THUNDERBIRD

Agricultural Weighing Systems
PS3000 Instructions

Installation

Locate a weighing site that is well drained. For best weighing results, ensure the weigh bars and weighing platform are on a level hard surface (ie concrete), and free from contact of any obstruction. Do not use wooden platforms. Make sure the platform doesn't rock, pack with spacers if needed. If the installation has any flexing or twisting in the platform, inaccurate weights may occur. The weight should be evenly distributed over the top of the weigh bars.

When bolting the bars down, also eliminate any twisting of the platform. Avoid bolting everything down tight. If in a fixed situation, it is best practice to bolt the rear bars to the concrete, then bolt the platform or crush to the bars, then leave the front bars unbolted with only guide pins into the concrete. This will minimise any flexing that could occur.

When weighing animals, be sure that their weight is totally on the weighing surface, and not touching fixed gates, rails, etc. If at all possible use a crush or weigh box, and place the weigh bars so that the whole structure is weighed. This will eliminate weighing errors if the animal does lean on any part of the structure.

Care and Maintenance

WARNING! DO NOT WELD TO THE WEIGH BARS OR ANY STRUCTURE THAT THEY ARE ATTACHED TO. The voltage and current from the welder can instantly destroy the sensitive strain gauges used to measure the weight. Welding currents create observable damage to the strain gauges, and will void your warranty. Remove the weigh bars from the structure before attempting to weld.

Care of cables is important to avoid erratic readings or breakdown. Plugs should be covered when not in use to avoid corrosion of contacts and to prevent moisture penetrating the cables.

Do not allow the bars to remain wet or allow a build up of manure inside the bars for long periods of time. This will shorten the life of the weigh bars, can cause premature failure and may void your warranty. If the area does remain wet, remove the weigh bars when not in use. The weigh bars are sealed, and can be hosed out with low pressure water to keep clean.

Store the indicator in a dry area away from moisture when not in use. Although it has a gasket seal to prevent rain ingress, repeated cycling of warm and cool from day to night in a damp area can cause a build up of moisture inside the indicator.

Do not transport weigh bars or load cells with a weight on them. If the vehicle goes over a bump, the resulting "G" forces increase the effective weight applied, which may exceed the load cell capacity, causing damage to the load cells. Load cells that have had excessive weight applied to them are not covered by warranty.

Power Supply

The PS3000 comes with an internal Ni-MH battery. **The indicator will need to be connected to the charger overnight before the first use.** The charger must be connected for approximately 15 hours to fully charge the battery. If, however, weighing must be done immediately, connect the 12V battery cable into the indicator and then the red clip to the positive of a 12V battery, and the black clip to the negative of the battery. The indicator automatically turns on. The indicator

is diode protected, so accidental incorrect polarity will not destroy the unit. However if the weigh bars are electrically connected to the battery, the protection diode is bypassed. **Make sure that the weigh bars are isolated from the battery**. That is, don't sit the weigh bars on a tractor trailer or ute, and then power the indicator from that vehicle's battery. It may damage the indicator.

The indicator may have an optional internal Ni-MH battery, in which case you don't need to connect an external battery. It will operate for approximately 9 - 12 hours on it's own battery, depending on the number of weigh bars attached and provided the battery is fully charged. A plug pack charger is supplied if the scale is purchased with an internal battery. The internal battery will also charge from a connected external 12V battery.

The internal battery will go completely flat after 7-10 days. This is done on purpose, and is designed to extend the life of the battery as much as possible. It has been found that an NI-MH battery can have a reduced life if it is stored for extended periods without being fully discharged.

There is a low battery indicator on the display. If the battery voltage starts getting low, a **LO BAT** indication will start to flash. The flash rate will depend on the battery voltage. If the external battery voltage falls to approximately 11 volts, the **LO BAT** indication will stay on continuously. Once the battery voltage falls to 10.5 volts, the indicator will turn off.

If the internal battery should go flat while weighing, an external 12V battery can be connected to continue the weighing session. The internal battery will start charging from this external power source while weighing is in progress.

NOTE: If the internal battery is flat or missing, leave the external battery connected for a couple of seconds after turning the scale off to ensure that all data is saved to permanent memory.

Turning On

All mode setting changes, draft settings and statistics are memorised by the PS3000. When the indicator is turned on, the weighing mode will be the same as it was when the indicator was turned off previously. A tare is performed automatically after a countdown delay of about 10 seconds. The scale is then ready for weighing.

