.000	1250.00	12500.0	125000	1250000
30000	15.0000	150.000	1500.00	15000.0	150000	1500000
35000	17.5000	175.000	1750.00	17500.0	175000	1750000
40000	20.0000	200.000	2000.00	20000.0	200000	2000000
50000	25.0000	250.000	2500.00	25000.0	250000	2500000
60000	30.0000	300.000	3000.00	30000.0	30000	3000000
70000	35.0000	350.000	3500.00	35000.0	350000	3500000
75000	37.5000	375.000	3750.00	37500.0	375000	3750000
80000	40.0000	400.000	4000.00	40000.0	400000	4000000
100000	50.0000	500.000	5000.00	50000.0	500000	5000000

4.5 Exit the Setup Menu

1. Power off the indicator by pressing and holding the **[ZERO/ON/OFF]** key.
2. Move the slide switch on the rear cover back to the left and replace the metal protective plate. Refer to section 4.2 for location.
3. Turn the indicator back on by pressing the **[ON]** key. The display will go through a digit check, then settle into Normal Operating mode. All front panel keys will now return to their normal mode of operation.

5 Calibration

The config/cal switch must be set to the ON position in order to calibrate the indicator.

NOTE: More than 25% of the full scale weight is needed for calibration.

5.1 Calibration Mode

Before calibration, prepare the standard weight (more than 25% of full scale).

1. Remove any weight on the scale.
2. When in normal weighing mode, press and hold down **[TARE]** and **[ON/OFF/ZERO]** keys to enter calibration mode.
3. When the indicator displays CAL -, the scale is ready for calibration. Press **[TARE]** to confirm and go to next step or press **[ON/OFF/ZERO]** to exit the calibration mode.
4. The indicator will display CAP--.

4a. This means the following data is the full capacity according to your setting of display resolution (P7), display division value (P8), location of decimal point in calibration unit (P9) and capacity unit in calibration (P10).

4b. If the setting of full scale is more than 199999 (regardless of decimal point and weight unit), the full scale capacity will be shown by first four digits and last four digits: Hxxx and Lxxx.

5. Press **[TARE]** to go to next step directly, press **[ON/OFF/ZERO]** to exit the calibration mode or after a few seconds it will automatically to next step.
6. The scale will automatically display the setting of division. Firstly it will display d.--, and then the data according to your setting of P8, P9 and P10. Refer to Table 5.1 to choose a division size.

Table 5.1 Divison Sizes

0.0001 kg/lb	0.0002 kg/lb	0.0005 kg/lb
0.001 kg/lb	0.002 kg/lb	0.005 kg/lb
0.01 kg/lb	0.02 kg/lb	0.05 kg/lb
0.1 kg/lb	0.2 kg/lb	0.5 kg/lb
1 kg/lb	2 kg/lb	5 kg/lb
10 kg/lb	20 kg/lb	50 kg/lb

7. Press **[TARE]** to go to next step directly, press **[ON/OFF/ZERO]** to exit the calibration mode or after a few seconds it will automatically to next step.
8. CAL.P0 is displayed. This is the scale zero point. Remove weight from scale and press the **[TARE]** key.

9. CAL.P 1 will be displayed. This is the second calibration point. The default standard weight is 50% of full scale. Load weight from 12.5% to 100% of full scale.

10. Use the **[PRINT/HOLD]** and **[UNIT]** keys to input the loaded weight.

10a. If the input data is larger than 199999 it will be shown by first four digits and last four digits: Hxxx and Lxxx.

10b. If the triangular symbol on the left bottom of LCD window appears, it means that the digit being changed is the displayed most significant bit which can only be 0/blank or 1.

11. Press the **[TARE]** key to confirm your setting and the indicator will flash the input standard weight. Wait till the scale comes steady and input A/D data as per the standard weight.

12. CAL.P2 will be displayed. This is the third calibation point. When xxxxxx kg (or lb) is displayed (100% FS is default), you can press **[ON/OFF/ZERO]** to exit the calibration mode or place a standard weight (must be in the range of 25%-100% FS, and equal or larger than that for the second calibration point; this is also the range of your input number) on the scale.

