LPS Series

Postal and Parcel Shipping Scales

User Instructions

AWT 35-501303
Issue AB

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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 LPS Series are located on the front panel of the indicator. The keystrokes are shown in **BOLD**. (e.g. **ZERO**)

Displayed messages appear in **BOLD** *italic* format (e.g. ***HId.01***) 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.

1.7 Declaration of Conformity

Brecknell, a trading name of Avery Weigh-Tronix Ltd.

Foundry Lane, Smethwick, West Midlands, B66 2LP, England

CE

Declaration of Conformity | **Konformitätserklärung**

Verklaring van Overeenstemming | **Dichiarazione di conformità**

Déclaration de Conformité | **Declaración de Conformidad**

Manufacturer	Avery Weigh-Tronix Limited
Type	Brecknell WS / PS / LPS Series SBI 140
corresponds to the requirements of the following EC directives:	
EMC Directive	2004/108/EC
Low Voltage Directive	2006/95/EC
The applicable harmonised standards are:	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

Avery Weigh-Tronix Limited
Reg. Office: Foundry Lane, Smethwick,
West Midlands B66 2LP, England.
Registered in England No: 595129

Fabrikant	Avery Weigh-Tronix Limited
Type	Brecknell WS / PS / LPS Series SBI 140
is in overeenstemming met de voorschriften van de volgende EG richtlijnen:	
EMC Richtlijn	2004/108/EG
Laagspanningsrichtlijn	2006/95/EG
Toegepaste geharmoniseerde normen:	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

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West Midlands B66 2LP, England.
Registered in England No: 595129

Fabricant	Avery Weigh-Tronix Limited
Type	Brecknell WS / PS / LPS Series SBI 140
correspond aux exigences des directives CE suivantes :	
Directive CEM	2004/108/CE
Directive Basse Tension	2006/95/CE
Les normes harmonisées applicables sont :	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

Avery Weigh-Tronix Limited
Reg. Office: Foundry Lane, Smethwick,
West Midlands B66 2LP, England.
Registered in England No: 595129

Hersteller	Avery Weigh-Tronix Limited
Typ	Brecknell WS / PS / LPS Series SBI 140
entspricht den Anforderungen folgender EG–Richtlinien:	
EMV-Richtlinie	2004/108/EG
Niederspannungs Richtlinie	2006/95/EG
Die angewendeten harmonisierten Normen sind:	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

Avery Weigh-Tronix Limited
Reg. Office: Foundry Lane, Smethwick,
West Midlands B66 2LP, England.
Registered in England No: 595129

Produttore	Avery Weigh-Tronix Limited
Modello	Brecknell WS / PS / LPS Series SBI 140
è conforme alle caratteristiche previste dalle seguenti direttive CE:	
Normativa EMC	2004/108/CE
Normativa per la bassa tensione	2006/95/CE
Le norme standard armonizzate e nazionali applicate sono:	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

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Fabricante	Avery Weigh-Tronix Limited
Tipo	Brecknell WS / PS / LPS Series SBI 140
conforme a las exigencias de las siguientes directivas CE:	
Directiva CME	2004/108/CE
Directiva de baja tensión	2006/95/CE
Las normas armonizadas en vigor son:	
EN60950-1:2006+A12:2011	EN61000-6-1:2007 EN61000-6-3:2007 + A1:2011

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West Midlands B66 2LP, England.
Registered in England No: 595129

Signature/Name Handtekening/Naam Signature/Nom Unterschrift/Name Firma/Nome Firma/Nombre	S. Hine Head of R & D (UK)	Authorised signatory for Avery Weigh-Tronix Limited Namens van Avery Weigh-Tronix Limited Signataire autorisé d'Avery Weigh-Tronix Limited Unterschriftsberechtigter für Avery Weigh-Tronix Limited Firmatorio autorizzato per Avery Weigh-Tronix Limited Firmante autorizado para Avery Weigh-Tronix Limited	Date Datum Date Datum Data Fecha 13 December 2012

