Tru-Test Model 702

User Manual

Contents

About This Manual

This manual tells you how to operate the *TRU-TEST* Model 702 Indicator - the keyboard and display unit for the *TRU-TEST* 700 Series agricultural weighing system.

The *TRU-TEST* Model 703 Indicator which is a more advanced model is described in a separate manual.

Operation of the Indicator is described in the main text of this manual. Complete lists of keys, display pointers and messages are given in the Quick Reference Sections at the end.

If you are setting up the system for the first time, read the *Installation* section in this manual, also read the *TRU-TEST Loadbars Manual* for instructions on installing the loadbars.

To gain the best possible performance from your Indicator and especially if you have an internal battery installed, read the *Care And Maintenance* section.

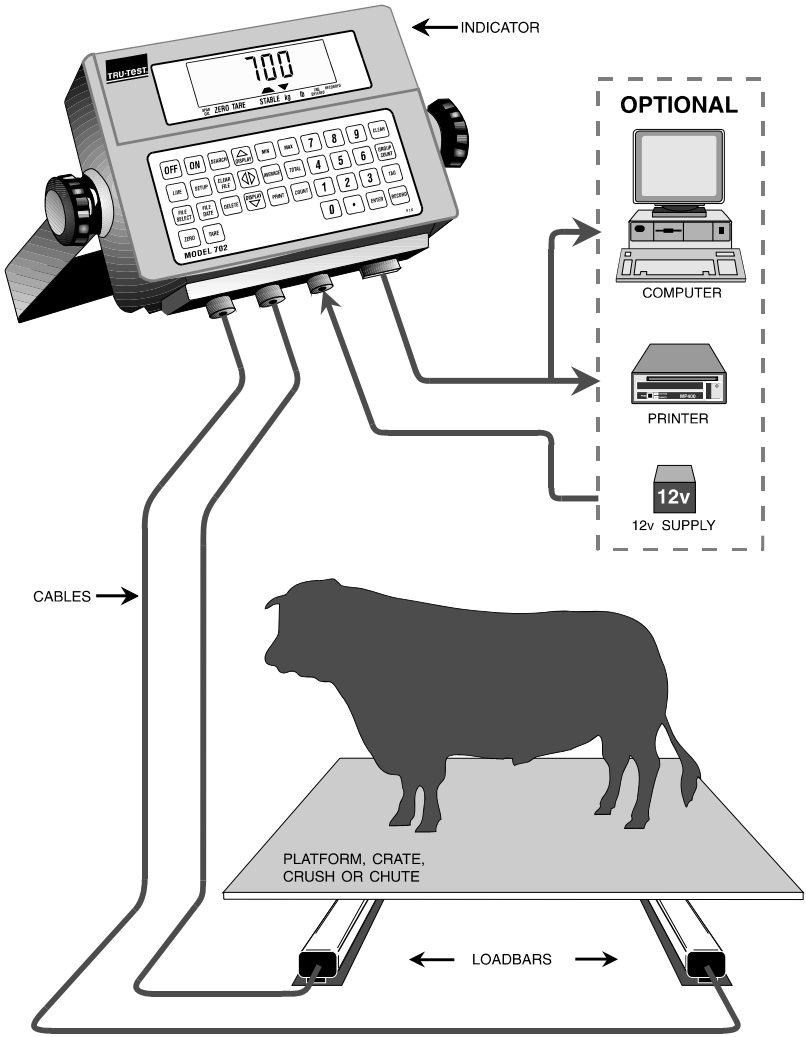
If problems arise, refer to *Troubleshooting* on page 61 before contacting your *TRU-TEST* Service Centre.

Special versions of the Indicator are made which comply with the regulations for "trade" use in particular countries. Differences which may apply are noted at the end of sections under the heading *Weights And Measures Versions* and specifications for particular countries are given in *Weights And Measures Versions* on page 85.

In this manual, the term "Loadbar" is used to mean "Loadbar, Suspension Cell or Produce Platform".

TRU-TEST Model 702

Agricultural Weighing System



System Overview

The *TRU-TEST* 700 Series is an advanced and versatile agricultural weighing system. It has been designed with the benefit of many years of animal weighing experience and is used by farm management professionals and agricultural scientists the world over.

The system consists of a microprocessor controlled Indicator (keyboard and display unit) and one or more Loadbars or Suspension Cells. The Loadbars are fitted beneath a platform or crate and the animal's weight is transmitted from the Loadbars to the Indicator. The Indicator gives a digital readout of the weight and, through the keypad, provides control over the processing capabilities of the scale.

Weight data is recorded in a reliable solid state memory in the Indicator and can be output to a printer at any stage during or after weighing. Comprehensive reports including weights, tag (ID) numbers, condition codes and statistics can be printed. The data can also be directly downloaded to a computer via a cable for permanent storage and further analysis.

A computer program, the *TRU-TEST* AgLinker, is available from your *TRU-TEST* Dealer for easy transfer of data between the Indicator and a PC computer.

Calibration

On power up, the Indicator automatically identifies and calibrates itself to the Loadbars connected. The latest Indicators operate (without re-calibration) with the complete range of *TRU-TEST* Loadbars, Suspension Cells or Produce Platforms. This is known as *Standard Calibration* and eliminates the need for time consuming calibration using test weights.

Applications using other manufacturers' Loadbars, which are not pre-programmed, can be satisfied using *Span Calibration* with known test weights.

Indicator Options

- The internal rechargeable battery option allows the Indicator to be conveniently independent of any external power supply.
- Models 702 and 703 can be connected to a printer to print results or to a computer for storing and further processing data.

Reliability

- The *TRU-TEST* Indicator is a rugged and robust product designed to withstand the environment associated with livestock handling. The case is made from extremely tough, ultraviolet resistant polycarbonate. The keyboard is completely sealed for all weather operation.
- The Indicator keeps three copies of calibration data in a separate battery backed memory so that it can recover automatically after a power failure or electrical disturbance.
- The Indicator can be unplugged from the Loadbars and taken indoors for you to study the data and recharge the battery.
- For livestock weighing, animal movement can sometimes be a problem with a digital scale. The Indicator eliminates the problem using ***SUPERDAMP©*** - a sophisticated statistical damping technique.
- The large digital display is easy to read. Stabilisation of the display is usually extremely fast - within seconds.

Main Features

Model 702 Features

- LIVE display mode.
- FLEECE (FINE WEIGHT) Mode for better precision at low weights.
- Records TAG (ID) numbers along with animal weights.
- Stores up to 3500 animal records in up to 99 files.
- Provides statistics on recorded data.
- Prints reports.
- Computer interface to record weights.
- *Span Calibration* using known weights if required.
- Separate TARE and ZERO controls.

Model 703 Advanced Features

- Records a condition code for each animal.
- Reports on animal weight gain and drafting.
- Stores up to 7600 animal records in up to 99 files.
- Provides a range of different print reports.
- Provides automatic (hands off) weight recording.

Upgrading

The *TRU-TEST* Model 702 can be simply upgraded to the advanced features of the Model 703. See your *TRU-TEST* Dealer for details.

Weights And Measures Versions

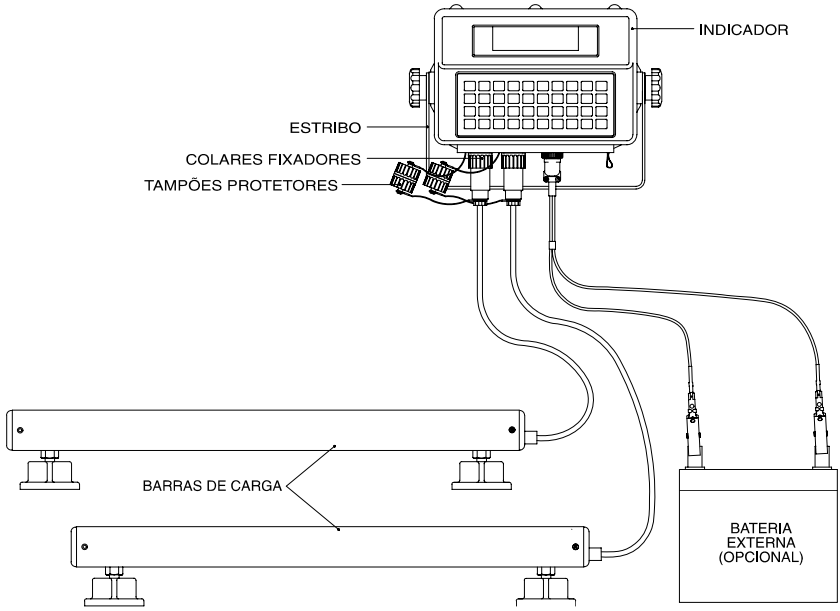
Special versions of the Indicator are available which comply with the regulations for "trade" use in particular countries.

(See *Weights And Measures Versions* on page 85).

Installation

In general, this section needs to be read only when setting up your system for the first time.

When you unpack your new Indicator, complete and post the guarantee card to ensure you receive the service you are entitled to.



700 Series System

1. Unpack and install the Indicator mounting stirrup in a convenient position. Ensure that it is located securely.
2. Install the Loadbars or Suspension Cells according to the manual which comes with them (*TRU-TEST Loadbars Manual*).
3. Run the Loadbar cables to the Indicator, making sure they are protected from damage.

4. Unscrew the protection caps from the cable plugs and the Indicator sockets marked CELL1 and CELL2. Insert the plugs into the sockets and tighten the retaining collars by hand only. The plugs can go into either socket. Screw the protection caps together to keep out dirt and moisture.

5. If an internal battery is installed, charge it by connecting the Indicator to a good 12 volt DC source, either the recommended power supply unit or a 12 volt car/bike battery. Refer to *Internal Battery Charging* on page 59 for full details.

6. If no internal battery is installed, 12 volts must be available where the Indicator is mounted. One of the following options must be used:

   - 12 volt battery

     Note: Red lead to positive terminal.
     Black lead to negative terminal.

   - Power Supply Unit

     230 or 115 volts AC to 13.8 volts DC at 5 amps.

   - AC Adaptor

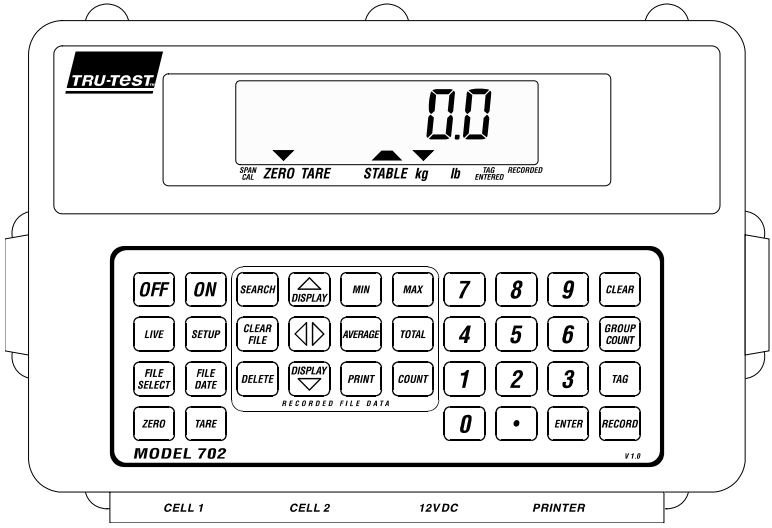
     230 or 115 volts AC to 13.8 volts DC at 600mA. (NOT suitable if a 12V printer is connected.)

   Use only the power cable supplied by *TRU-TEST*. Plug it in to the socket marked 12V DC. on the Indicator and tighten the retaining collar by hand only.

Calibration

The Indicator automatically identifies and calibrates itself to the Loadbars connected. This is known as *Standard Calibration*. *Span Calibration* with known weights can also be carried out. (See your *TRU-TEST* Service Centre.)

Operation



Operating the **TRU-TEST** Model 702 is straightforward and logical. Many functions are performed with a single key press.

Safety

To avoid damage, never load the scale further if the overload message appears on the display.