13. Use the **[PRINT/HOLD]** and **[UNIT]** keys to input the loaded weight.

14. Use **[TARE]** key to confirm the standard weight and input number are correct.

14a. If the calibration weight for third point is same with that for second point and the calibration weight is more than 25%FS, input the standard calibration weight same as second point calibration and press **[TARE]** key to confirm the setting. The indicator will flash the input weight. If the indicator get reasonable data (the input weight is correct, and the calibration weight of third calibration is more than equal to the calibration weight of second calibration), it will go to next step.

15. CAL.P0 will be displayed again. Press **[TARE]**. The display will blink. If the calibration is good the data will be saved. The display will perform an auto reset and return to the working mode.

15a. If an error occurs during calibration, CAL.Er will be displayed. Start from step 1 and recalibrate.

5.2 Display ADC Code or Working Voltage Value

In this mode, you can examine the stability of weighing system and increment the ADC output code corresponding to the loaded weight.

Note:

- The increment of ADC code for full scale weight must be larger or equal to 2 times of selected display division. Otherwise, the calibration cannot be properly completed.
  - e.g. The display division is 0.1kg. Load 100kg standard weight on the platform, the increment of ADC code should be at least more than 2x100kg/0.1kg= 2x1000=2000. In this case, the scale can be calibrated. Otherwise, smaller division needs to be chosen.
- The data should be stable. Otherwise, the calibration cannot be properly completed.

In this mode, the proper ADC data at zero point can be viewed by examining the A/D data for loaded weight.

- If the ADC increase for full capacity is NFS, the power-on zero range is set to Zp% FS (P12 setting) and zero key range is set to Zk% FS (P13 setting). Then proper ADC data of zero point is larger than (Zp%+ Zk%) x NFS.

1. From the weigh mode press and hold the **[ON/OFF/ZERO]** and **[HOLD/PRINT]** key until CodE is shown. The indicator will show the firmware version.

2. ADC increase for full capacity (NFS) can be make by loading the weight (W) on the platform and the ADC increase for W weight is Nw. The ADC increase for full capacity WFS is (NFS)= (Nw)x (WFS)/W.

2a. It is possible a negative value will be displayed due to an error from the loadcell(s) or the position of the zero-point potentiometer on PCB. However, the software only deals with positive values. In this case the position of zero-point potentiometer will need to be adjusted to make the ADC data will be positive value and larger than (Zp%+ Zk%) x NFS. Normally the indicator is factory-calibrated and adjustment is not necessary. Refer to Figure 5.1 for the zero point potentiometer location. Decrease ADC data by rotating clockwise, and increase ADC data by rotating counter-clockwise.

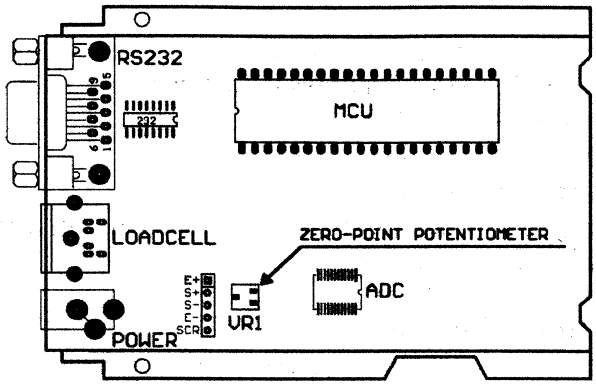


Figure 5.1 Zero Point Potentiometer Location

3. Press the **[UNIT]** key to select the ADC weight inner code or input the inner working voltage value. When Ux.xx is displayed, the displayed digits are the voltage value. The proper working power voltage is between 5V - 8V.

4. Press the **[TARE]** key to display filtered or unfiltered weigh A/D data. When ▶ is on the data is filtered.

5. Press the **[ON/OFF/ZERO]** key to exit this mode and return to the normal weighing mode.

6 Serial Communication

6.1 Com Port 1

COM1 is a RS-232 bi-directional port. Communication wires are connected to the RS-232 connector using TXD1, RXD1 and GND.

Table 6.1 PS-500 Com1 Port

Designation	Description	Pin
TXD	transmit	2
RXD	receive	3
GND	ground/common	5
DSR	data set ready	4
DTR	data terminal ready	6
CTS	clear to send	7
RTS	return to send	8
no connection	no connection	1
no connection	no connection	9

NOTE: The indicator DB9 female connector has pin 4 and pin 6 shorted together. Pin 7 and pin 8 are also shorted together.