If auto memory (described later) is on, the weight displayed will be the same as that shown when the indicator was turned off previously.

Operation

The PS3000 has a water resistant 13 button keypad for a user interface. An extra large 40mm digit display provides the user with the ability to view the weight at a distance. The display also has other indications which are used at various times. All settings are memorised, so that the indicator will return to the previous set up when it is turned on. The PS3000 contains highly stable circuitry, which is designed to improve accuracy.

Following is a description of each button and what it does.

Off/On - This button does what it says. When the indicator is turned off, power to all parts except the microcontroller are switched off. The microcontroller goes in a sleep mode, and can only be turned back on by pressing the Off/On button. The indicator counts down for 10 seconds when turning on. This is to give the converter circuitry time to normalise. If the indicator has been turned off, there will be a delay of a few seconds before it can be turned back on again.

Hold - The hold button freezes the current weight display. All other functions continue to operate normally. Press hold again to allow the displayed weight to change. Hold will also be released after viewing stats, changing draft settings or taring.

Tare - When pressed, the scale will display 4 dashes ("----") and cancel any weight that exists on the weigh bars. After a few seconds the display will show zero weight, regardless of any weight (such as a weigh box) that may be present. The tare button also has other functions that will be described in other features.

Kg/lb - The indicator is capable of displaying weights in either pounds or kilograms. Alternate presses of this button swaps between units. The indication of the units is displayed on the screen.

Auto Tally - This button is used for adding weights to statistics automatically. **Note- Auto tally only works if the PS3000 is in one of the livestock modes**. It is also used in conjunction with the draft button to turn on either autodrafting or point set programming. These 2 features are described later. An indication is displayed showing if auto tally is turned on. With auto tally turned off, each weight must be added to the statistics by pressing the enter button. More on auto tally is described later.

Auto Memory - If auto memory is on when the scale is turned off, the weight displayed at turn off is remembered, and the tare setting is adjusted when turned on again so that the same weight is displayed. Alternate pressings of this button turns automemory on or off. **Warning! The scale must be turned off using the on-off button for the weight to save**. The weight won't be remembered if the battery is simply unplugged. **Auto memory only works in general or fine mode**.

Draft - This button is used to turn drafting on or off and adjust draft settings. It is also used enter or exit point set programming or autodraft in conjunction with the auto tally button. A full description is provided later.

Stats - The PS3000 is able to record statistics on individual weights. The stats button allows the user to display the current statistics or to clear all recorded values. A section on statistics is included later.

Calib. - This button is used to enter the calibration mode or other specific functions described later. This button would normally be rarely used.

Mode - Mode selects the weighing mode. The current mode is displayed during normal operation. There are 4 available weigh modes, each with a different purpose. They are:

Livestock - This mode is designed to weigh moving weights, such as animals. The indicator switches to a damping system that filters out sudden changes in weight, and averages many weight samples over a couple of seconds. The weight must be relatively continuous for a time before the weight is displayed. The displayed weight will change if the indicator determines that the weight isn't quite right. Both livestock modes incorporate zero and weight tracking.

Livestock Locking - Locking mode works the same as normal livestock mode, except that once a weight is displayed, any change in weight won't be shown until the change exceeds +/-5% of that displayed. The indicator will beep to indicate that it has locked the weight.

General - This mode is for weighing static weights and produce. The displayed weight is updated every second, and doesn't have any weight damping. It is suitable for weighing products that are slowly added to, such as weighing grain being augered into a bin. Zero tracking is enabled in general mode.

Fine - Fine mode weighs in smaller increments than general, and has a maximum weight of 50kg. It is suitable for weighing fleece or domestic pets. Fine mode is not available in weighing systems above 2000kg, and works best in systems that are 500kg or less. There is no tracking in fine mode to allow any minor changes in weight to be displayed. This also means that you may experience a small drift in weight for the first 5 - 10 minutes after power on while the electronics are warming up. After this time the weight should be very stable.

The weigh mode is changed by successive presses of the mode button. Each mode is selected in a "round robin" fashion. Mode also has other functions described later in calibration.

Up and Down Arrows - Use these arrow to change the contrast level of the display. This only works while the indicator is showing the normal weight display. There are 16 steps of contrast

available. Repeated pressing of an arrow key changes the contrast level one step at a time. These arrows have other functions described in calibration, stats and draft.