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2 Specifications

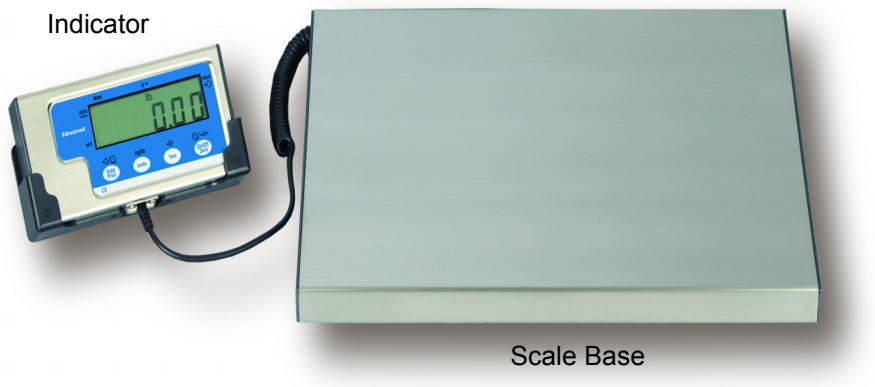
Models	LPS-15 (15 kg / 30 lb) , LPS-150 (68 kg / 150 lb), LPS-400 (182 kg / 400 lb)
Calibration Method	Software calibration with long term storage in EEPROM
SERIAL COMMUNICATIONS	
Mode	Full Duplex
Baud rate	1200, 2400, 4800, 9600, 19,200 bps
Data format	7 data bits, even or odd parity, 1 stop bit 8 data bits, non-parity, 1 stop bit
Protocol	Compatible with NCI standard SCP-01
OPERATION INTERFACE	
Display	0.65" (17 mm) 7-segment LCD, 5 1/2 digits
Keyboard	4-key push button
POWER	
Alkaline Batteries	4 x "AA" batteries (When all displayed segments of the LCD display flash, the batteries are low and should be replaced immediately.)
DC Power Consumption	25mA@6Vdc (does not include load cell's con- sumption)
Operation temperature	9° to 107°F (5° to 35°C)
Options	Foot Switch (LPS-15 only)
Approval	CE

3 Introduction

Thank you for purchasing an LPS Series with 140 indicator. Please read all instructions carefully before using the scale and keep the following points in mind:

- Avoid lengthy exposure to extreme heat or cold. Your scale works best when operated at normal room temperature. Always allow the scale to reach room temperature before use.
- Allow sufficient warm up time. Turn the scale on and wait for a few minutes if possible, to give the internal components a chance to stabilize before weighing.
- These electronic scales are precision instruments. Do no operate near an inuse cell phone, radio, computer or other electronic device. These devices emit RF and can cause unstable readings. If your scale ever performs poorly, try moving the scale to a different room or location.

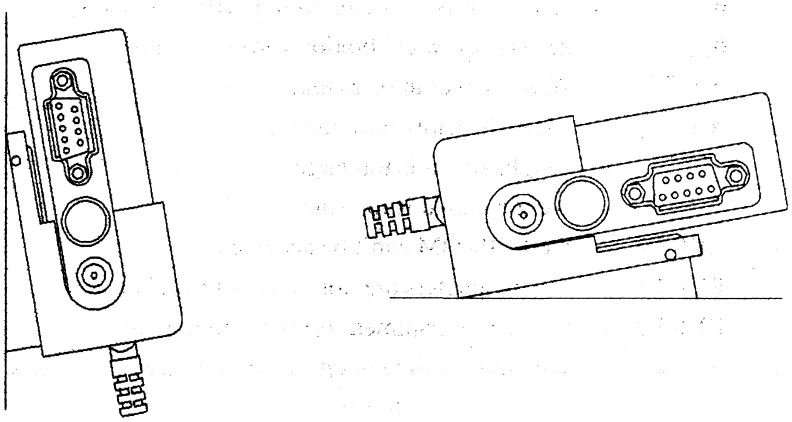
3.1 Packing List



Name	Quantity
LPS Series scale with indicator	1
Communication cable	1
Indicator bracket	1
User manual	1