Keypad

The Indicator comes ready to use with default options set by the factory. However, you can use the keypad to set your own preferred options, such as kilograms or pounds for the units of measure. These options remain in memory until they are changed, even when the Indicator is not connected to a power supply.

The keys to use are listed in the instructions below.

A quick reference to all the keys is given on page 47.

Display

Normally the display shows the current live weight on the platform.

When the Indicator is carrying out an operation, for example re-setting zero, the display shows an appropriate message.

(If the weight is about half way between two values, it is normal for the display to switch occasionally between the two, even when the *Stable* pointer is *On*.)

Pointers

A row of triangular pointers at the bottom of the screen give status information. The labels beneath them show their purpose.

Resolution

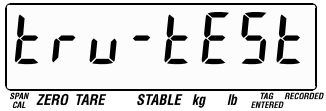
The resolution is the smallest weight change that can be displayed at a particular time (also known as a division), for example 0.5kg or 1.0kg division size.

The division size close to zero (base resolution) depends on the Loadbars fitted. (See your *TRU-TEST Loadbars Manual*.)

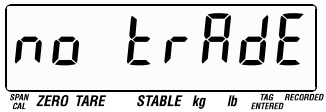
The division size automatically changes at particular weight limits to reflect the accuracy of the scale. (See *Autoranging* on page 81.)

Switching On

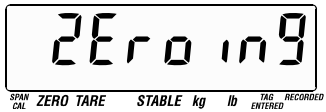
1. If there is no internal battery, connect the 12 volt supply, red lead to the positive terminal, black to negative.
2. Press **ON**, display shows:



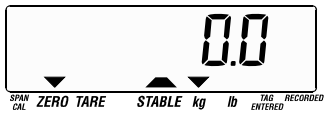
Message showing that this is not a Weights and Measures approved version for trade use:



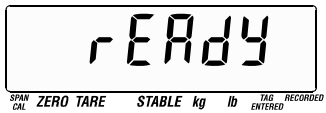
The scale zeroes itself automatically (if *Power Up Zero* is *On*, see page 16).



Current weight:



If there is no Loadbar connected:



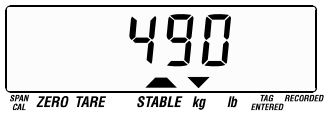
Weighing

Normally the display shows the current live weight on the platform (Live Mode). The reading is called Live because it never locks up - when the weight changes, the reading changes.

- To return to Live Mode at any time, press LIVE.

To weigh an animal:

1. Make sure the Indicator is displaying zero. If not, refer to *Zeroing* on page 16. (If the display shows a negative number and the *Tare* (*Net*) pointer is *On*, then a *Tare* has been entered, see *Taring* on page 19.)
2. Move the animal onto the platform or crate, making sure it does not lean on any other structure.
3. Wait for the *Stable* pointer to come *On* which shows that the scale has settled and the reading is reliable.
4. Read the weight displayed.



Switching Off

1. Press **OFF**.
2. Disconnect the external power supply if required.

Automatic Power Off

The Indicator automatically switches *Off* after 30 minutes if no change in weight or key press is detected. This conserves battery life when the scale is not being used.

Automatic Power Off can be disabled if required. Contact your *TRU-TEST* Service Centre for details.

Changing Units of Measurement

Weights can be displayed in kilograms or pounds.

The *kg* and *lb* display pointers show which units are being displayed.

- To change the units, see *Setup Mode* on page 12.

Weights And Measures Versions

- Units selection may be disabled.

(See *Weights And Measures Versions* on page 85.)

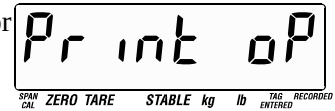
Setup Mode

Setup Mode allows you to change various parameters and options which affect the operation of the Indicator, for example, the units of measurement or the print option.

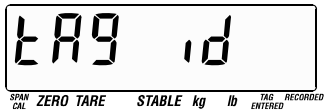
You can also display the battery voltage and the model number of the Indicator.

To enter Setup Mode, press SETUP.

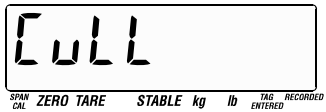
The first setup option is displayed for 2 seconds.



Then the current setting is displayed.



To change, press DISPLAY or DISPLAY.



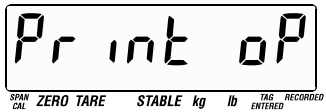
To save the new value and move on to the next setup option, press SETUP.

You can press LIVE at any stage to save the displayed value and return to live mode.

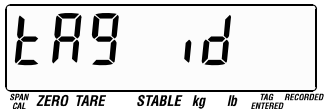
After the last setup option, the Indicator automatically returns to the first setup option.

The options available are as follows:

Print (Report) Options

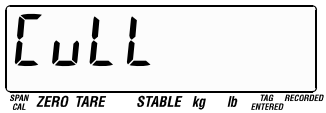


Tag / ID Report.

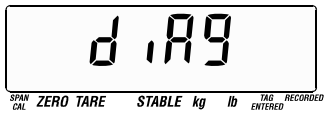


Cull Report.

See *Printing Reports* on page 40.

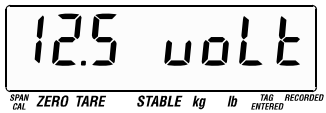


Diagnostic Information



Battery voltage.

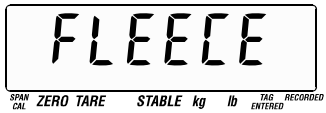
See *Battery Charging* on page 59.



Model, language and software.

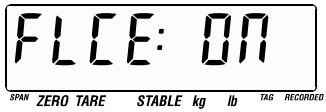
For detailed information see *Service* on page 70.

Fleece (Fine Weight) Mode

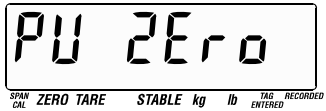


Fleece (Fine Weight) Mode *On*. (Also *Off* option.)

See *Fleece (Fine Weight) Mode* on page 21.



Power Up Zero



Power Up Zero On. (Also *Off* option.)

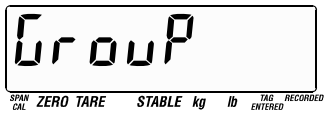
See *Power Up Zero* on page 16.

Auto Zero

Auto Zero On. (Also *Off* option.)

See *Auto Zero* on page 16.

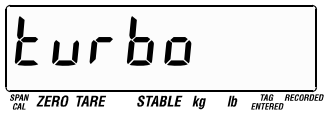
Group Mode



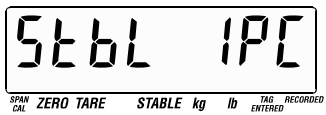
Group Mode On. (Also *Off* option.)

See *Group Mode* on page 43.

Turbo mode



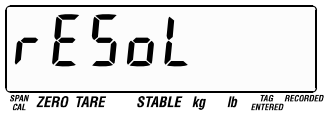
Turbo setting 1 per cent (default setting).



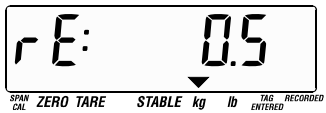
Available options are 0.5%, 1%, and 2%.

See *Turbo Mode* on page 27.

Resolution

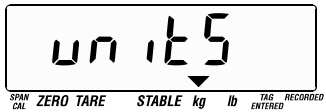


Resolution 0.5.

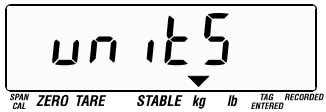


See *Resolution* on page 22.

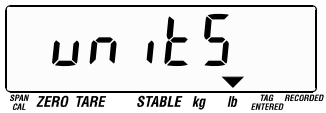
Units



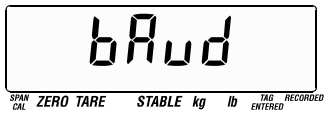
kg units.



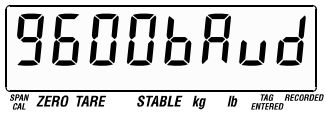
lb units.



Baud

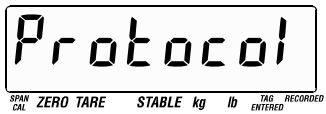


Baud rate 9600.

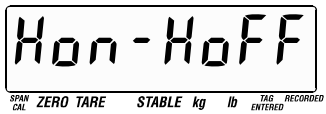


See *Technical Information* on page 72.

Protocol



Hon-Hoff protocol.



See *Technical Information* on page 72.

Zeroing

To compensate for any build up of dirt on the weighing platform, the TRU-TEST Model 702 has three methods of zeroing the scale:

- *Power Up Zero*
- *Automatic Zero*
- *Manual Zero*

Power Up Zero

The scale normally zeroes itself on power up, i.e. when it is turned *On*. The weight of the platform or crate on the Loadbars is zeroed Any *Tare* weight is also cleared. In some situations, it may be desirable to turn this feature *Off*.

To view or change the *Power Up Zero* setting (*On* or *Off*) see *Setup Mode* on page 12.

A typical situation where *Power Up Zero* should be turned *Off* is when wool bales are being filled and the scale has been zeroed for the wool press. For the displayed weight after turn *On* to be the same as when the Indicator was turned *Off* (e.g. overnight break or power failure), ensure *Power Up Zero* is set to *Off*.

Weights And Measures Versions

- Weights more than 2% (of capacity) from the span calibrated zero may show "ZEro oL" (zero overload).

(See *Weights And Measures Versions* on page 85).

Automatic Zero

The *TRU-TEST* Model 702 normally re-zeroes automatically when a load is taken off.

This feature can be disabled.

To view or change the *Automatic Zero* setting (*On* or *Off*), see *Setup Mode* on page 12.

If *Automatic Zeroing* is *On*, *Manual Zeroing* is usually unnecessary, unless the weight being zeroed is relatively large and is outside the range for *Automatic Zeroing* (6 divisions maximum). See *Model 702 Specifications* on page 86.

In some situations this feature should be turned *Off*. For example, when weighing animals in certain crates where opening and closing the doors may cause the Indicator to zero incorrectly.

Weights And Measures Versions

- Zero tracking range may be set to 0.5, 1 or 3 divisions.
- Weights more than 2% (of capacity) from the span calibrated zero may show "ZEro oL" (zero overload).

(See *Weights And Measures Versions* on page 85).

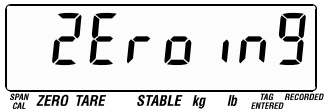
Manual Zero

If *Automatic Zeroing* is *Off*, the scale should be manually zeroed occasionally.

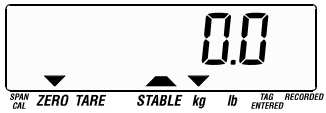
To manually zero the scale:

1. Remove load.
2. Press [ZERO].

Waiting for a stable zero reading:



The *Zero* pointer comes *On* when the scale has settled.



Zeroing differs from taring in that the capacity of the scale is not affected; you can still weigh up to live capacity on top of the zeroed out amount before overload is displayed. Overload is also displayed when the platform weight plus the live weight are greater than the Total Loading Capacity.

Weights And Measures Versions

- Zeroing may clear Tare.
- Weights more than 2% (of capacity) from the span calibrated zero may show "ZEro oL" (zero overload).

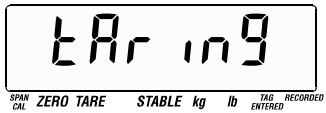
(See *Weights And Measures Versions* on page 85).

Taring

Taring subtracts the container weight so that the display reads a *Net* weight.

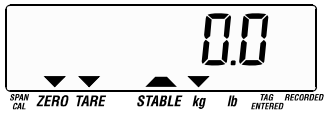
To *Tare* a container:

1. Place the empty container on the platform.
2. Wait for a stable reading.
3. Press TARE.



After taring, the display should read zero and the *Zero* pointer should be *On*.

The *Tare* (*Net)* pointer turns *On* to show that the displayed weight for the following animals is now a *Net* weight.