6.2 Protocol

The baud rate and byte format is fixed by P5 and P6 settings.

Responses to serial commands will be immediate or within one weight measure cycle of the scale. One second should be adequate for use as a time-out value by remote (controlling) device.

6.3 Transaction String

The length of the weight field will be 7 digits. One digit for minus sign, one for decimal point, 2 for unit of measure.

- If the unit is lb:oz, another two for lb and on for a space after lb. Units of measure abbreviations are always lower case.
- If the weight is over capacity, the scale will return nine "^" characters (the field of minus sign, decimal point, weight data is filled by "^").
- If the weight is under capacity, it will return nine "_" characters (the field of minus sign, decimal point, and weight data is filled by "_").
- If the zero point is error, it will return nine "_" characters. The character will be “-” for negative weight or a space character for positive weight. Minus sign follow after the first digit.

Useless leading 0 before digits is suppressed.

Table 6.2 Symbols Used

<LF>	Line Feed character (hex 0AH)
<CR>	Carriage Return character (hex 0DH)
<ETX>	End of Text character (hex 03H)
<SP>	Space (hex 20H)
$H_1H_2H_3$	Four current status bytes
<P>	Polarity character: "?" or " "
W_1---W_7	Reading data, 1-7 bytes (seven digits)
<DP>	Decimal point
U_1U_2	Measure units, kg, lb, lb:oz, % or pcs; 2-5 bytes

Table 6.3 Bit Definition of $H_1H_2H_3$

Bit	Byte 1 (H_1)	Byte 2 (H_2)	Byte 3 (H_3)
0	0 = stable	0 = not under capacity	00 = compare disable 01 = lower limit 10 = ok 11= upper limit
	1 = not stable	1 = under capacity	
1	0 = not at zero point	0 = not over capacity	
	1 = at zero point	1 = over capacity	
2	always 0	always 0	0 = gross weight
			1 = net weight
3	0 = eeprom OK	always 0	always 0
	1 = eeprom error		
4	always 1	always 1	always 1
5	always 1	always 1	always 1
6	always 0	always 1	always 0
7	parity	parity	parity

6.4 Commands and Response

Command: W<CR> (57h 0dh), request current reading

Response
<LF>^^^^^^^^U_1U_2 <CR><LF> $H_1H_2H_3$ <CR><ETX>---over capacity
<LF>_ _ _ _ _ _ _ _ U_1U_2 <CR><LF> $H_1H_2H_3$ <CR><ETX>---under capacity
<LF> - - - - - - - - U_1U_2 <CR><LF> $H_1H_2H_3$ <CR><ETX>---zero-point error
Note: If the weigh unit is lb:oz, U_1U_2 oz in above responses
<LF><P>$W_1W_2W_3W_4W_5W_6$<DP>W_7 U_1U_2<CR><LF> $H_1H_2H_3$ <CR><ETX>---scale is stable and the current weigh unit is kg or lb. With or without decimal point and the position is as per the P9 setting.
<LF><P>$W_1W_2W_3$lb<SP>W_4W_5lb<SP>W_6W_7oz<CR> $H_1H_2H_3$<CR><ETX>
<LF><P>$W_1W_2W_3$lb<SP>W_4lb<SP>W_5W_6<DP>W_7oz<CR> $H_1H_2H_3$<CR><ETX>

Command: S<CR> (53h 0dh), request current status

Response
<LF> $H_1H_2H_3$ <CR><ETX>

Command: Z<CR> (5ah 0dh)

Response
Zero function is activated (simulate ZERO key) and it returns to current scale status.
<LF> $H_1H_2H_3$<CR><ETX>

If ZERO function cannot be activated, it will return to current scale status.

Command: T<CR> (54h 0dh)

Response
TARE function is activated (simulate TARE key), and then returns scale status.
<LF> $H_1H_2H_3$ <CR><ETX>

If TARE function cannot be activated, it will return to current scale status.

Command: U<CR> (55h 0dh)

Response
Changes units of measure (simulate UNIT key) and return scale status with new units, The new measure unit should be allowed to use
<LF> U_1U_2 <CR><LF> $H_1H_2H_3$<CR><ETX>

Command: L<CR> (4ch 0dh)

Response
If Hold function can be activated, it will enable/disable hold function (simulate HOLD key) and returns scale status.
<LF> $H_1H_2H_3$<CR><ETX>

Command: X<CR> (58h 0dh)

Response
Power off the scale, just like press down the ON/OFF key to turn off the scale.