3.2 Placement of Indicator and Bracket

For Reference Only

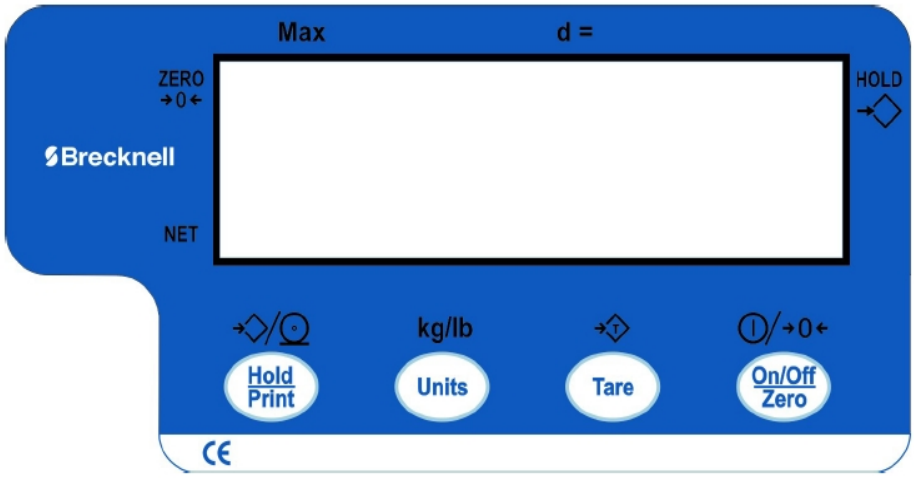


(1) Placed Vertically

(2) Placed Horizontally

3.3 Quick Start

The front panel incorporates the display and keypad.



3.3.1 Keys

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

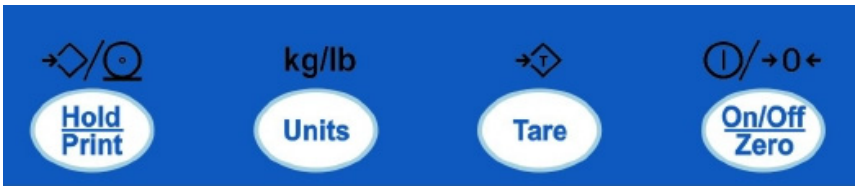


Figure 3.1 LPS Series Keypad

Table 3.1 Function of the Keys (normal working mode)

Key	Function
Hold / Print	This key can be configured so it operates as a hold key only, operate as a print key only or operate as both.
Units	All units of measure within the scale should be able to be enabled / disable through the configuration mode.
	When the unit's key is pressed the scale will automatically switch to the new unit of measure and display the correct weight, even if there is a hold or tare is active.
Tare	Press the tare key to tare the weight on the scale. The net annuncator will illuminate.
	To cancel a tare, press the tare key with no weight on the scale.
On/Off / Zero	Press this key to turn the scale on. The display will show the scale's ca- pacity, the scale will automatically zero if the weight is within 10% of the calibrated zero point, and then 0 (kg/lb) will be displayed. This is normal weighing mode.
	The scale powers up in the same unit of measure as when it was turned off.
	Press this key to zero any weight, up to 2% of full capacity, on the scale.
	Press and hold this key for five seconds to turn the scale off.

3.3.2 Performing a Weighment

1. Turn the scale on and press the **ZERO** key if the display shows any weight.
2. Place item on the scale. Weight is displayed.
3. Press the **TARE** key to tare a weight.
4. Press **UNITS** key to change unit of measure.

3.4 Key Function

The keys have different functions depending on what mode the unit is in and how long the key is pressed.

In normal mode, hold down the key for less than five seconds for these functions:

HOLD	UNITS	TARE	ON/OFF

In normal weighing mode, hold down the key for more than five seconds for these functions:

CODE	SETUP	CALIBRATION	OFF

CODE	Go to display inner code mode
SETUP	Go to user setup mode
CALIBRATION	Go to calibration mode

In Setup mode, press the keys for these functions:

SHIFT/BACK/DEC	CHANGE/INC	ENTER/NEXT	EXIT

SHIFT/BACK/DEC	Shift the flashing position to the left; Or go back to above step; Or decrease the flashing digit
CHANGE/INC	Change the flashing item; Or increase the flashing digit
ENTER/NEXT	Confirm your input or selection; Or go to next item
EXIT	Exit from setting mode to normal work mode

3.4.1 Key Details

HOLD

1. From normal weighing mode, press this key for less than five seconds to enable or disable the *Display Data Hold* function. When this is enabled the ▶ will flash or continuously appear in the upper right of the display window.