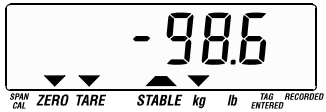


Unlike zeroing, taring affects the remaining capacity of the scale. That is, the *Gross* weight (*Tare* weight plus *Net* weight) cannot exceed the total loading capacity of the Loadbars (see *TRU-TEST Loadbars Manual*).

Up to 100% of the live capacity can be tared.

Very small weights cannot be Tared because, if the Tared weight is close to zero, the *TRU-TEST* Model 702 assumes you are clearing the *Tare*.

When a Tared container is removed from the Loadbars, the display shows the negative of the container's weight:



To display *Gross* weight, the *Tare* must be cleared:

1. Remove the container.

2. Press TARE.

Note: clearing the *Tare* does not zero the scale.

Weights And Measures Versions

- The *Tare* may operate down to 1 division.
- The *Tare* feature may be disabled.
- The *ZERO* key may be set to clear the *Tare*.

(See *Weights And Measures Versions* on page 85).

Example Use of Tare and Zero

Taring and zeroing are useful in situations such as produce weighing, for example weighing potatoes in bins.

At the beginning of a session the scale is zeroed, then the empty bin is placed on the platform and Tared.

When the bin is removed, the display reads the negative of the bin weight, for example, -100kg. During weighing dirt may fall *on the platform* and gradually accumulate until the display reads say -95kg. By simply pressing *ZERO*, the display is corrected so that it again reads -100kg.

If the *bin* picks up residue, first re-zero the scale without the bin, then re-Tare the bin.

If *Automatic Zeroing* is *On*, the Indicator automatically maintains the reading of -100kg between uses without having to press the *ZERO* key.

Fleece (Fine Weight) Mode

Fleece (Fine Weight) Mode allows precise measurement of relatively small weights on certain Loadbar systems.

You can weigh wool fleece(s), produce or small animals up to 300kg (660lb) with weight changes as small as 0.1kg (0.2lb).

Weight changes as small as 0.05kg (0.1lb) can be measured using a single Loadbar system (see the *TRU-TEST Loadbars Manual*).

To view or change Fleece Mode setting see *Setup Mode* on page 12.

(Fleece Mode is disabled for particular markets and models, and when using *Span Calibrated* Loadbars.)

Weights And Measures Versions

- Fleece Mode is disabled.

  (See Weights And Measures Versions on page 85).

Setting Resolution

The base resolution (or division size) is automatically set by the Loadbar connected. The displayed (and printed) resolution can be manually set to a coarser value if desired.

Four different settings are available starting from the base resolution of the Loadbars connected (eg. 0.5, 1.0, 2.0 and 5.0 kilograms for a base resolution of 0.5kg).

A finer resolution (0.1kg or 0.2lb) is provided by *Fleece Mode* (see page 21).

To view or change the resolution, see *Setup Mode* on page 12.

The resolution control can be used to prevent the Indicator autoranging when animals are both above and below an autoranging boundary (see *Autoranging* on page 81).

For example, if the base resolution is 0.5kg increments, the Indicator normally changes to a resolution of 1kg increments at weights above 250kg. If you are weighing animals with weights both above and below 250kg, you can fix the resolution at 1kg increments using *Setup Mode* so that you get the same resolution for all your animals.

The coarser of the manually set resolution and the current autoranging resolution is used by the Indicator.

Weights And Measures Versions

- Resolution setting may be disabled.

(See Weights And Measures Versions on page 85).

Entering Tag (ID) Numbers

The *TRU-TEST* Model 702 Indicator stores animal weights in a memory file along with a tag (ID) number of up to eight digits.

Tag numbers are separated into three parts so that you can specify different categories in one tag number.

For example year, herd and individual animal:

Year 1993, herd 3, animal 146

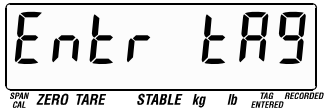
When tag numbers are printed the three parts are separated by spaces rather than commas.

You do not have to use all the available number places, a simple 2-digit number may be sufficient.

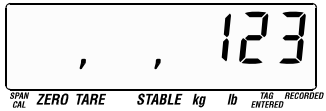
The tag number must be entered prior to pressing the *RECORD* key, otherwise the Indicator generates one automatically (beginning at 00,00,0001). Clearing a file resets the automatic tag number to 1.

To enter a tag:

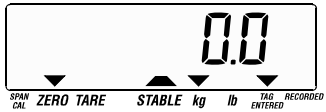
1. Press [TAG] (ID).



2. Key in a tag number (up to 8 digits) using the numeric keys.



3. Press [ENTER] to enter the tag.



The *Tag Entered* (*ID Entered*) pointer comes *On*.

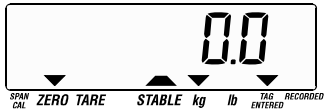
4. When ready, (tag entered, animal in place, reading stable), press *RECORD* to store the tag and weight into the memory file. See *Recording* on page 26 for more details.

There is a faster method of entering tags; you can key in the tag number directly then press *TAG* (*ID*). This saves having to press *ENTER* each time.

(You can enter the tag number while the scale is determining the animal's weight.)

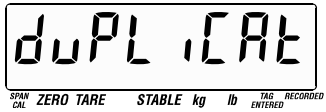
The *Tag Entered* (*ID Entered*) pointer turns *On* when a tag is entered and turns *Off* again when the weight is recorded. This shows whether or not a tag has been entered for the current animal. It also shows whether or not you have pressed the *RECORD* key for the current animal.

eg. tag entered, but animal weight and tag not yet recorded.



When a new tag is entered, the memory is checked to make sure the number is unique.

If not unique, "duplicate" is displayed.



If a duplicate tag is OK, press *ENTER* again (if using the quick method of entry described above, press *TAG* (*ID*) a second time), otherwise, enter a new number.

Making Corrections

If incorrect numbers have been keyed, but you have not yet pressed *ENTER*, you can:

- Delete digits one at a time by pressing [CLEAR].

If *ENTER* has been pressed, you can:

- View the tag you have entered by pressing TAG (ID).
- If it is okay, press LIVE to return to live mode.
- If not okay, re-enter the tag.

If you have already pressed *RECORD* to and store the data in memory, you can quickly delete the last record:

- Press DISPLAY, DELETE, LIVE.

You can edit other records later - see *Editing Records* on page 32.

Recording

The *TRU-TEST* Model 702 can store up to 3500 animal records (weight and tag). The data is retained in memory until cleared, even when the Indicator is switched *Off*. The records can be displayed one at a time on the display screen or printed out as a report using the ***TRU-TEST*** printer.

Up to 99 different files of animal records can be stored (see *Multiple Files* on page 35).

To record a weight (and corresponding tag number):

1. Move the animal onto the platform or crate.
2. Enter a tag number if required (see *Entering Tag Numbers* on page 23).
3. Wait for the *Stable* pointer to come *On*.
4. Press RECORD.

The display blinks and the *Recorded* pointer comes *On*. This prevents further recording of the same animal.

(If the Indicator will not record, it is because the display is not showing a live weight - press *LIVE*.)

When the animal leaves the platform (or the platform weight changes), the *Recorded* pointer goes *Off* ready for the next animal. This feature greatly helps to prevent operator errors.

If a printer is connected, the *TRU-TEST* Model 702 scale normally prints the data when *RECORD* is pressed. This feature can be disabled at your *TRU-TEST* Service Centre if required.

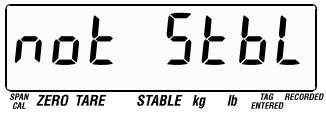
There are several conditions which prevent recording. In each case, the Indicator beeps when *RECORD* is pressed and a brief message to identify the problem is displayed (see *Display Messages* on page 51).

If the *Stable* pointer goes *Off* just as the *RECORD* key is pressed (because the animal jumps off the platform say), the *TRU-TEST* Model 702 still stores the true weight. There is a 0.5 second period provided for this, after which the *RECORD* key is disabled until the *Stable* pointer comes *On* again.

The *Recorded* pointer may not go *Off* or may be delayed in turning *Off* during speed weighing when a new animal, which is equal in weight to the previous animal, quickly follows onto the platform (especially when the second animal is moving about). Usually a short pause is all that is necessary for the Indicator to recognise a slight change in weight. If not, press *CLEAR* to force the *Recorded* pointer to go *Off*.

Turbo Setting

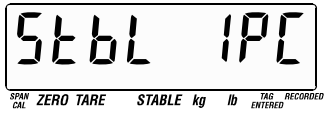
If the *Stable* pointer is not *On* when you press the *RECORD* key, a message is displayed and the weight is not recorded.



Using the *Turbo Setting*, you can change the speed of response of the *Stable* pointer so that it comes on faster for rapid throughput of animals or slower for greater accuracy.

To view or change the turbo setting see *Setup Mode* on page 12.

Turbo setting of 1 per cent (default factory setting). ie. the *Stable* pointer comes *On* when the reading is within 1% of the true weight.



Available options are 0.5%, 1%, and 2%.

Settings:

- To do speed weighing, select 2% for rapid throughput of animals.
- Alternatively, to ensure that weights are not recorded until measured to the best accuracy of the scale, select 0.5%.

Note: This feature affects only the speed at which the *Stable* pointer comes *On*, the display can still update with more accurate readings even after the *Stable* pointer is *On*.

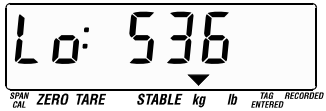
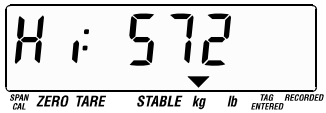
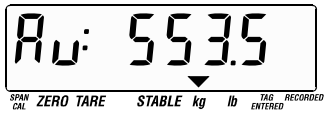
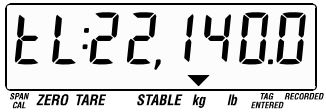
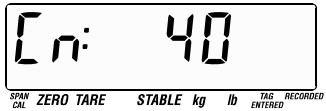
Weights And Measures Versions

- The *Turbo* function may be disabled.

(See *Weights And Measures Versions* on page 85).

Displaying Statistics

The *TRU-TEST* Model 702 Indicator has five keys to display statistics about the animal records held in the current file:

MIN Minimum weight recorded.	
MAX Maximum weight recorded.	
AVERAGE Average of weights recorded.	
TOTAL Total of weights recorded.	
COUNT Number of weights recorded.	

- Press LIVE to return to *Live Weighing Mode*.

The statistics are calculated differently in *Group Weighing Mode* (see page 43).

Statistics are also available in various printed reports - see *Printing Reports* on page 40.

Displaying Records

You can display the records in the current file one by one in chronological or weight order. This is important if you do not have a printer as it allows you to study the results at leisure after the weighing session.

To display the records in chronological order:

- Press [DISPLAY ▽] to start at the first animal recorded.

OR

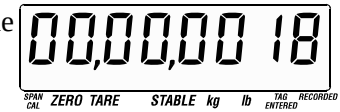
- Press [△ DISPLAY] to start at the last animal recorded.

  (for weight order, press [SEARCH] before the display key)

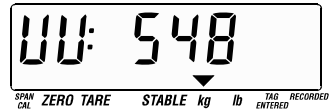
- To scroll up and down the list use [DISPLAY ▽] and [△ DISPLAY].

- To scroll rapidly, hold down the appropriate key.

Initially the tag numbers of the records are displayed.
(eg. tag number 18)



- Press [◁▷] to see the corresponding weight (W).



- If *Group Mode* is *On*, press [◁▷] again to display group count (see *Group Mode* on page 43).

- Press [LIVE] at any stage to return to *Live Weighing Mode*.

Deleting Records

Warning: **when the *DELETE* key is pressed, the record is totally lost and cannot be recovered**.

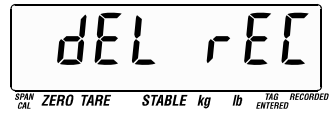
You can delete any record (tag and weight) as follows:

1. Use [△ DISPLAY], [DISPLAY ▽] or [SEARCH] to find the unwanted record.

   (See *Displaying Records* on page 30, or *Searching Records* on page 33).