Enter - The enter button is required for calibration and selecting other functions described later. It is also used to add the displayed weight to the statistics during weighing.

Auto Memory

This feature is designed for weighing applications such as feed bins or wool presses. With auto memory on, the indicator may be turned off overnight or over the weekend with the weight still on the load cells. Next time the indicator is turned on, the display will indicate the same weight that was shown just before the indicator had been switched off.

This feature doesn't work in the livestock modes.

WARNING! If the weight changes while the scale is turned off, it will **not** compensate for this. You will need to remove the entire weight and perform a tare.

The scale **must** be turned off using the on-off button for this feature to work.

Auto Tally

Auto tally allows statistics to be accumulated without the need to press a button. It is a handy way of recording if the beasts or weights are moving in a free flowing manner. There are limitations when using this mode. These limitations are:

1. One of the livestock modes must be on for auto tally to work. It will **not** work in general or fine mode.

2. The true weight might not be recorded if there is a pause of more than 2 seconds in applying it.

3. Weights that are applied slowly may be recorded incorrectly.

4. If the weight doesn't change for more than 2 seconds the weight will be recorded.

Once a weight has been recorded, no other weight can be added until the displayed weight returns to zero. This is to avoid multiple recordings of the same weight.

To enter auto tally mode, press **auto tally**. The display will show "Clr?". Press the **up arrow** to clear any existing statistics, or the **down arrow** to add to the existing statistics. The normal screen will then reappear. 2 short beeps will be heard when a weight is added to the statistics.

Note that the scale must be turned off using the **on/off** button for the statistics to be remembered.

Draft Mode

The PS3000 has the ability to visually or automatically draft animals from 2 up to 5 ways. The automatic draft is only possible if the optional draft socket is fitted, and a mechanism to achieve the drafting is installed. In general weighing mode, point set programming is possible if draft is on.

For draft mode to work, weight boundary settings must be entered. The number of settings depends on how many ways the PS3000 is to draft. For example, for 2 way drafting only one setting is needed. Any weight greater than the setting falls into the high range, if the weight is lower or the same as the setting, it falls into the low range. For 5 way drafting, 4 weight boundaries need to be entered. If a weight is equal to the boundary, it'll be drafted into the higher range.

In visual drafting, the range that the weight falls into is indicated on the display. For 5 way drafting, the possible ranges are **LOW**, **LOW MID**, **MID**, **HIGH MID** and **HIGH**. Other drafting ways have varying combinations of these.

To start draft mode, follow this procedure:

1. Press **draft**. Draft will flash and "dr 2" will be displayed.

2. Use the **arrow keys** to select the number of ways.

3. Press **enter** or **draft** to accept the number of ways. A 4 digit number will appear. This is the lowest weight boundary setting.

4. Use the **arrow keys** again to adjust the most significant digit, then press **enter** to move to the next digit. Alternatively, if the value display is correct, press **draft** to skip step 5 and accept the setting.

5. Change each digit in turn to adjust the setting to the desired value. **Enter** must be pressed for 4 times to accept the setting.

6. The next setting will appear if there are more than 2 ways of drafting. Repeat steps 4 and 5 until all settings have been entered.

Draft mode is now on and the display will indicate which draft range the weight falls into.

To turn draft mode off:

1. Press **draft**. "OFF?" will be displayed.

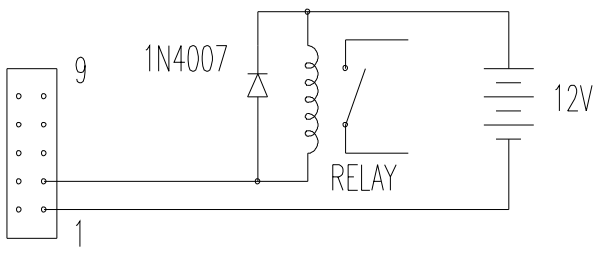
2. Press **draft** again if you want to review or change the settings. The sequence described above will be entered.

3. Press either **enter** or the **up arrow** to turn draft mode off, any other key cancels the action.

Autodrafting

The PS3000 is able to control an auto drafting mechanism if the optional draft socket is fitted. For autodraft to work, one of the livestock modes must be selected, as well as draft and autotally being turned on. The draft range that the weight falls into will also be displayed. **Draft and autotally will flash** on the screen when the scale is ready to start autodrafting. If they aren't flashing the scale will not control a mechanism in this mode. An autodraft mechanism must be connected for these to flash. Should both draft and autotally be on and they don't flash, turn autotally off then on again to start them flashing.