   There are three Hold Function modes (set these using instructions found in section 3.5):

   - If ***Hld.00*** is set, a stable displayed weight, above 10 divisions, will be held/locked when the weight is removed from the scale. If you place a heavier weight on the scale, that new weight will be displayed and held. If you remove the weight and let the scale become stable, the held weight is still displayed until you place a smaller weight on the scale. That smaller weight will be displayed and held.
   - If ***Hld.01*** is set, a stable displayed weight, above 10 divisions, will be held/locked when the weight is removed from the scale. If you place a heavier weight on the scale, that new weight will be displayed and held. Only a larger weight than the held weight will change the display. This is different than the Hld.00 mode.
   - If ***Hld.02*** (… ***Hld.99***) is set, the stable, displayed weight will be held/locked as long as weight changes stay within the division window (± 2 . . . ±99) you choose.

Note: Only stable weight can be held! The weight is stable when the unit of measure symbol is steady. When ▶ flashes, the displayed reading is the current weight on the scale. When ▶ is continuously lit, the displayed reading is the held/locked reading.

If you press **TARE** when the hold function is enabled, the held reading will be cleared, but the hold function is still enabled. To disable hold function, press **HOLD** once more.

2. Press this key for more than five seconds to access the Display Internal Code mode. See section 3.7 Display Internal Code for more information.

UNIT

1. Press this key for less than five seconds to toggle the unit of measure between lb and kg. This information is saved when you turn off the scale. It will power up in the same unit of measure.
2. Press this key for more than five seconds to access the Setup mode. In this mode you can set the auto-off timer and select the serial communication protocol.

TARE

1. From normal weighing mode, press this key less than five seconds to zero or tare the scale if the weight is stable. When the current gross weight is in the zero-point range, this will zero the scale and clear the NET. When current gross weight is not in zero-point range, this will tare the scale and light NET on the display window. If the weight is not stable, the scale will attempt the zero/tare function for approximately 10 seconds.

2. From normal weighing mode, press this key more than five seconds to access Calibration mode.

ON/OFF/ZERO

1. Press this key to turn the scale on. The display will show the scale's capacity, the scale will automatically zero if the weight is within 10% of the calibrated zero point, and then ***0*** (kg/lb) will be displayed. This is normal weighing mode.

   If the scale is not in zero-point range, the scale will display ***0 -----*** or

   0 ____ and wait.

2. Press this key to zero any weight, up to 2% of full capacity on the scale.

3. Press and hold this key for five seconds to turn the scale off.

3.5 Setup Auto off Time, RS-232 and Hold Function Setting

Follow these steps to setup the auto off timer and the RS-232 settings:

1. With the scale in normal weighing mode, press the hold the **UNITS** key until. . .

   A.oFF.x is shown. This shows that you are in the auto off time setting mode. ***x*** can be equal to 1-9 minutes or 0, which means the feature is disabled. Default value is 0.

2. To change the ***x*** value, press the **UNITS** key. . .

   The ***x*** value will change and flash.

3. When the value you want is displayed, press the **TARE** key to accept the value.

   The value is stored and ***SP.X*** is displayed. This shows the unit is in the RS-232 setting mode. ***X*** is defined below.

SP.0 No RS232 input or output

SP.1 Continuous data output. The scale will continuously communicate the displayed weight including the unit of measure, a line feed and a carriage return. Example below:

120.2 kg

120.3 kg

120.4 kg

120.4 kg

120.4 kg

SP.2 If the **HOLD/PRINT** key is active and pressed, the scale will transmit the displayed weight, including the unit of measure, a line feed and a carriage return once the weight becomes stable and locked on the display. Example below:

120.4 kg

SP.3 The scale will transmit the following data once the reading becomes stable and will not allow a second print until the scale reading returns back to gross zero:

Gross 123.8 kg Net 120.4 kg Tare 3.4 kg

4. Use the **HOLD** and **UNITS** keys to change the value of ***X***. When you are done making changes press the **TARE** key to accept the changes and go to next step (hold function). . .

   Hld.xx is displayed. This means you are in Hold function setting mode. xx values 00,01,02,03…99

   Hld.00 = hold function mode 0

   Hld.01 = hold function mode 1

   Hld.02 . . .***99*** = hold function mode 2-99

5. Use the **HOLD** and **UNITS** keys to change the value of each ***xx***. When you are done making changes press the **TARE** key to accept the changes and restart the scale.

On any step in this section you can press the **ZERO** key to exit the setting mode.