2. Press [DELETE].

   Confirmation that the record has been deleted:



If the last record of a file is deleted, the Indicator then displays the previous record. If a record in the middle of a file is deleted, then the next record in sequence is displayed.

(If you press *DELETE* again, the currently displayed record is immediately deleted and the "dEL rEc" message does not appear - this is to save time when deleting multiple records.

- Press [LIVE] to return to normal weighing mode.

Quick Delete

To undo the last press of the *RECORD* key:

- Press [△ DISPLAY], [DELETE], [LIVE].

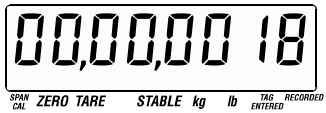
See also *Editing Records* on page 32.

Editing Records

The *TRU-TEST* Model 702 allows editing (changing) of data stored in memory.

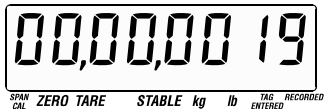
Records which have been edited are marked with an * on all printed reports.

1. Display the tag, weight or condition code you wish to change (see *Displaying Records* on page 30).



(In this example tag number 18)

2. Key in the new value.
3. Press ENTER.



4. Press LIVE to return to *Live Weighing Mode*.

Weights And Measures Versions

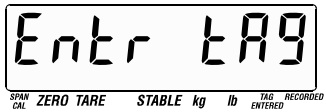
- Editing of the weight part of the record may be disabled.

(See *Weights And Measures Versions on* page 85).

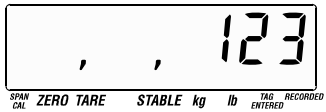
Searching Records

You can search through the records in memory to find a particular tag (ID):

1. Press **SEARCH**, display shows:

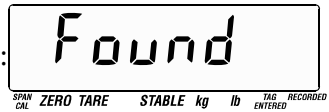


2. Key in the tag number required.

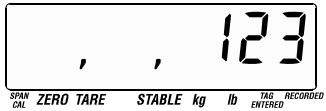


3. Press **ENTER**.

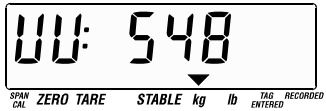
   If the Indicator finds the tag number in memory, it displays:



   Then the tag is displayed:

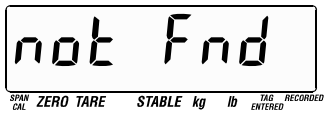


- Press ◁▷ to display weight.



- Press **LIVE** to return to *Live Weighing Mode*.

If the tag number is not found, the display shows:



Press **SEARCH** to enter a new tag number, or press **LIVE**.

Searching for Minimum or Maximum Weight

To search the current file for the maximum weight recorded:

- Press SEARCH, DISPLAY ▲.

The record is found and you can display the tag number or weight as required (see *Displaying Records* on page 30).

To search the current file for the minimum weight recorded:

- Press SEARCH, DISPLAY ▼.

Multiple Files

The *TRU-TEST* Model 702 Indicator can store data in multiple files (up to 99 files allowed) and you can record the date of each file. The Indicator is pre-set to file 1 at the factory and it may be that you have no need to use other files.

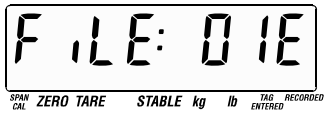
However, multiple files can be used for many purposes such as separating different mobs or herds, keeping the data from different jobs until they are all printed at the end of the day or keeping data from different Loadbar systems separate.

The FILE SELECT key is located in a handy position on the keyboard so it is possible to change files on an animal by animal basis in order to sort them on some characteristic. This allows you to obtain separate statistics or reports on different types of animals weighed during the same session.

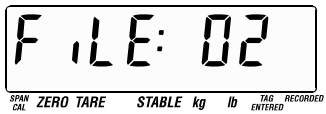
To view or change the current file:

1. To view, press FILE SELECT.

   ("E" means an empty file)



2. To change, key in a new file number.



3. Press ENTER.

The global file (file 0) is a special file that allows you to do statistics and print reports on data in all the files. This is only relevant if the data is from the same Loadbars and is in the same units. You cannot record or edit data in file zero.

Setting File Date

To view or change the date of the current file:

1. Press [FILE DATE].
2. Key in the date.
3. Press [ENTER].

The date can be in any format with a maximum of 6 digits.

Clearing File Date

1. Select the required file.
2. Press [FILE DATE], [CLEAR].

The date is also cleared when the file data is cleared.

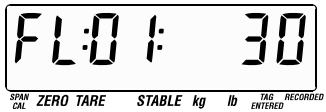
Scanning Files

1. Press [FILE SELECT].
2. Press [△ DISPLAY] or [DISPLAY ▽] to scroll through the file numbers.

(To rapid scroll, press and hold down the key.)

You can scan for an empty file by looking for the "E" sign.

Press [◁▷] to display file numbers and animal counts.



(In this example File 1, 30 animals.)

Press [◁▷] again to display file numbers and dates.

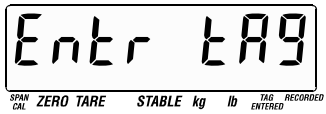
(In this example File 1, 30th August 1993.)

When the required file is found, press [LIVE].

Finding a File by Tag (ID) Search

If you know the tag number of one of the animals in the file, you can do a global (all files) search for it.

1. Press [FILE SELECT], [0], [ENTER] to select the global file.
2. Press [SEARCH].



3. Key in the known tag number
4. Press [ENTER].

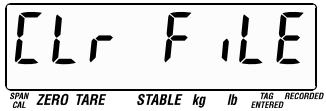
The Indicator searches for the first file containing the tag number and, if found, selects the file and displays that record.

Clearing Files

Warning: Once a file has been cleared, the weight data cannot be recovered.

To clear a file:

1. Select the file using FILE SELECT, DISPLAY △ and DISPLAY ▽.
2. Press CLEAR FILE.



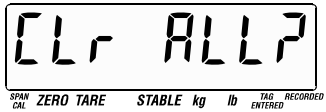
3. Press CLEAR FILE again to confirm.

   (or press *LIVE* to abort the clear operation)

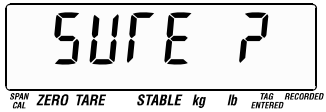
Clearing all of Memory

Warning: Once the memory has been cleared, the weight data cannot be recovered.

1. Press FILE SELECT, 0, ENTER to select the global file
2. Press CLEAR FILE.



3. Press CLEAR FILE



4. Press CLEAR FILE a third time to confirm the clear operation.

   (or press *LIVE* to abort the clear operation)

The following table shows the affect of clearing file 0.

Items Cleared	Not Affected By Clearing Memory
1. All records in all files.	1. kg/lb setting.
2. The date of all files.	2. Auto Zero tracking on/off status.
3. Any Tare.	3. Power Up Zero on/off status.
4. Resets auto tag number to 1.	4. Stable pointer speed setting.
	5. Resolution selected.
	6. Print option selected.
	7. Baud rate.
	8. Interface handshaking method.

Printing Reports

The *TRU-TEST* Model 702 can print two reports:

Tag / ID	All records in tag (ID) number order.
Cull	All records in weight order.

The reports include the statistics described on page 29.

The Tag/ID report format changes when *Group Mode* is *On* (see *Group Mode* on page 43).

There is also a computer output option available (see *Downloading to a Computer* on page 74).

Note: *TRU-TEST* printers come complete with the correct cable to connect to the Indicator. Never connect the Indicator to a parallel (Centronics) printer interface as damage to the printer may result. Never use a parallel IBM printer cable.

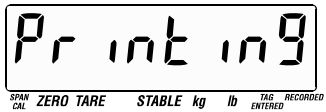
The printer cable used with old AG300 Series *TRU-TEST* scales cannot be used with the 700 Series.

Since the *TRU-TEST* Model 702 stores data in a highly reliable memory, it is recommended that the printer be left indoors away from the dirt and moisture of the weighing area. At the end of weighing, take the Indicator inside to the printer for printing (and charging if applicable).

To print a report:

1. Connect the printer to the Indicator's printer socket using the correct cable. Ensure the printer is supplied with power, turned *On* and is ready for printing.
2. Enter *File Date* if required on printed report (see *Setting File Date* on page 36).
3. Select the required report (see *Setup Mode* - print options on page 12).

4. Press PRINT (REPORT).



- To abort a printout, press LIVE.

TRU-TEST MP400 Printer

Use only the printer cable supplied by *TRU-TEST*.

The printer is powered from the Indicator via this cable. The Indicator must be connected to an external power supply, the internal battery is not sufficient to power the printer as well as the Indicator. See *Installation* on page 6.

Note: The printer cable used with the *TRU-TEST* Citizen printers cannot be used with the MP400 printer.

The *TRU-TEST* Model 702 Indicator and printer are factory configured with compatible settings. Earlier model Indicators may need to be set up to communicate correctly with the printer. See *Printer Interfacing* on page 78.

For changing the printer paper and general care of the printer refer to the *MP400 Printer Operators Manual* supplied with the printer.

If there are any problems, refer to *Troubleshooting* on page 61 of this manual.

TRU-TEST Citizen Model Printer

Use only the RS232 cable supplied by *TRU-TEST*.

To change the paper, refer to the underside of the mechanism cover on the printer.

If there are any problems, refer to *Troubleshooting* on page 61.

DC Power

The DC power version of the printer receives its power from the Indicator via the printer cable. The Indicator must be connected to an external power supply, the internal battery is not sufficient to power the printer and the scale. See *Installation* on page 6.

AC Power

The AC power version requires an AC supply for the printer and the normal 12 volt supply or internal battery for the Indicator.

Group Weighing Mode

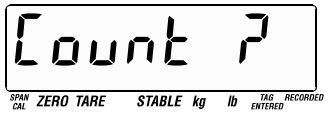
Group Weighing Mode allows you to weigh several animals at once and record the number of animals along with the group weight.

Reports can be printed showing statistics for group weights and calculated average animal weights.

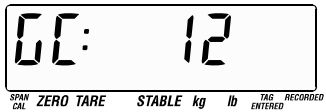
To enter *Group Mode* see *Setup Mode* on page 12.

When weighing, the number of animals in the group must be entered before pressing the *RECORD* key:

Press GROUP COUNT.



Key in the number of animals eg. Group Count = 12.



Press ENTER.

If required, enter a tag (ID) number for the group.

When ready (animals in place, *Stable* pointer *On*), press *RECORD* to record the group weight and group count.

Accumulating Group Weights

If *Group Mode* is *On* and a new group of animals is weighed using the same tag (ID) number as a previously recorded group, the weight and group count are added together.

In this way a large group can be weighed in small groups (to suit scale capacity), but is recorded as one large group.

Making Corrections

If incorrect numbers have been keyed in, but you have not yet pressed *ENTER*, you can:

- Delete digits one at a time by pressing CLEAR.

If *ENTER* has been pressed, you can:

- View the number of animals you have entered by pressing *GROUP CNT*.
- If it is okay, press LIVE to return to *Live Mode*.
- If not okay, re-enter the number.

If you have pressed *RECORD* to store the data in memory, you can edit the record later - see *Editing Records* on page 32.

Displaying Statistics

With *Group Mode On* the statistics keys display the following:

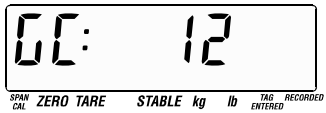
COUNT	Sum of the group counts in the current file. For example, If three groups of two animals are recorded, the *COUNT* key displays "6".
TOTAL	Sum of the group weights in the current file.
AVERAGE	Average animal weight (TOTAL / COUNT).
MIN	Minimum group weight.
MAX	Maximum group weight.