Up to five 12V relays or solenoids can be controlled. The PS3000 outputs are rated at 12V 0.5A. **Warning! Any relay or solenoid connected to the PS3000 must have a back-emf protection diode installed across it to prevent voltage spikes damaging the indicator.**



Typical Relay Connection

The draft number of ways must match the number of ways the mechanism will draft. Once the draft boundaries are set, the PS3000 will control the gates according to the draft range that the weight falls into.

The autodraft sequence is controlled by a switch on the mechanism. This switch is closed when an animal enters the mechanism, which triggers the scale to weigh the animal. Draft and autotally stop flashing. If the switch isn't closed, the weight will not be taken. This is to give the operator an opportunity to remove one animal if 2 try to enter the mechanism at the same time, or if the animal hasn't fully entered the mechanism.

Once the weight is measured, the draft gates will be set, then the front gate opened. The PS3000 waits for the switch to open, which indicates that the animal has left the mechanism, and then for a zero weight. Once the weight is zero, the gates are reset, and draft and autotally flash ready for the next sequence.

Point Set Programming

Point set programming is a method of controlling the amount of material filling a bin or bag by monitoring the weight. When the weight reaches a preset value, the scale can automatically turn on or off a mechanism, if the optional output socket is fitted. For example, the scale can monitor the weight of a bag as it's being filled by an auger, and when the bag reaches a preset weight, the PS3000 can be used to turn off the auger filling that bag.

Point set programming is enabled only if general mode is selected, as well as draft being turned on. Additionally, the display will indicate which draft range the weight falls into. Point set programming will not work if an autodraft mechanism is connected.

A zero weight relay and up to 4 preset weight relays may be controlled by the PS3000. The PS3000 outputs are rated at 12V 0.5A. **Warning! Any relay or solenoid connected to the PS3000 must have a back-emf protection diode installed across it to prevent voltage spikes damaging the indicator.**

Output 1of the socket is turned on when there is zero weight. This output can be optionally used to start the process. When the weight reaches a draft setting, the appropraite output is turned on. Draft setting 1 controls output 2, draft setting 2 controls output 3, draft setting 3 controls output 4, and draft setting 4 controls output 5. The number of outputs controlled depends on the number of drafting ways set. These multiple settings can be used to turn on various augers for putting different ingredients into a mixer for example. Extra control equipment such as relays and contactors would be needed to achieve this however.

Statistics

Statistics may be accumulated on animals or objects weighed. The recorded weight is entered into an overall statistics collation, as well as draft statistics if draft mode is on. There are up to 5 sets of draft statistics, depending on how many ways the draft mode has been programmed for. This means that there are up to 30 separate statistical values recorded.

All statistics are remembered when the PS3000 is turned off, provided it is turned off using the on-off button. The statistics will not be saved if the battery is simply unplugged while the internal battery is flat. This applies also if the battery lead is accidentally disconnected. This feature is to allow a break in a weighing session, and then continue with the same session at a later time. **The statistics must be cleared if a new weighing session is to be recorded**. Otherwise the weights will be added to the old statistics.

There are 5 distinct values recorded for each range of statistics. They are;

- number weighed
- minimum weight
- maximum weight
- average weight

total weight

To view the statistics, press **stats**. The overall number weighed will be displayed. Use the **arrow keys** to scroll up and down the overall statistics values. The statistic displayed will be indicated on the screen.

If the draft mode is on, the draft statistics may be view by subsequent pressings of the **stats** button. The screen will indicate which draft statistic is being displayed by showing LOW, MID or HIGH, or a combination of two. Use the **arrow keys** again to scroll through the values for each draft range.

To exit the statistics display function, press **enter**. Normal weighing will resume.

To reset the statistics, press **stats**, and then press **tare**. "Clr?" will be displayed. Press the **up arrow** to confirm, or the **down arrow** to keep them. All values will be reset to zero once the up arrow has been pressed.

There are 2 ways of adding to the statistics. They are:

1. Manual entry. **Enter** must be pressed each time a weight is to be added to the statistics. The weight may be added in any weigh mode, and only the weight displayed at the time will be added. This method will not work if auto tally is on. 2 short beeps will be heard to confirm that the weight has been entered into the statistics.