3.6 Function Set

1. When the scale is in normal weighing mode, press and hold the **HOLD** key and then press down and hold the **ON/OFF** key until. . .

   F-Set is temporarily displayed, then ***FS. oN*** or ***FS.oFF*** is shown. If the Function Set is enabled you are allowed to modify the calibration unit of measure, display divisions (n), the division size (d) and location of the decimal (dot) during calibration. If you choose OFF, these are not available during calibration.

2. Press the **UNITS** key to toggle between ***oN*** or ***oFF***. Press the **TARE** key to save the displayed choice. . .

   tr. oN or ***tr. oFF*** is displayed. This stands for AZT (auto zero tracking). Choose ON to enable AZT and OFF to disable AZT.

3. Press the **UNITS** key to toggle between ***oN*** or ***oFF***. Press the **TARE** key to save the displayed choice. Factory default is ON. . .

   Indicator exits the Function Set mode.

4. Press **ON/OFF** anytime while in the Function Set mode to exit this mode.

3.7 Display Internal Code

1. In normal weighing mode, press and hold the **HOLD** key for more than five seconds, until ***codE*** is shown. This means you are in Display Internal Code mode.

2. Press the **UNIT** key to display filtered or unfiltered A/D data; when ▶ is on, the data is filtered.

3. Press the **HOLD** key to select displaying weight inner code or around current power voltage (4.7V-6.5V); when displaying current voltage, the "p" will be displayed also.

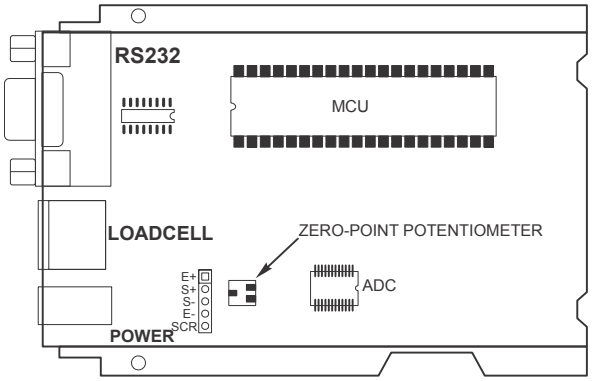
4. Press the **ON/OFF** key to exit this mode.

Notes:

The full capacity weight code must be larger or equal to two times the selected display division-n; otherwise, the calibration cannot be properly completed.

A zero point code of about 5000-20000 is recommended. You can adjust the potentiometer on PC board to make it in this range. Normally this need not be adjusted by the end user.

The position of the zero-point potentiometer on the PC board is shown below:



3.8 The Meaning of Displayed Symbols

xxxxxx kg/lb	the scale capacity is xxxxxx kg/lb
0----	zero point is over calibration zero + 10% Full capacity
0-----	zero is below calibration zero - 10%Full capacity
Ad---	ADC is over max. range
Ad _ _ _	ADC is below min. range
-----	weight signal is too large
_ _ _ _ _	weight signal is too small
EEP.E0	the EEPROM can't be accessed
EEP.E1	The parameters are not same with backup data
EEP.E2	The setting parameter(s) is not in normal range
A.oFF.x	the auto-off time is set to x minutes,(when x=0,the scale will not auto-shutoff
CAL-Px	scale's calibration point
CAL.Er	- there is an error in calibration
	display division is xxxxx, (xxxxx=500…80000)
	selected the unit for the capacity and standard calibration weight is kg(x=0, uu=kg), or lb(x=1, uu=lb).
d. x	division size is x, (x=1,2,5)
dot. x	the location of decimal point,(x=0,1,2,3)
▶	hold function is active.
F-Set	in Function Set mode
FS---	selected Full Scale of the scale is larger than 5 1/2 LCD display capacity (199999)
FS. oN(oFF)	Full Scale selection enable (disable)
tr. oN(oFF)	tracking enable(disable)
Hab / L cdef	alternately display these information, that means: the display weight is 'abcdef' kg/lb, this only occurs when current weight is larger than 199999kg/lb (not include decimal point).

4 Calibration

You should perform three point calibration. This will give the most accurate weighing results. You will need two test weights for this procedure:

Calibration point P0 = no wieght on the scale

Calibration point P1 = a test weight that is 12.5%-100% of full capacity

Calibration point P2 = a test weight that is 25%-100% of full capacity

If you do not have two certified test weights, you can use one weight. It must be more than 25% of full capacity. Instructions for both procedures are below.