With *Group Mode Off* the statistics keys display the following:

COUNT	The number of groups in the current file.
TOTAL	Sum of the group weights in the current file.
AVERAGE	Average group weight (TOTAL / COUNT).
MIN	Minimum group weight.
MAX	Maximum group weight.

Displaying Records

When displaying records, the group count is also displayed for each record.



(see *Displaying Records* on page 30)

Note

If no group count is entered, the Indicator assumes a single animal is being weighed. The group count is displayed as zero and is not printed (if a printer is being used). The single animal and its corresponding weight are added to the statistics.

Printing Reports

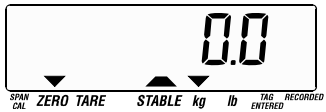
In *Group Mode*, the Tag (ID) ordered report includes a column for group counts. Also, the total number of animals and average animal weight are printed in addition to the number of groups and average group weight.

Quick Reference Section

Typical Weighing Session

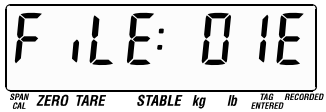
A typical weighing session is summarised below. A handy reference card with a diagram of this process is also supplied with the Indicator.

1. **ON** - turn the Indicator *On*.



2. **FILE SELECT**, **DISPLAY** or **DISPLAY**

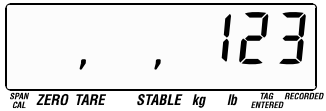
   Scan for an empty file ("E").



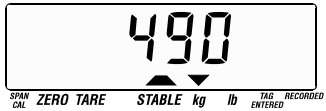
3. **LIVE** return to live mode.

4. First animal on the platform.

5. **1** **2** **3** **TAG**, enter tag number.



6. Wait for *Stable* pointer.
   Press **RECORD** - record the data (display blinks).



7. Repeat from step 4 (next animal onto platform).

8. **OFF** - at the end of the session, turn the Indicator *Off*.

The weights are retained in memory and can be displayed or printed later.

Keys

1	(0 to 9) - numeric keys.
AVERAGE	Displays the average weight of all the animals recorded in memory.
CLEAR	Clears the last digit entered. Also used to clear the *Recorded* pointer, file date etc.
CLEAR FILE	Clears the current file of all animal records and date. As a safety feature, this key must be pressed twice before records are deleted
COUNT	Displays the total number of animals recorded in memory.
DELETE	Deletes the displayed record from a file.
△ DISPLAY	From live display, displays the tag of the last animal recorded. If displaying records, scrolls up. The key auto-repeats when held down. If pressed after the *SEARCH* key, finds and displays the heaviest animal record.
DISPLAY ▽	Displays the tag of the first animal recorded. If displaying records, scrolls down. The key auto-repeats when held down. If pressed after the *SEARCH* key, finds and displays the lightest animal record.
◁ ▷	Toggles between display of tag number / weight / group count when displaying records in memory.

ENTER	Final key press for entering numbers using the numeric keypad.
FILE DATE	View or set the current file date.
FILE SELECT	View or enter the current file number.
GROUP COUNT	View or enter the current group count.
(ID)	View or enter the current ID number (USA Model Indicators).
LIVE	Selects *Live Weighing Mode* (the normal state of the Indicator). This key can be pressed at any stage during the operation of the Indicator.
MAX	Displays the maximum weight recorded in the current memory file.
MIN	Displays the minimum weight recorded in the current memory file.
OFF	Turns the Indicator *Off*.
ON	Turns the Indicator *On*.
PRINT	Prints a report of the records in the current memory file.
RECORD	Records the displayed live weight (and tag).
(REPORT)	Prints a report of the records in memory. (USA Model Indicators.)

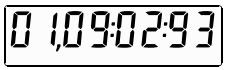
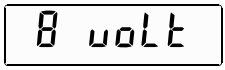
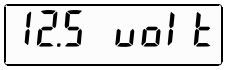
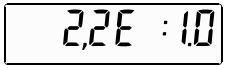
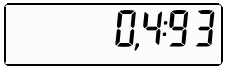
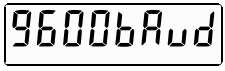
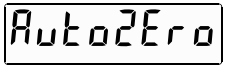
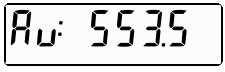
SEARCH	Search for the record with minimum or maximum weight or particular tag number.
SETUP	Access *Setup Mode*.
TAG	View or enter the current tag number.
TARE	Cancels out a container weight.
TOTAL	Displays the total weight of all the animals recorded in the current memory file.
ZERO	Cancels out dirt and excrement accumulated on the platform and returns the display to exactly zero.

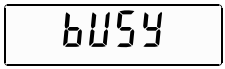
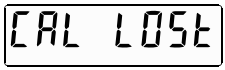
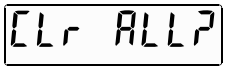
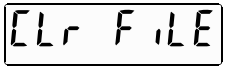
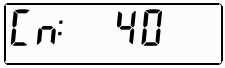
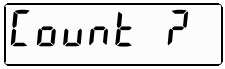
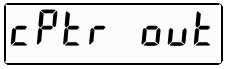
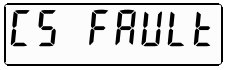
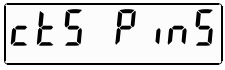
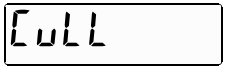
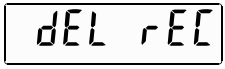
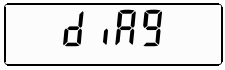
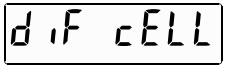
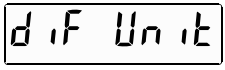
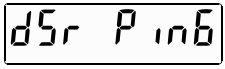
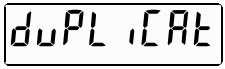
Display Pointers

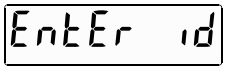
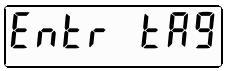
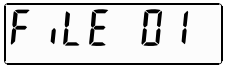
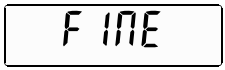
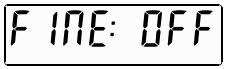
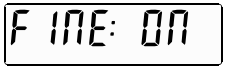
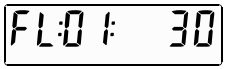
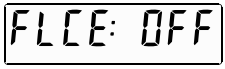
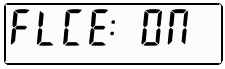
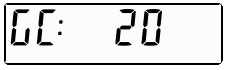
SPAN CAL	Shows that the *Span Calibration* option is being used. (For Service Centres' use only.)
ZERO	Shows that the weight is within one quarter of a division of zero.
TARE	Shows that *Net* weights are being displayed (a *Tare* has been entered).
NET	Shows that *Net* weights are being displayed (a *Tare* has been entered). USA Model Indicators.
STABLE	Shows that the reading is stable.
kg	Shows that the displayed weight is in kilograms.
lb	Shows that the displayed weight is in pounds.
TAG ENTERED	Tag number has been entered ready to record the weight.
ID ENTERED	ID number has been entered ready to record the weight (USA Model Indicators).
RECORDED	The current weight has been recorded.

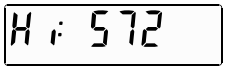
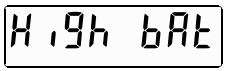
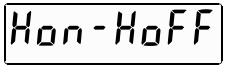
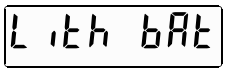
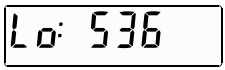
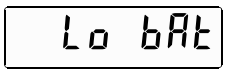
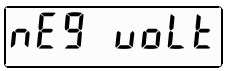
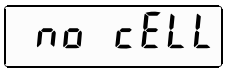
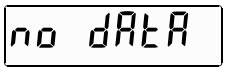
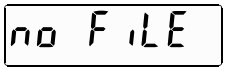
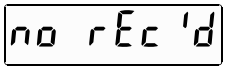
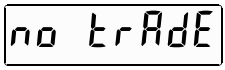
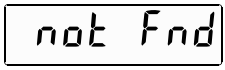
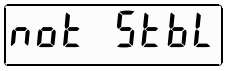
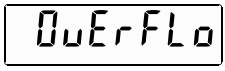
Weights and Measures Versions: Some keys and pointers may have been removed or changed to conform with local regulations. (See *Weights And Measures Versions* on page 85).

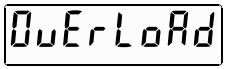
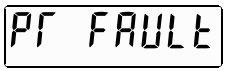
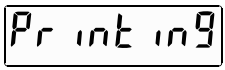
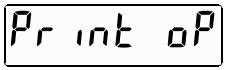
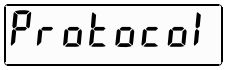
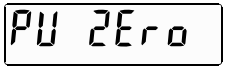
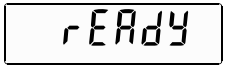
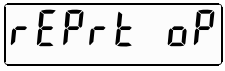
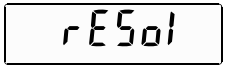
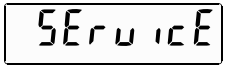
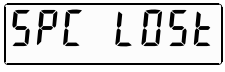
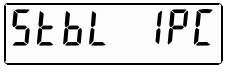
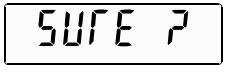
Display Messages

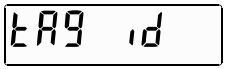
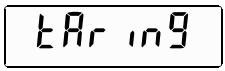
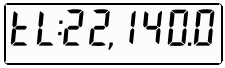
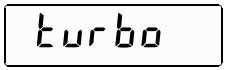
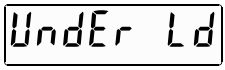
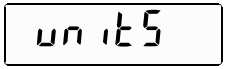
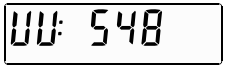
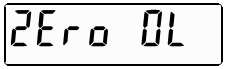
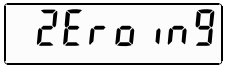
Message		Meaning
		File number and date.
	**8 Volt**	Internal 8 volt supply failure.
	**12.5 Volt**	Diag information 1, supply voltage.
		Diag information 2.
		Diag information 3.
		Diag information 4.
	**9600Baud**	Baud rate of communications port.
	**Autozero**	Setup Automatic zero options.
	**Av:**	Average weight statistic.
	**Az: off**	Automatic zeroing *Off*.
	**Az: on**	Automatic zeroing *On*.
	**Bad Code**	Bad code from Loadbar cable plug.
	**Bad Conf**	Configuration data is lost.
	**Baud**	Setup Baud rate options.

	**Busy**	Busy performing sorting or calculations.
	**Cal Lost**	*Standard Calibration* data lost.
	**Clr All?**	Do you want to clear all files?
	**Clr File**	Do you want to clear file?
	**Cn:**	Count statistic.
	**Count**	Enter group count.
	**Cptr Out**	Computer output format.
	**Cs Fault**	Checksum Fault in EPROM.
	**Cts Pin5**	CTS handshaking on pin 5 of the communications interface.
	**Cull**	Print option: Cull report in weight order.
	**Del Rec**	Delete animal record done.
	**Diag**	Setup Diag options.
	**Dif Cell**	Memory records present which were recorded with a different Loadbar.
	**Dif Unit**	The units (kg/lb) are different to those in other memory records.
	**Dsr Pin6**	DSR handshaking on pin 6 of communications interface.
	**Duplicat**	Duplicate tag warning.

	**Enter ID**	Enter an identification number.
	**Entr Tag**	Enter a tag.
	**File**	Current file number.
	**Fine**	Setup Fine Weight Mode options.
	**Fine: off**	Fine Weight Mode *Off*.
	**Fine: on**	Fine Weight Mode *On*.
	**Fl:**	File number and animal count.
	**Flce: Off**	Fleece Mode *Off*.
	**Flce: On**	Fleece Mode *On*.
	**Fleece**	Setup Fleece Mode options.
	**Found**	Tag found.
	**Full**	Memory is full.
	**GC: 20**	Group count field of memory record.
	**GP: Off**	*Group Mode Off*.
	**GP: On**	*Group Mode On*.
	**Group**	Setup *Group Mode* options.