2. By autotally. Autotally will only work in a livestock mode. The weight first displayed will automatically be added to the statistics. There will be 2 short beeps to indicate that the weight has been recorded. If livestock locking mode is on, there will be 3 beeps, 1 for weight lock and the other 2 for the weight recording. Any subsequent change in the display will be ignored until the displayed weight returns to zero. Autotally then re-arms to record the next weight.

Note: The weight recorded may not be the true weight if the beast pauses while moving on to the scale using autotally, or if the weight is applied slowly in increments. There is also no way of skipping an unwanted weight unless autotally is turned off.

Calibration

The PS3000 has the capability of being calibrated in the field. The electronics in this weighing system is very stable, and this calibration procedure should rarely need to be done. However, if the weights are critical, it is advisable that the scale be calibrated every year or so. If the load cells have been slightly overstressed, or specific errors have been displayed as described later, it is also advisable to re-calibrate the system before returning the scale for repair. It may be that re-calibration will solve the problem. Re-calibration may not fix the problem if the weigh bars or load cells have been grossly overstressed.

To perform the calibration, a known fixed weight must be at hand. The capacity of the total system, and the number of load cells in the system must also be known. The capacity will be printed on the label attached to the weigh bar or load cell. The test weight must be a minimum of 5% of the capacity of the system, and small enough to be able to balance easily on 1 weigh bar or load cell. The maximum test weight is the total capacity of the system divided by the number of weigh bars or load cells. For example, a 4 tonne system with 4 load cells would have a maximum test weight of 1 tonne. Similarly, a 200kg system with 2 bars has a maximum test weight of 100kg.

Each weigh bar or load cell is calibrated independently, and they must be removed from any structure that they're supporting before calibration starts.

The procedure is as follows:

1. Press **calib**. "??" will appear. Press **calib** again then hold down **enter** within 1 second to

proceed or **tare** if you do not wish to calibrate at this time. The calibration procedure **must** be performed if you procede past this point. If the power is turned off during calibration, you will have to re-do the calibration from the start when the power is turned back on.

2. "SYS1" or "SYS2" will be displayed if there is more than one system in memory, depending on the system in use. The PS3000 is capable of remembering the calibration parameters of 2 separate weighing systems. This will be described later. Press **enter** to proceed.

3. A zero will be displayed and capacity will flash. This is where the total capacity is to be entered. The capacity must be in kilograms and must contain 4 digits, even if it's only in the hundreds of kilograms. For example, a 500kg system would be entered as "0500". Use the **arrow keys** to adjust the digit, then pess **enter** to move on to the next digit. Repeat this process for all 4 digits.

4. "1 LC" will be displayed. Use the **arrow keys** to select the number of load cells in the system. The 4 options are; 1 load cell (1 LC), 2 load cells (2 LC), 2 load cells linked (2LLC), and 4 load cells (4 LC). Linked load cells have a cable between them and only one plug to connected to the indicator. **WARNING! If there are 2 load cells linked and they use an adaptor to convert from a 4 pin to a 7 pin plug, select 1 load cell. If there are 4 load cells linked and two 4 pin plugs with adaptors, select 2 load cells.** Once the correct number is displayed, press **enter**.

5. The Bar No. to be calibrated will be displayed. If the indicator has 2 load cell sockets, bar 1 is the one connected to the left hand socket looking at the front of the indicator. In a 2 linked bar system, bar 1 is the bar with 2 leads connected to it. In a 4 bar system, bar 1 is the bar connected to the left hand socket and has 2 leads connected to it. Press **enter**.

6. "0000" will flash. Make sure that there is nothing sitting on the weigh bar to be calibrated, and the bar is sitting on a flat, level surface. Press **enter**.

7. "----" will be displayed while a reference value is recorded. Don't touch or move the bar while this display is shown, it will create an incorrect calibration.

8. A zero will be displayed after a few seconds. This next step requires a known test weight. This test weight must be a minimum of 5% of the total capacity of the system. **Before** entering the test weight, place the known weight on the appropriate load cell. Use the method described in step 3 to enter the known weight. If the entered value is less than 5% of the total capacity, the minimum required weight will be displayed for 2 seconds before another test weight value is asked for. **WARNING! When enter is pressed to accept the 4th digit, the indicator immediately starts obtaining a reference value for this weight**.

9. "----" will be displayed while a reference value is recorded. Don't touch or move the weight while this display is shown, it will create an incorrect calibration.