4.1 Calibration Steps

Follow these instructions for two or three point calibration of your scale:

NOTE: To exit the calibration mode any time during these steps, press the ON/OFF key. This ignores any new settings and returns the scale to normal weighing mode.for calibration.

1. With the scale in normal weighing mode, remove all weight from the scale and press and hold the **TARE** key until ***CAL?*** is shown. ***?*** will flash, asking if you are sure you want to calibrate the scale.

2. Press **TARE** to accept.

2a. If the Function Set is enabled you are allowed to modify the calibration unit of measure, display divisions (n), the division size (d) and location of the decimal (dot). For information on the Function Set, see section 3.6 Function Set.

2b. Go to step 3 if the Function Set is enabled. If it is disabled, skip to the indented portion of step 8b.

3. From the key press (TARE) in step two. . .

   Unit. x is displayed. Use this to set the default unit of measure on power up and the calibration weight unit of measure. If x = 1, lbs is the unit of measure. If x = 0, kg is the unit of measure.

4. Toggle between the two choices by pressing the **UNITS** key. Press **TARE** to accept the displayed value. . .

   The current display divisions value is displayed. Choices are: 500,

   600, 750, 800, 1000, 1200, 1500, 2000, 2400, 2500, 3000, 3500,

   4000, 5000, 6000, 7000, 7500, 8000, 10000,12000,15000, 20000,

   25000, 30000, 35000, 40000, 50000, 60000, 70000, 75000, 80000

5. Press the **HOLD** or **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

   d. x is displayed. ***x*** = division size. Choices are 1, 2 , and 5. This means the countby will be by 1, 2 or 5.

   In the next parameter you will select the countby; for example:

   1, 0.1, 0.01, etc.

Refer to the section 4.2 *Determine the Display Division (n), Division Size (d) and Decimal Point* for information on choosing usable parameters.

6. Press the **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

   dot. x is displayed. ***x*** = number of digits after the decimal point. Choices are 0, 1, 2, or 3.

7. Press the **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

   xxxxxx flashes on the display. This is the scale capacity calculated from the choices you made for display divisions (n), division size (d) and decimal point (dot).

8. Perform step 8a or 8b.

8a. Press the **HOLD** or **UNITS** key to return to step 3 and reset any of the parameters in steps 4-7.

OR

8b. Press the **TARE** key to continue with calibration. . .

   CAL.P0 is briefly displayed, showing the indicator is ready to acquire the calibration zero point, then displays ***0.0*** weight with the last digit flashing.

9. Remove all weight from the scale and press the **TARE** key to acquire the zero point.

   The display will blink and then ***CAL.P1*** is temporarily displayed, then ***xxx*** is displayed (50% of capacity is the default value) with the last digit blinking. This shows the scale is ready for the P1 calibration point.

10. Place the test weight on the scale (between 25%-100% of full capacity for 2 point calibration; between 12.5% - 100% for three point calibration). Enter the test weight value by using the **HOLD** and **UNITS** keys. Press the **HOLD** key to select which digit to change (it will flash). Press the **UNITS** key to change the flashing digit. Press the **TARE** key to accept this value.

    The display will blink and then ***CAL.P2*** is temporarily displayed, if successful. Then ***xxx*** is displayed (100% of capacity is the default value) with the last digit blinking. This shows the scale is ready for the P2 (25%-100% of full capacity) calibration point.

    Go to step 11 to finish the three point calibration, or, if you want to do a two point calibration, leave the test weight on the scale, enter the same test weight value that you entered above and press the **TARE** key. ***CAL.P0*** is temporarily displayed if successful, then ***0.0*** is displayed. Skip to step 12.

    CAL.eR is displayed if calibration failed. Repeat from step 8b.

11. Place the P2 weight on the scale and use the **HOLD** and **UNITS** keys to enter this weight. Press the **TARE** key to accept. . .

    The display will blink and then ***CAL.P0*** is temporarily displayed if successful, then ***0.0*** is displayed.

    If calibration failed, repeat from step 8b.

12. Remove the weight from the scale and press the **TARE** key. . .

    The display blinks and the zero point is captured again. If calibration is successful the unit will go through the power up display routine. If an error occurs in calibration, ***CAL.Er*** is temporarily displayed and the indicator repeats the procedure from step 8b.