	**Hi:**	Maximum (high) weight statistic.
	**High Bat**	High supply voltage indicated.
	**Hon-HoFF**	XON XOFF handshaking on the communications interface.
	**Lith Bat**	Internal lithium battery flat.
	**Lo:**	Minimum (low) weight statistic.
	**Lo Bat**	Low supply voltage indicated.
	**Neg Volt**	Internal negative voltage failure.
	**No Cell**	No Loadbar is connected.
	**No Data**	No data in memory file.
	**No File**	No data recording file selected (file 00 selected).
	**No Rec'd**	*RECORD* key pressed but a weight has already been recorded for this animal.
	**No Trade**	Not legal for trade.
	**Not Fnd**	Tag not found.
	**Not Stbl**	Not stable when attempting to record.
	**Overflo**.	Overflow in number entry (value too large).

	**Overload**.	Overload on scale.
	**Pr Fault**	Processor fault.
	**Printing**	Printing in progress.
	**Print Op**	Setup print options.
	**Protocol**	Setup handshaking protocol options.
	**Pu Zero**	Setup *Power Up Zero* options.
	**Pz Off**	*Power Up Zero Off*.
	**Pz On**	*Power Up Zero On*.
	**Ready**	The Indicator is ready, but no Loadbar is connected.
	**Reprt Op**	Setup report options.
	**Re: 0.5**	Resolution (set to 0.5).
	**Resol**	Setup resolution options.
	**Service**	The Indicator requires service.
	**Spc Lost**	*Span Calibration* data is lost.
	**StbL xPC**	*Stable* pointer *On* when within x%.
	**Sure ?**	Are you sure about clearing all files?

	**Tag Id**	Print option: tag (ID) ordered report.
	**Taring**	The Indicator is taring.
	**Tl:**	Total weight statistic.
	**Turbo**	Setup turbo options.
	**Under Ld**	The voltage from the Loadbars is abnormally low.
	**Units**	Setup measurement units options (*kg* or *lb*).
	**W(UU):**	Weight field of memory record.
	**Zero OL**	Zero overload for W&M versions and when using S*pan Calibration*.
	**Zeroing**	The Indicator is Zeroing.

Care and Maintenance

The *TRU-TEST* Model 702 Indicator is a rugged and robust product, designed to withstand the environment associated with livestock handling. The case is made from extremely tough, ultraviolet-resistant polycarbonate. The keyboard is completely sealed for all-weather operation.

Like any equipment, however, appropriate care and maintenance ensures long life and good appearance.

A set of simple guidelines is given below:

- Both the Indicator and Loadbars or Suspension Cells are designed to be shower proof. Under no circumstances should the equipment be submerged in water or left in a damp environment for extended periods.
- Occasionally clean away foreign material from the underside of the platform to make sure that all the load is taken by the Loadbars.
- The Indicator should be stored in a dry cool place.
- Keep the Indicator clean. Use a soft damp cloth to remove dust and mud. *Do not use abrasive cleaners*.
- Replace the protection caps onto the plugs and sockets whenever the Loadbars are detached from the Indicator. When the cables are plugged in, screw the protection caps together. Dust and moisture can be removed from the plugs and caps with methylated spirits or ethyl alcohol. Stronger spirits must not be used as they may react with the plastic.
- If fitted with an internal battery, store the Indicator in a fully charged state and recharge every three months.

- To extend the life of the Indicator keep it indoors when not in use. If the internal battery is fitted, it is convenient to do the charging at the same time.
- **Do not open the Indicator case.** There are no user serviceable parts inside. Refer all servicing matters to your *TRU-TEST* Service Centre. The case is a sealed unit and, if opened, moisture could affect the operation of the Indicator. The product warranty becomes void if the case seal is broken.

Internal Battery

The rechargeable internal battery option allows the Indicator to be conveniently independent of any external power supply.

The internal battery comes with its own internal battery charger. See *Internal Battery Charging* below.

Once charged the internal battery (if installed) gives 8 hours of continuous operation at normal temperatures
(5°C - 20°C) (40°F - 70°F) with two Loadbars connected.

The battery lasts for 3 to 5 years or approximately 250 charges if stored in a charged state and not submitted to temperature extremes.

To preserve battery life, observe the following simple guidelines:

- Never use an insufficiently charged or exhausted battery.
- Recharge the battery regularly.
- Recharge the battery once every 3 months even if not in use.
- Store the Indicator in a cool dry place.
- Use the recommended power supply.

Internal Battery Charging

Automotive battery chargers are NOT suitable for charging. The voltage and current they supply may be outside the required range. They may damage the Indicator resulting in the warranty becoming void.

Small AC to DC adaptors are also NOT suitable for charging.

A special system automatically controls the internal battery charging. This is designed to provide maximum protection for the battery and to allow charging while the Indicator is in use or when it is switched *Off*.

The charger unit maintains maximum life of the battery, while giving the fastest charging rate possible. It automatically changes from a full charge rate to a trickle charge depending on the internal battery state. Charging from a flat state takes six hours. A quiet buzzing noise from within the Indicator shows that the battery charger is working.

The internal battery charger operates from either the recommended *TRU-TEST* power supply unit or a 12 volt car battery. Other charging supplies may damage the Indicator resulting in the warranty becoming void.

When charging the *TRU-TEST* Model 702 from a car battery, the car battery will lose energy equivalent to leaving the car headlights *On* for approximately 1 hour.

If the power source is unable to supply the required power, the charger switches *Off* and does not charge the internal battery. The Indicator continues to operate from the external power source. The charger only restarts once the external power supply has been disconnected or turned *Off* and then reapplied.

The *TRU-TEST* Model 702 enables the user to read the supply voltage at any time in order to check the condition of the internal battery (see *Setup Mode* on page 12).

If an external supply is connected, the charging voltage is displayed. Otherwise, the internal battery voltage is displayed.

A fully charged internal battery reads 12.5 volts or more when the Indicator has been *On* for 5 to 10 minutes with no Loadbars or external power source connected.

The internal battery is considered low when the voltage reads less than 11.0 volts.

You can use the internal voltmeter to determine if the battery has been charged by displaying the voltage 30 minutes after connecting it to the external 12 volt supply. If the battery has been charged, the display should read greater than 13.5 volts. However, this does not mean that charging is complete.

Troubleshooting

"8 Volt" is displayed

Cause — The internal 8 volt supply (used to supply the Loadbars) is outside its specified limits.

Solution — Disconnect the Loadbar cables from the Indicator one at a time. If the "8 voLt" message disappears then there is a fault in the Loadbars or their cables. If, after disconnecting the cables, the message is still displayed then the Indicator is faulty. Return all faulty items to your Service Centre.

"Bad Code" displayed

Cause — The code resistors in the Loadbar cable plugs are not recognised. (This message also displays for Loadbars which are only used with Span Calibration before being calibrated.)

Solution — If you have two Loadbars, disconnect one at a time to determine which has faulty code resistors. Return faulty parts to your Service Centre.

Cause — Moisture inside the indicator.

Solution — Return the Indictor to your Service Centre.

"Cal Lost" displayed during turn on

Cause — The Indicator has not been calibrated or has lost its *Standard Calibration* data.

Solution — The *Standard Calibration* data is not used if the Indicator has been *Span Calibrated*. If this is the case then the extreme left pointer (SPAN) should be *On* when the Loadbars or Suspension Cells are plugged in. The Indicator can then be used normally.

If the Indicator is not using *Span Calibration* then it may still be used without its *Standard Calibration* but with reduced accuracy. The accuracy cannot be guaranteed. Return the Indicator to your Service Centre to have its *Standard Calibration* data cleared or restored.

"CS Fault" displayed

Cause The EPROM CheckSum self test has failed.

Solution Turn the Indicator *Off* and then *On* again. If the condition persists, return the Indicator for service.

"Dif Cell" when pressing the *RECORD* key

Cause Memory records are present which were recorded with a different Loadbar.

Solution Clear memory or select an empty file before starting the recording session.

"Dif Unit" when pressing the *RECORD* key

Cause The currently selected measurement units (kgs or lbs) is different to that used for previous memory records.

Solution Change the measurement units, clear the file, or select another file.

Display is unstable

The display jumps from reading to reading or cycles up or down.

Cause Moisture or dirt in the Indicator or Loadbar plugs.

Solution Clean with methylated spirits or ethyl alcohol and dry out the Indicator and Loadbar plugs.

Cause	Loadbar cable damaged.
Solution	Check for broken or split areas on the covering of the Loadbar cable and repair by covering with waterproof tape. If any of the wires in the Loadbar cable are exposed, cut or frayed, return the Loadbar to your Service Centre for repair.
Cause	One Loadbar foot off the ground.
Solution	Ensure all feet are in firm contact with ground. Use spacers under the feet if required.
Cause	Dirt or other material build - up underneath the platform.
Solution	Clean the underside of the platform.
Cause	An animal having one leg off the platform and resting on the ground. An animal touching the side of the race.
Solution	Ensure animal correctly positioned on the platform.

"Full" displayed

Cause	Memory is full.
Solution	Print or download some files to a computer (if they are needed) and then clear the data in those files.

"High Bat" displayed

Cause	The supply voltage is greater than 16 volts DC. This message is displayed for 15 seconds and then the Indicator switches itself *Off*.
Solution	Replace power supply with a unit that can provide 10.5 to 16 volts DC.
Cause	Moisture inside the indicator.
Solution	Return the Indictor to your Service Centre.

Indicator functions suddenly behave abnormally

Cause An Indicator memory variable may have become corrupted by severe electrical disturbance.

Solution Turn the Indicator *Off* and then *On* again. If the problem persists, check all Indicator settings and change if necessary. If problem persists, clear all of memory.

"Lith Bat" displayed

Cause The internal memory lithium battery is near the end of its life. (Normal life 7 years).

Solution Return the Indicator to your Service Centre for lithium battery replacement.

Cause Moisture inside the indicator.

Solution Return the Indictor to your Service Centre.

"Lo Bat" displayed

Cause The supply is below 10.5 volts DC or the battery terminals are dirty. This message is displayed for 15 seconds, and then the Indicator switches itself *Off*.

Solution Replace power supply or battery with a unit that can provide 10.5 to 16 volts DC. Clean the battery terminals. Re-charge the battery if necessary.

Cause Moisture inside the indicator.

Solution Return the Indictor to your Service Centre.

"Neg Volt" is displayed

Cause The internal negative supply is outside its specified limits.

Solution Disconnect any cable plugged in to the communications (printer) socket. If the problem disappears check the cable. Otherwise return the Indicator to your Service Centre.

"No Cell" displayed during turn on and then displays "Ready"

Cause There is no Loadbar connected or the Loadbar code resistors are open circuit.

Solution The Indicator can be used without the Loadbars connected for setting up, editing, electronic note pad and report printing. If the condition persists when the Loadbar cables are plugged in, refer to "bAd codE" above.

Cause Old code 99 Loadbars are being used.

Solution Contact your distributor for reconfiguration of the Indicator to recognise 99 as a valid code.

"No Rec'd" displayed when pressing *RECORD*

Cause The weight has already been recorded.

Solution If a new animal is on the platform and the *Recorded* pointer has not gone *Off*, press the *CLEAR* key to force it to go *Off* ready for the current animal.

"Not Stbl" when pressing the *RECORD* key

Cause The *Stable* pointer was not *On* when the *RECORD* key was pressed.

Solution Wait for the *Stable* pointer to come *On* and then press *RECORD* again.

"PR Fault" is displayed

Cause — The processor inside the Indicator has "crashed", probably due to an electrical trauma in the power supply line.

Solution — Turn the Indicator *Off* and then *On*. If there is a "Bad Conf", "Cal lost" or "Spc Lost" message during turn *On* then the crash has caused the loss of vital internal data which the Indicator has been unable to recover by itself. (The Indicator keeps three copies of calibration data to enable recovery in most cases.) Refer to the troubleshooting section specific message(s).

If the "PR FAULt" recurs regularly, check the power supply by running the Indicator from a 12 volt car battery. If the condition persists, return the Indicator for service.