Command: all others

Response
Unrecognized command
<LF>? <CR><ETX>

Table 6.4 Summary of Command and Response:

Command		Response
ASCII	**HEX**	
W<CR>	57 0d	Read scale weight: <LF>^^^^^^^^U1U2 U3U4U5<CR><LF> H1H2H3 H4<CR><ETX>---over capacity ?<LF>_____U1U2U3U4U5<CR><LF> H1H2H3 H4<CR><ETX>---under capacity ?<LF>-------- U1U2 U3 U4U5<CR><LF> H1H2H3 H4<CR><ETX>---zero-point error ?<LF><p>W1W2W3W4W5<dp>W6U1U2U3U4U5<CR><LF>H1H2H3H4<CR><ETX>---normal data
S<CR>	53 0d	<LF> H1H2H3H4<CR><ETX>; read scale status
Z<CR>	5a 0d	<LF> H1H2H3H4<CR><ETX>; simulate ZERO key
T<CR>	54 0d	<LF> H1H2H3H4<CR><ETX>; simulate TARE key
U<CR>	55 0d	<LF> U1U2 U3 U4U5<CR><LF> H1H2H3H4<CR><ETX>; simulate UNIT key
L<CR>	4c 0d	<LF> H1H2H3H4<CR><ETX>; simulate HOLD key
X<CR>	58 0d	power off the scale, simulate OFF key
others		<LF>? <CR><ETX>

7 Troubleshooting

This chapter gives explanations on commonly seen errors, display characters and display symbols.

7.1 Display Characters

ASCII	Display Character	ASCII	Display Character	ASCII	Display Character
0		A		N	
1		B		O	
2		C		P	
3		D		Q	
4		E		R	
5		F		S	
6		G		T	
7		H		U	
8		I		V	
9		J		W	
		K		X	
		L		Y	
		M		Z	

7.2 Display Symbols

Symbol	Description
0------	Zero is over the setting range
0_____	Zero point is below the setting range
Ad------	Signal to ADC is over maximum range
Ad_____	Signal to ADC is below minimum range
--------	Weight is over upper limitation or display data is over limitation
_______	Weight is below lower limitation
EEP.E0	EEPROM can't be accessed.
EEP.E 1	The parameters are not the same as the backup data
EEP.E2	The setting parameter(s) is not in normal range
Lo.bAt	Battery voltage is below 4.7V
CAP.- -	The setting full capacity will be displayed
CAL.P11	Calibration on point (x)
CAL.Er	Calibration error, maybe input data or loaded weight is incorrect, unstable, non-linear
d.--	The division will be displayed
P11.y	The x = parameter, y = parameter choice

7.3 Error Messages and Troubleshooting

Symptom	Probable Cause	Remedy
Ad------	Loadcell wires to indicator are incorrectly connected, shorted, opened, ADC or loadcell(s) are damaged.	Make sure wires are ok and correctly connected. Replace loadcell or ADC chip, Service required.
Ad_____		
0------	Weight reading exceeds Power On Zero limit.	Make sure scale platform is empty. Perform zero calibration.
0_____	Weight reading below Power On Zero limit.	Install platform on scale. Perform zero calibration.
--------	Weight reading exceeds Overload limit or the weight value cannot be displayed in the current unit of measure because it exceeds 6 digits.	Reduce load on scale until weight value can be displayed. Use a more appropriate unit of measure.
_______	Weight reading below under load limit.	Install platform on scale. Perform zero calibration.
EEP.E2	Parameter is not correctly set.	Re-set parameter
CAL.Er	Calibration error. Input data or loaded weight is too small, too big, unstable, non-linear.	Input correct data, load correct weight onto platform, Service required.
Will not turn on.	Power cord not plugged in or properly connected. Power outlet not supplying electricity. Battery discharged. Other failure.	Check power cord connections. Make sure power cord is plugged into the power outlet. Check power source. Replace batteries. Service required.
Cannot zero the display or will not zero when turned on.	Load on scale exceeds allowable limits. Load on scale is not stable. Load cell damage.	Remove load on scale. Wait for load to become stable. Service required.

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