13. The indicator is now calibrated and in normal weighing mode.

4.2 Determine Display Division (n), Division Size (d) and Decimal Point (dot)

When you set the capacity and division size for your system, you must be sure to not exceed the upper limit of 25,000 display divisions. The three tables on the next pages will help you determine if your choices are acceptable.

The tables are expressions of this equation:

$$\frac{\text{Capacity}}{\text{Division Size}} = \text{Display Division}$$

Display division should always be 25,000 or less.

Follow these steps to use the tables and check that your system will work satisfactorily:

1. Use the table labled with your required division size;

   Table 4.1 for a division size of 1

   Table 4.2 for a division size of 2

   Table 4.3 for a division size of 3.

2. Choose the column under the number of decimal positions you want;

   0 if no decimal (1 for a division size of 1)

   1 if decimal position moved 1 space (0.1 for a division size of 1)

   2 if decimal position moved 2 spaces (0.01 for a division size of 1)

   3 if decimal position moved 3 spaces (0.001 for a division size of 1)

3. Follow the column down to the scale capacity of your scale (500 lbs for the PS 500 scale). If your capacity appears in the column, your system should work properly. If the capacity does not appear in the column, you must choose a different decimal position and/or division size.

Table 4.1 Division Size of 1 (weight unit is kg of lb)

display division	decimal point position (dot)			
	0	1	2	3
500	500	50.0	5.00	0.500
600	600	60.0	6.00	0.600
750	750	75.0	7.50	0.750
800	800	80.0	8.00	0.800
1000	1000	100.0	10.00	1.000
1200	1200	120.0	12.00	1.200
1500	1500	150.0	15.00	1.500
2000	2000	200.0	20.00	2.000
2400	2400	240.0	24.00	2.400
2500	2500	250.0	25.00	2.500
3000	3000	300.0	30.00	3.000
3500	3500	350.0	35.00	3.500
4000	4000	400.0	40.00	4.000
5000	5000	500.0	50.00	5.000
6000	6000	600.0	60.00	6.000
7000	7000	700.0	70.00	7.000
7500	7500	750.0	75.00	7.500
8000	8000	800.0	80.00	8.000
10000	10000	1000.0	100.00	10.000
12000	12000	1200.0	120.00	12.000
15000	15000	1500.0	150.00	15.000
20000	20000	2000.0	200.00	20.000
25000	25000	2500.0	250.00	25.000

Table 4.2 Division Size of 2 (weight unit is kg of lb)

display division	decimal point position (dot)			
	0	1	2	3
500	1000	100.0	10.00	1.000
600	1200	120.0	12.00	1.200
750	1500	150.0	15.00	1.500
800	1600	160.0	16.00	1.600
1000	2000	200.0	20.00	2.000
1200	240	240.0	24.00	2.400
1500	3000	300.0	30.00	3.000
2000	4000	400.0	40.00	4.000
2400	4800	480.0	48.00	4.800
2500	5000	500.0	50.00	5.000
3000	6000	600.0	60.00	6.000
3500	7000	700.0	70.00	7.000
4000	8000	800.0	80.00	8.000
5000	10000	1000.0	100.00	10.000
6000	12000	1200.0	120.00	12.000
7000	14000	1400.0	140.00	14.000
7500	15000	1500.0	150.00	15.000
8000	16000	1600.0	160.00	16.000
10000	20000	2000.0	200.00	20.000
12000	24000	2400.0	240.00	24.000
15000	30000	3000.0	300.00	30.000
20000	40000	4000.0	400.00	40.000
25000	50000	5000.0	500.00	50.000

Table 4.3 Division Size of 5 (weight unit is kg of lb)

display division	decimal point position (dot)			
	0	1	2	3
500	2500	250.0	25.00	2.500
600	3000	300.0	30.00	3.000
750	3750	375.0	37.50	3.750
800	4000	400.0	40.00	4.000
1000	5000	500.0	50.00	5.000
1200	6000	600.0	60.00	6.000
1500	7500	750.0	75.00	7.500
2000	10000	1000.0	100.00	10.000
2400	12000	1200.0	120.00	12.000
2500	12500	1250.0	125.00	12.500
3000	15000	1500.0	150.00	15.000
3500	17500	1750.0	175.00	17.500
4000	20000	2000.0	200.00	20.000
5000	25000	2500.0	250.00	25.000
6000	30000	3000.0	300.00	30.000
7000	35000	3500.0	350.00	35.000
7500	37500	3750.0	375.00	37.500
8000	40000	4000.0	400.00	40.000
10000	50000	5000.0	500.00	50.000
12000	60000	6000.0	600.00	60.000
15000	75000	7500.0	750.00	75.000
20000	100000	10000.0	1000.00	100.000
25000	125000	12500.0	1250.00	125.000

5 Serial Communication

RS-232 Connections between scale and host.