Printer doesn't print and the Indicator locks up

Cause — The handshake mode is set incorrectly.

Solution — See *Printer Interfacing* on page 78.

Try both "Dsr Pin 6" and "Cts Pin 5". Then try again with the hand shaking set to XON-XOFF to verify that it is a handshaking problem. If the printer now prints, check that there are no sections of the printout missing.

Printer prints garbage

Cause — Incorrect baud rate.

Solution — Set the baud rate to that of the printer. See *Printer Interfacing* on page 78.

Printer prints nothing but the Indicator doesn't lock up

Cause Incorrect baud rate or faulty cabling.

Solution Check the cable. Set the baud rate to that of the printer See *Printer Interfacing* on page 78.

Printout - sections missing

Cause Hand shaking is not working.

Solution Try changing the handshaking to DSR pin 6. If the Indicator now locks up when printing, check the cabling. See *Printer Interfacing* on page 78.

"Service" or "Bad Conf" displayed

Cause Essential memory data containing the configuration number has been corrupted or an upgrade attempt has failed.

Solution Contact your Service Centre.

"Spc Lost" displayed during turn on

Cause The *Span Calibration* data has been lost.

Solution If configured to do so, and if standard Loadbars are being used, the Indicator may continue to function using *Standard Calibration* although possibly with different resolutions and load ratings and with reduced accuracy.

If you need to use *Span Calibration*, the system must be recalibrated in situation. If you do not use *Span Calibration*, you may continue to use the Indicator normally. Return the Indicator to your Service Centre to have the *Span Calibration* cleared.

If your Indicator is a Weights And Measures Versions, contact your Service Centre.

"Taring" or "Zeroing" message persists indefinitely

Cause — The signal from the Loadbars is excessively noisy or the cables are contaminated with moisture or the 12 volt power source is excessively noisy.

Solution — Remove any live weight from the platform. If you have two Loadbars, disconnect one at a time to determine if one is faulty. Check the power supply by replacing it or running the Indicator from a 12 volt car battery.

"Under Ld" displayed

Cause — The signal from the Loadbars is abnormally low (negative) or the Indicator is faulty.

Solution — If you have two Loadbars, disconnect one at a time to determine if one is faulty. Return faulty units to your Service Centre.

Weights are out by a factor of nearly two

Cause — The Indicator is working in the wrong measurement units.

Solution — If both kilograms and pounds are available, two pointers labelled "kg" and "lb" indicate which one is currently being used. Change the units (see *Changing Units* on page 11).

If the Indicator's units of measurement cannot be changed, return it to your Service Centre to have the configuration number corrected.

Weights cannot be recorded

Cause — The displayed value is not a live weight or the displayed weight is negative. (Also check for "Not Stbl", "No Rec'd", "Dif Unit", "Dif Cell", "Full", "Overload".)

Solution — Press *LIVE* to return the Indicator to a live weight display. Only positive weight readings can be recorded.

Weight readings inaccurate

Cause
- loose Loadbar feet
- load bearing surface is not supporting foot
- faulty Loadbar
- uneven or non-level surface
- faulty Indicator.

Solution Carefully tighten loose Loadbar feet lock nuts and ensure that all four feet are resting on concrete or 25mm (1 inch) of timber. If a Loadbar or the Indicator is faulty, return faulty item to your Service Centre.

See also "Weights are out by a factor of nearly two".

"Zero Ol" displayed

Cause The Indicator is using *Span Calibration* without the 50% dead load configuration option and is trying to zero more than 2% of live capacity.

Solution If a Weights and Measures approved scale, remove any dead weight which did not exist on the platform when it was span calibrated and re-zero manually.

If not a Weights and Measures approved scale, have your Service Centre check the configuration to ensure that 50% dead load allowance is included.

Service Centres

If after carrying out the above recommended solutions to the various problems the fault has not been rectified, contact your local *TRU-TEST* Service Centre:

New Zealand

Phone	Facsimile	Toll Free
(09) 274 5799	(09) 274 6367	0800 653 356

USA

Phone	Facsimile	Toll Free
(210) 377 2885	(210) 377 2932	1 800 874 8494

Australia Vic. S.A. Tas.

Phone	Facsimile	Toll Free
(03) 5831 5525	(03) 5831 5524	1 800 682 880

Australia Qld. N.S.W. N.T.

Phone	Facsimile	Toll Free
(07) 3807 8800	(07) 3807 8877	1 800 682 880

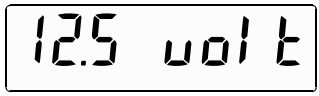
Australia W.A.

Phone	Facsimile	Toll Free
(08) 9274 5122	(08) 9274 4824	1 800 682 880

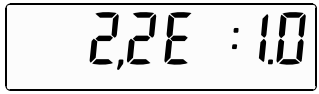
Please have on hand the diagnostic information which can be obtained from the Indicator in *Setup Mode* (see page 12) with the Loadbars connected.

Selecting the *Diag SETUP* option, then pressing the DISPLAY key three times gives the information in the following sequence (see *Setup* on page 12):

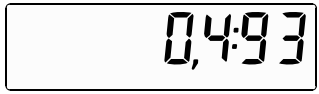
1. Battery voltage



2. Model numbers, language and software version.



3. PCB type, memory size and Loadbar code.



4. Configuration number.

Write the diagnostic information here:

1. Voltage ____ . ___

2. Diag number _____

3. Diag number _____

4. Config number _____

Technical Information

Communications Port

The *TRU-TEST* Model 702 is equipped with an RS232C serial interface port for connection to a computer or printer.

The Indicator is configured as a DTE (Data Terminal Equipment) device and therefore requires a cross-wired cable for most computers which are also DTE devices.

WARNING: Never use the printer cable to connect the Indicator to an IBM computer as damage to the computer could result.

The interface connector pin assignment for the *TRU-TEST* Model 702 is as follows:

Pin Number	Name	Function	Direction
2	TX	Transmit	output
3	RX	Receive	input
4	RTS	Request To Send	output
5	CTS	Clear To Send	input
6	DSR	Data Set Ready	input
7	SG	Signal Ground	
20	DTR	Data Terminal Ready	output
1	PG	0 volts supply	output
25		+12 volts DC	output

For connection to a computer or printer using software ("Hon-HoFF" selected), only TX, RX and SG need to be wired. TX and RX usually must be cross wired.

For connection to a printer using hardwired (or sometimes called DTR) handshaking, only TX, DSR and SG need to be wired. Usually TX (pin 2) on the *TRU-TEST* 700 Series Indicator is wired to RX (pin 3) on the printer. DSR (pin 6) is wired to DTR (pin 20) on the printer.

Serial Data Format

The format of the serial data is asynchronous, eight data bits, no parity, one stop bit. Baud rate and handshaking method are user selectable.

Setting Communications Port

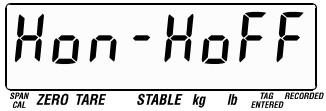
The baud rate and the handshaking protocol can be set to the requirements of the connected device. The factory default is 9600 baud and Xon-Xoff ("Hon-Hoff") handshaking.

To set the baud rate and hand shaking protocol see *Setup Mode* on page 12.

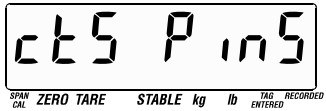
The possible baud rates are 110, 150, 300, 600, 1200, 2400, 4800 and 9600.

The available handshaking protocols are:

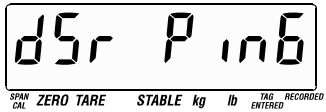
XON-XOFF for use with computers and printers with software handshaking.



CTS-PIN5 for use with hardwired handshaking on pin 5 of the RS232C port.



DSR-PIN6 for use with hardwired handshaking on pin 6.



Downloading to a Computer

The *TRU-TEST* Model 702 has the facility to download the records in its memory to a computer. This allows the tag (ID) numbers and weights data to be saved on the computer and used for further farm management purposes.

The *TRU-TEST* program, AgLinker, takes care of the entire process. Connection to the computer is via the RS232 serial port (marked "printer"). The computer must have a corresponding serial port.

The following technical information is given for those wishing to write their own software.

Computer Download Format

When the print function of the Indicator is executed with the print option set to "cPtr out", the data records are output as ascii characters, one record per line. Each record contains the tag, weight, and optionally group count fields delimited by commas. Leading zeros are suppressed. Each line ends in a <CR><LF>. At the end of all the data is a line containing the word END.

eg. 1,377.5,20
2,389.0,18
.
.
END

The number of decimal places given for the weights is appropriate for the resolution of those weights.

Remote Control by Computer

In addition to being able to down load data from the Indicator to a printer or computer, the *TRU-TEST* Model 702 can be remotely controlled by a computer.

Remote control is only available at 9600 baud and Xon-Xoff. This setting is automatically selected by sending an STX to the model 702.

The following gives details for those writing their own software to control the Indicator.

Remote control of the Indicator is gained by sending a STX (02Hex) or a SOH (01Hex) to the Model 703.

> STX temporarily sets the Indicator to 9600 baud and Xon-Xoff.
>
> SOH doesn't change the baud rate or handshaking protocol.

While the Indicator is under remote control, it does not respond to the keyboard.

Control of the Indicator is relinquished by sending an ETX (03Hex).

All keys on the keyboard with exception of the *ON* and *OFF* keys are coded with two digit codes. The first digit is the row, 0..3, and the second is the column, 0..9. That is, from 02 to 39.

To simulate a key press, the computer must send a key code having two ASCII characters eg. the LIVE key is code 10. To remotely access this key, the computer will need to send '1','0', (31H,30H).

Hidden Remote Functions

In addition to keyboard codes, there are a number of 'hidden' key functions which allow information to be extracted from the Indicator. These are codes 42 through 45.

42 Turn *Off* all output modes (ie. key code 45).

43 Data output on *RECORD* key mode. In this mode, the Indicator outputs to the serial port the TAG (ID) and WEIGHT information each time a weight is recorded by pressing the *RECORD* key. This is used for printing as animals are weighed. (The Indicator is factory preset into this mode.)

44 LCD one shot echo. On this command, the Indicator outputs to the serial port the contents of the LCD buffer. The format is the same as for the continuous LCD echo mode.

45 Continuous LCD echo mode. In this mode, the Indicator outputs to the serial port the contents of the LCD buffer every time it changes. This can be used for a complete remote display which mimics the *TRU-TEST* Model 702 display.

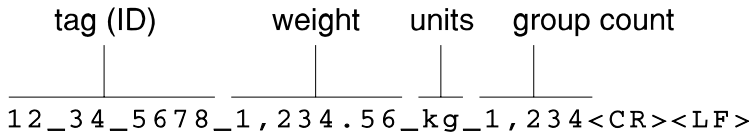
47 Beep. Activates the *TRU-TEST* Model 702 beeper.

Remote keys 42, 43 & 45 control output modes which are mutually exclusive. The output mode activated remains active when computer control is relinquished and over Indicator power downs.

Remote keys 42, 43 & 45 can be executed from the Indicator's keyboard if necessary. This allows the Indicator to talk to some unintelligent output devices. To do this, turn the Indicator *Off* and then hold down the '0' key while turning it back *On*. The display will go blank. Release the *ON* key. Then press the two digits of the required function, eg. 42 turns *Off* data output on *RECORD* and allows a printer used for reports to be permanently connected.

Key 43 Output Data Format

In live mode:



The number of decimal places printed varies according to the current resolution of the Indicator. If no decimal places are printed, no decimal point is printed. Leading zeros on the weight fields are spaces. The underlines represent space(s).

Key 44 and 45. LCD Echo Data Format

The first two bytes contain the pointers encoded as follows:

	bit7							bit0
byte 1	0	1	0	T5	T4	T3	T2	T1
byte 2	0	1	0	0	T9	T8	T7	T6

Where T1..T9 are the nine display pointers from left to right.

Next is the contents of the LCD display as ASCII characters including any decimal points, commas or colons in their respective positions. Leading or trailing spaces are not removed, so the number of characters is always at least 8.