10. If there are other bars in the system, steps 5 through to 9 must be repeated for each load cell. Once all load cells have been calibrated "donE" will be displayed. **Remove the test weight**, then press **enter** to exit the calibration mode. A tare will be performed on exit.

Displaying the Total Capacity

The total capacity that was entered during calibration can be displayed by the following procedure:

1. Press **calib**. "??" will be displayed.

2. Press **mode**. The number "1" will flash.

3. Press **enter**. The total capacity in kilograms will be displayed.

Pressing any key after this will exit from this display and a tare will be performed.

Adding a Second System

The PS3000 is capable of remembering the parameters of 2 separate weigh systems. An example of this would be having one set of weigh bars under a cattle crush, and another set under a feed bin. The one indicator can be used for both systems, and it saves moving load cells from one location to another and setting them up.

The procedure is:

1. Press **calib**. "??" will be displayed.

2. Press **mode**. The number "1" will flash.

3, Use the **arrow keys** to change the number to a "3".

4. Press **enter**, or press **tare** to exit. If there are already 2 systems in use, "FULL" will be displayed, in which case press any key to exit.

5. The new system will be displayed, for example "SYS2". Press **enter** to add it, or **tare** to exit. If the system is added, this will become the current system, and calibration mode will be entered. Take note of which system is which, because incorrect weight readings will result if the wrong system is selected.

Swapping Systems

To swap from one system to the other, follow this procedure:

1. Press **calib**. "??" will be displayed.

2. Press **mode**. The number "1" will flash.

3, Use the **arrow key**s to change the number to a "2".

4. Press **enter**, or press **tare** to exit. If enter was pressed, the current system will be displayed.

5. Use the **arrow keys** to select the desired system, then press **enter**. This system will now be the current system. Make sure that the system is the one connected. Errors in weight will result if the incorrect system is selected.

Deleting a System

Only the weigh system not in use may be deleted. To delete the current system, it must first be swapped as described above. A weigh bar system may be deleted by the following procedure:

1. Press **calib**. "??" will be displayed.

2. Press **mode**. The number "1" will flash.

3, Use the **arrow keys** to change the number to a "4".

4. Press **enter**, or press **tare** to exit. "DEL" is displayed, and the system number will flash.

5. Press **enter** again to delete, and other key will exit the procedure.

6. “donE” will be displayed for 2 seconds before exiting.

Increments

The PS3000 displays in varying weight increments, depending on a number of factors. These factors include the capacity of the system, the weighing mode, and the amount of weight applied. The guide below shows the increments used.

If system capacity is 200kg (440lb) or less;

General-	0.1kg (0.2lb)
Livestock-	0-50kg, 0.2kg; 51-200kg, 0.5kg
	0-100lb, 0.5lb; 101–400lb (1lb)
Fine-	0-50kg, 0.05kg
	0-100lb, 0.1lb

For 201kg (441lb) to 2000kg (4400lb) systems;

General –	0-200kg, 0.5kg for systems over 500kg, otherwise 0.2kg;
	201-1000kg, 0.5kg; >1000kg, 1kg
	0-440lb, 1lb for systems over 500kg, otherwise 0.5lb;
	441-2200lb, 1lb; >2200lb, 2lb
Livestock-	0-100kg, 0.5kg; 101-500kg, 1kg; >500kg 2kg
	0-200lb, 1lb; 201-1200lb, 2lb; >1200lb, 5lb
Fine-	0-50kg, 0.1kg
	0-100lb, 0.2lb

For systems over 2000kg (4400lb);

General-	0-1000kg, 1kg; 1001-4000kg, 2kg; >4000kg, 5kg
	0-2200lb, 2lb; 2201-8800lb, 5lb; >8800lb, 10lb
Livestock-	0-200kg, 1kg; 201-2000kg, 2kg; >2000kg, 5kg
	0-440lb, 2lb; 441-4400lb, 5lb; >4400lb, 10lb

There is no fine mode selection on these systems.

Error Messages

The PS3000 has a very comprehensive self monitoring system that detects any problems that may occur. Should such a problem be detected, an error message will be displayed on the screen, for example “Er36”. Most error messages displayed concern problems with the signal coming from the weigh bars or load cells. The signals from the sensitive strain gauges are extremely small. The maximum signal from a load bar that has its rated capacity weight applied is approximately 0.01 volts, and the signal from a 1kg weight on a 2000kg system is less than 0.5 microvolts.