Indicator	Cable		Host
(DB9 female)	(DB9 male)	(DB9 female)	(DB9 male)
TXD 2	2	2	2RXD
RXD 3	3	3	3 TXD
GND 5	5	5	5 GND
DSR 4	4	4	4 DTR
DTR 6	6	6	6 DSR
CTS 7	7	7	7 RTS
RTS 8	8	8	8 CTS
NC 1	1	1	1
NC 9	9	9	9

Notes:

On the indicator's DB9 female, pins 4 and 6 are shorted and pins 7 and 8 are shorted.

The baud rate and parity are configurable. Parity, start (low) and stop (high) bits will each be fixed at one. Data bits will be fixed at seven (if no parity bit, the data bit is eight). Modem lines will not be supported. Baud rates supported will be 1200, 2400, 4800, 9600 and 19200. Responses to serial commands will be immediate, or within one weight meter cycle of the scale. One second should be more than adequate for use as a time-out value by the remote (controlling) device.

The length of the weight field will be 10 bytes (for 5 1/2 LCD): one for minus sign, one for decimal point, two for unit of measure (e.g. "lb", "kg"), six for weight data; The leading zero in weight data will be suppressed.

- If the weight is overcapacity, the scale will return eight '^' characters (the field of minus sign, decimal point, weight data is filled by '^').
- If the weight is under capacity, it will return eight '_' characters (the field of minus sign, decimal point, and weight data is filled by '_').

SP.X is the serial protocol of RS-232:

- If weight is negative, in motion, the scale will still respond with a weight and status string.
- If the weight is overcapacity, the scale will return eight '^'. If the weight is under capacity, it will return eight '_'; if the zero point is error, it will return eight '-'.
- Units of measure abbreviations are always lower case.
- The weight may be negative; therefore a polarity character is present. The character will be '-' for negative weight or a space character for positive weight.
- Weight field is always eight characters (6 for weight, 1 for decimal point, 1 for polarity).
- Leading zeroes are suppressed.

Table 5.1 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)
x	Weigh characters from display including minus sign and out-of-range characters
c	Message/menu (i.e. non-weight) characters from display
p	Polarity character (i.e. - for negative, space for positive)
hh	Two status bytes
uu	Units of measure (lb, kg, using ANSI standard abbreviations)

There will only be two status bytes: hh. Bit 0 is the least significant bit (in each byte), while bit 7 is the most significant bit. The status bits are defined as follows:

Bit	Status Byte 1	Status Byte 2
0	1 = Scale in motion	1 = Under capacity
	0 = Stable	0 = Not under capacity
1	1 = Scale at zero	1 = Over capacity
	0 = Not at zero	0 = Not over capacity
2	always 0	always 0
3	always 0	always 0
4	always 1	always 1
5	always 1	always 1
6	always 0	always 0
7	parity	parity

5.1 Commands and Response

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

Response
<LF>pxxxxxxxuu<CR><LF>hh<CR><ETX>
<LF>^^^^^^^^uu<CR><LF>hh<CR><ETX>---over capacity
<LF>_ _ _ _ _ _ _ _ uu<CR><LF>hh<CR><ETX>---under capacity
<LF> - - - - - - - - uu<CR><LF>hh<CR><ETX>---zero-point error

Command: S<CR> (53h 0dh)

Response
Returns scale status
<LF>hh<CR><ETX>

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

Response
Scale is zeroed, returns scale status, same as the T<CR> Command.
<LF>hh<CR><ETX>

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

Response
Scale is tared, returns scale status. Like the TARE key is pressed.
<LF>hh<CR><ETX>

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

Response
Changes units of measure, returns new units and scale status.
<LF>uu<CR><LF>hh<CR><ETX>

Command: all others

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

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