For example the TOTAL statistics display would be sent as follows:

@AtL:1,234.5_<CR>

'@A' are the encoded annunciators which in this case indicate that only T6 (kg) is *On*. The 'tL' is the prefix for the TOTAL statistic display. The underscore represents a space. The string is terminated with a <CR> (0DH).

Setting Baud Rate and Handshaking Remotely

To facilitate the computer automatically determining the Indicator's current baud rate, the Indicator responds if it receives an ENQ with an ACK regardless of the handshaking mode. Wait a time dependent on the transmission time of one character there and back at the baud rate being tested.

eg. for 110 baud, wait 200mS. Discard any characters received except ACK. Start at 9600 baud and work down to avoid the Indicator getting junk characters.

After determining the baud rate, send an STX (this will temporarily set the Indicator to 9600 baud and Xon-Xoff). Wait until all characters have been sent and then change the computer to 9600 baud, Xon-Xoff.

The computer and Indicator should now be communicating. Use remote control of the keyboard to identify the model (read Diag information through *SETUP* key) and carry out other functions as required.

Once the Indicator has been turned *Off* and back *On* again, the baud and protocol settings are automatically set back to the previous Indicator settings.

Printer Interfacing

This section describes technical details of the communications interface with a printer.

For instructions on how to print reports, see *Printing Reports* on page 40.

For instructions on operating a particular printer, refer to its user manual.

If you are using a *TRU-TEST* printer, the factory default settings of both printer and Indicator are correct and there is no need to change them.

If another make of printer is used, or for some reason the factory settings have been changed, the required details are described in *Non Tru-Test Printers* below.

The Indicator's factory default baud (data transfer) rate is 9600 and the handshaking method is "Hon-Hoff" to suit the *TRU-TEST* printer.

To set the baud rate and hand shaking method see *Setting Communications Port* on page 73.

TRU-TEST MP400 Printer

The Indicator and printer are factory configured with compatible settings. On earlier Indicators the baud rate may need to be set to "9600" and the handshaking may need to be set to "Xon-Xoff".

TRU-TEST Citizen Model Printer

The printer is factory configured to "9600" baud rate and "dSr Pin6" handshaking. The Indicator needs to be set to match the printer. If the above settings don't work, set the Indicator baud rate to "600" as earlier printers needed this setting.

Non TRU-TEST Printers

The printer must have a *SERIAL* interface, otherwise known as RS232C. A suitable serial cable must be available (or a standard null modem cable). If necessary refer to *Communications Port* on page 72 for details on cable pin assignments.

Caution 12 volts is available from pin 25 on the Indicator which could damage a printer if the cable is incorrectly wired.

If possible, set the printer to use "9600" baud rate and "Xon-Xoff" handshaking to match the Indicator. Otherwise set the Indicator to match the printer. Check your printer manual for the parameters.

Electronic Tag (EID) Reading

The *TRU-TEST* Model 702 and Model 703 Indicators can be coupled to electronic tag readers. This section gives technical information about communication between the two devices.

The preferred method is for the tag reader to input the number using the *TRU-TEST* Model 702's keyboard remote control functions and for the Indicator to store the data.

If "hands off" operation is required, use a *TRU-TEST* Model 703 Indicator and the auto record "ON TAG" option - the weight is automatically recorded once the tag has been read. (This requires the animal in the crate when the tag is read.)

Example Transmission Data

1. Identify the tag number and convert to an 8 digit (or less) whole number. No decimal points allowed.
2. Gain control of the Indicator by transmitting STX ASCII (02hex), if identification is valid.
3. Transmit numbers to the Indicator:

LIVE	10	ASCII (31hex, 30hex)
TAG	29	ASCII (32hex, 39hex)
1	26	ASCII (32hex, 36hex)
2	27	ASCII (32hex, 37hex)
3	28	ASCII (32hex, 38hex)
4	16	ASCII (31hex, 36hex)
5	17	ASCII (31hex, 37hex)
6	18	ASCII (31hex, 38hex)
7	06	ASCII (30hex, 36hex)
8	07	ASCII (30hex, 37hex)
ENTER	38	ASCII (33hex, 38hex)

4. Switch control back to the Indicator with ETX ASCII (03hex).
5. The animal weight can now be recorded along with the tag number.

Note: It is advisable to execute the *LIVE* key first to ensure the Indicator is in a known state before transmitting the tag.

Autoranging

The scale is usually set to autorange. This means that the display resolution automatically changes to coarser steps when the weight reaches the equivalent of 250 times the next coarser division size. This better reflects the actual accuracy of the scale.

The weight is still displayed in kilograms or pounds.

Example Autorange (standard Loadbars)

Weight Range	**Resolution**
0 to 250kg (500lb)	0.5kg (1lb)
250kg (500lb) to 500kg (1250lb)	1kg (2lb)
500kg (1250lb) to 1250kg (2500lb)	2kg (5lb)
1250kg (2500lb) to capacity	5kg (10lb)

The live capacity of the scale is usually a round multiple of the base resolution, for example:

3000 x 0.5kg = 1500kg.

Refer to the *TRU-TEST Loadbars Manual* for live capacities of *TRU-TEST* Loadbars and Suspension Cells.

Weights And Measures Versions

- Autoranging may be disabled.
- Autoranging intervals are different to the above example.

USA Model Indicators

USA Model Indicators have some different key names, pointer names and display messages from the standard model. See *Keys Reference* on page 47 and *Display Pointers* on page 50.

See also *Weights and Measures Versions* on page 85.

FCC Warning

The *TRU-TEST* Model 702 Indicator is certified to comply with the limits for a Class B computing device in accordance with the specifications in subpart B of Part 15 of FCC rules if installed and used as instructed in the *TRU-TEST* manuals. Only peripherals certified to comply with the Class B limits may be attached to this Indicator. Operation with non certified peripherals is likely to result in interference to radio and TV reception.

Shielded cables must be used between the external devices and the Indicator serial port.

These specifications are designed to minimise radio frequency interference in a residential installation; however there is no guarantee that interference will not occur in a particular installation.

If this Indicator does cause interference to radio or TV, which can be determined by turning the Indicator *Off* and *On* when the radio or TV is *On*, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the Indicator with respect to the receiver.
- Move the Indicator away from the receiver.

- Plug the Indicator into a different power outlet (if used) so that the Indicator and the receiver are on different branch circuits.

If necessary, the user should consult the Dealer or experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington D.C. 20402 by ordering stock number 004-000-00345-4.

Weights and Measures Versions

Weights and Measures models of the Indicator are specially manufactured to conform with local regulations for trade use. The printed circuit board is Type 1 for Weights and Measures Indicators (see diagnostic information on page 71).

Generally, the following items are different to the standard version:

- circuit board
- keyboard
- window legend
- labelling
- Loadbars are matched to the Indicator and must not be mixed up with other platforms
- configuration number.

For further details on correct configuration numbers contact your local *TRU-TEST* Dealer.

The weighing system needs to be checked and approved for trade by a Weights and Measures inspector on a regular basis. (This is the responsibility of the user.)

Model 702 Specifications

Note

For configuration details of Weights And Measures versions see *Weights And Measures Versions* on page 85.

Analogue input

Loadcell excitation: 8 volts DC, 4 wire, 6 x 350 ohm loadcells max.

Sensitivity: 3 microvolts/division minimum.

(Weights and Measures versions)

Full Scale: 27mV max. including dead load.

Input Ranges: 2.0 or 3.0 mV/V.

Accuracy *Standard Calibration* (System):

greater of ± 1 division or 0.5% of reading OR,
greater of ± 2 division or 1.0% of reading,

depending on the Loadbar type used. Refer *TRU-TEST Loadbars Manual*.

Accuracy Span Cal. (Indicator only, Weights and Measures):

± 0.35 divisions below 500 divisions.
± 0.7 divisions from 500 to 2000 divisions.
± 1.05 divisions above 2000 divisions.

Display

Display divisions: Single-interval (Weights and Measures):

3000 maximum. Number of divisions selectable as required during *Span Calibration*.

	Multi-interval (Weights and Measures):
	5000 maximum (Max3/d1). Three division sizes (d1, d2, and d3). Transitions at 500d2 and 500d3. Requires configuration. Maximum number of divisions selectable as required during *Span Calibration*.
	Standard versions (non trade):
	Set by built-in configuration, dependent on Loadbar type used. Four division sizes (d1, d2, d3, and d4). Transitions at 250d2, 250d3, 250d4.
Centre of Zero:	Pointer turns *On* when scale is within ± 0.25d of centre of zero. (*Net* or *Gross* weight.)
Stable pointer:	(Weights & Measures versions):
	On when displayed result is within ± 1d or ±0.5d of the static condition depending on configuration.
	(Non Weights and Measures versions):
	On when displayed result is within 0.5%, 1% or 2% of the true weight (user selectable).
Weighing speed:	For a step change in weight, the display will indicate a stable reading within 0.8 seconds.
Damping algorithm:	Non locking, based on intelligent statistical analysis.
Maximum displayed weight:	
	999,999kg or lb.
Division sizes:	0.0001 through 100 (kg or lb).
Zone of uncertainty	0.3d
Overload indication:	Displays "Overload" at greater than 9 divisions above live capacity.
Under zero:	Displays negative weights until the hardware limits, then displays "UndEr Ld".

Zero and Tare controls

Push button Zero: For span cal and Weights and Measures: Maximum weight which can be zeroed is ± 2% of live capacity.

For std cal or 50% deadweight allowance option: Any weight up to live capacity may be zeroed. Capacity reduces if zeroed weight is greater than the built-in dead weight allowance.

Auto Zero tracking: User selectable (*On* or *Off*). Capture range factory configured to 0.5d, 1d, 3d or 6d. Minimum time between operations: 8 seconds.

Non Weights and Measures Capture Range: 6d.

Weights and Measures Capture Range: Depends on configuration.

Auto Power Up Zero: User selectable *On*/*Off*. Limits are same as for push button zero.

Push-button Tare: Any weight up to live capacity. Not rounded to nearest division.

Minimum Tare 6d or 1d depending on configuration. (Taring with *Gross* weight within ± 6d (or ±1d) of zero clears the *Tare*.)

Power requirements

Voltage: +10.5 to +16.0 volts DC
(Protected against polarity reversal).

Current: 200mA.
1.5A with internal battery charger option.

Internal battery

Sealed lead acid. Must be stored in a charged state.

Operating time: 8 hours @ 20°C (70°F), with two Loadbars connected.

Charging time: Not less than 6 hours using 12 volt DC 1.5A (3 Amp 20uS pulses) @ 20°C (70°F).

Environmental

Operating temperature: -10 to +40°C (+15 to +105°F).

Storage temperature: -20 to +80°C (-5 to +175°F).

Storage with internal battery:

-10 to +30°C (+15 to +85°F).

Approximately 20°C (70°F) recommended if stored for extended periods.

Humidity: 95% relative humidity. Case is proof to IP53 moisture and dust.

Communications port - RS232C serial port.

Baud rates for printers: 110, 150, 300, 600, 1200, 2400, 4800, 9600.

Baud rate for computer interfacing: 9600.

Handshaking: Software: Xon Xoff.

Wired: CTS pin 5 (printers only)
DSR pin 6 (printers only)

Format: Asynchronous 8 data bits.
No parity.
1 stop bit.

Memory capacity

	32K RAM: 3500 records.
Tag numbers:	Eight numerical digits.
Stored Weights:	Up to 16383 divisions (Positive weights only).
Group counts	Up to 4 digits.
Number of files	up to 99.

Physical dimensions

Display:	8 by 7-segment LCD. Height 18mm (3/4 inch). 9 pointers.	
Dimensions:	Height	210mm (8.25 inches).
	Width	315mm (12.5 inches).
	Depth	62mm (2.5 inches).
Weight:	Indicator only:	1.8kg (4.0lb).
	With battery:	2.6kg (6.0lb).

Note: Product Specifications may change without prior notice.

Index