Each load cell is sampled independently many times per second, which allows the PS3000 to continuously monitor any problems that could occur. One of these problems is an overload condition. Any bar that is overloaded will be displayed, even if the overload only lasts for a fraction of a second. This feature enables the user to minimise possible damage and ensure a more reliable weight, as well as extending the useful life of the scale.

If an error message is displayed, turn the indicator off, and closely inspect the cables connecting the weigh bars or load cells. If there is a cut in the outer sheath, or a squashed section of cable, it may have to be replaced.

If there doesn’t appear to be any visible damage after inspecting the installation, contact your supplier or distributor, quoting the error number that appeared. They may be able to help with a cure. Some recurring error problems may be cured by performing a calibration (described earlier).

Options

The PS3000 can be supplied with various options. These are:

Autodraft Connection - With this connection fitted, the PS3000 is able to control an autodrafting mechanism or a point set system.

Weigh Bar Size- Thunderbird currently manufacture 4 different sized weigh bars. They are:-

Easymove 500kg bars- 2 bars, 580mm in length designed for portability.
Easymove 2000kg bars- 2 bars 580mm in length also designed for portability.
Extender 3000kg bars- 2 bars 1000mm in length.
Quad 4000kg bars- 4 bars 580mm in length.

The 3000kg and 4000kg bars are designed to fit under cattle crushes or large weigh bins for maximum stability.

Specifications

Indicator:

External Supply Voltage:	12Vdc nominal
Internal Battery Voltage:	7.2Vdc
Supply Current:	System with 1 weigh bar- 100mA System with 2 weigh bars- 140mA System with 4 weigh bars- 260mA
Load Cell Excitation Voltage:	5Vdc
Load cell input sensivity:	Maximum 2.2mV/V
Maximum offset voltage:	+/- 25mV
Accuracy:	Greater than 99% at full scale
Autodraft supply voltage:	12Vdc nominal
Autodraft current per channel:	500mA maximum
Autodraft channel spike protection:	27V zener diode
RS232 connection:	9600 baud, 1 stop bit, no parity
Flow control:	None as default or Xon/Xoff (selectable by command from host)
IP rating	IP24 (provided indicator is at 45 degrees or more)

Weigh Bars:

Gauge resistance:	120 or 350 Ohms
Offset Error:	Within +/- 10mV
Sensitivity:	Approx 1.35mV/V
Overload Capacity:	150% of rated capacity

Battery Charger:

Input Voltage:	240Vac 50Hz
Output Voltage	9Vdc at 500mA

Troubleshooting

Problem	Cause	Remedy
Won't turn on	Battery not connected	Connect to a charged, 12V battery
	Battery leads in reverse	Make sure the +ve clip is on the +ve terminal
	Battery lead has been stretched	The battery lead wires are connected to the battery clip with a push on connector, this may be disconnected. Simply push it back onto the terminal.
	Internal battery (if fitted) is flat	Charge the battery or connect an external 12V supply.
Won't tare	Moving weight	The weight must be still and stable before the indicator is able to obtain a tare reading, make sure any weight still on the load cells does not move.
	Poor installation	The load bars must be installed on a solid base such as concrete. Sitting them on the ground is not satisfactory. Refer to the installation section.
	Flexible platform	Any platform that may be used on top of load bars must be rigid, and must spread the load over the entire bar. Timber panelling is not acceptable.
	Moisture in plug	Moisture is the most common cause of eratic weights in any scale. If there is moisture in the plug, undo the plug, and thoroughly wipe out and dry all parts of the plug before re-assembling.
Eratic weight	Moisture in plug	Moisture is the most common cause of eratic weights in any scale. If there is moisture in the plug, undo the plug, and thoroughly wipe out and dry all parts of the plug before re-assembling.
	Poor installation	The load bars must be installed on a solid base such as concrete. Sitting them on the ground is not satisfactory. Refer to the installation section.
"Er15" displayed	There is most likely a short in the weigh bar or its cable.	If the cable is damaged it must be replaced. If the problem is in a weigh bar, return the system for service.
"2 OL" displayed	There is too much weight on the bar indicated.	This error will self clear when the weight is removed. This display could flash up for a fraction of a second if there is a momentary overload due to a heavy weight being put down.
"OL" displayed	There is too much weight applied	This error will self clear when the weight is removed.