Electro-Magnetic Compatibility (EMC)

CE

This product complies with Council Directive 89/336/EEC when installed and used in accordance with the relevant instructions.

Service and Technical Support

PLEASE CONTACT YOUR LOCAL DISTRIBUTOR If unknown, then fax: 44 (0) 1453 733311 for details.

Our policy is one of continuous improvement and the information in this document is subject to change without notice. Check that the software reference matches that displayed by the instrument.

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User Guide

Loadmaster 5000

Calibration and Operation

Software Ref: NG403-25

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1 - Introduction

The *Loadmaster 5000* is primarily intended for use on fork-lifts, front-end loaders, industrial loaders, or in any situation where a hydraulic mechanism is used to lift a load and it is required to record the weight. Since the *Loadmaster 5000* measures hydraulic pressure and converts the pressure to weight by means of pre-calibrated data, its accuracy relies to some extent on -

- Careful calibration and smooth operation.
- Consistent load profile or bucket position.
- Use on reasonably level ground.

Given intelligent use the *Loadmaster 5000* will achieve accuracy as good as +/- 1% of full scale but +/- 2% is more common in practice and consequently, *Loadmaster 5000* readings cannot be used as a legal basis for the sale of goods.

The *Loadmaster 5000* has been designed from the outset with the operator in mind. The instrument incorporates the maximum flexibility of operation to fit in with any normal operating routine giving the greatest accuracy with the minimum delay. Its features include :

- Twin L.C.D. displays to indicate 'Bucket load' and 'Target load'.
- The 'Target load' is keyed in directly from the front panel and *Loadmaster 5000* recalculates and displays the remainder to be loaded throughout the loading sequence.
- Static weighing mode enables precise weight adjustment with a 'live' display weight of a part bucketload.
- Dynamic weighing for uninterrupted loading routine.
- Lift speed compensation allows consistent accuracy irrespective of engine speed/lift speed.
- Automatic or manual entry of the bucket weight.
- Option to delete an accidental or erroneous entry.
- Programmable alarm for overloaded bucket (or fork), normally used on fork lift trucks/fork attachments.
- Accumulated total of all loads recorded.
- Store facility of up to 500 separate sub-total registers, which may be allocated to different products, customers, etc as desired.
- RS 232 output to enable a range of print functions or downloading data for use in a database software package.

Power-On Switch

The *Loadmaster 5000* is switched on and off via the vehicle ignition and also by an on-off switch at the back of the instrument.

LCD Displays

The *Loadmaster 5000* has two separate displays.

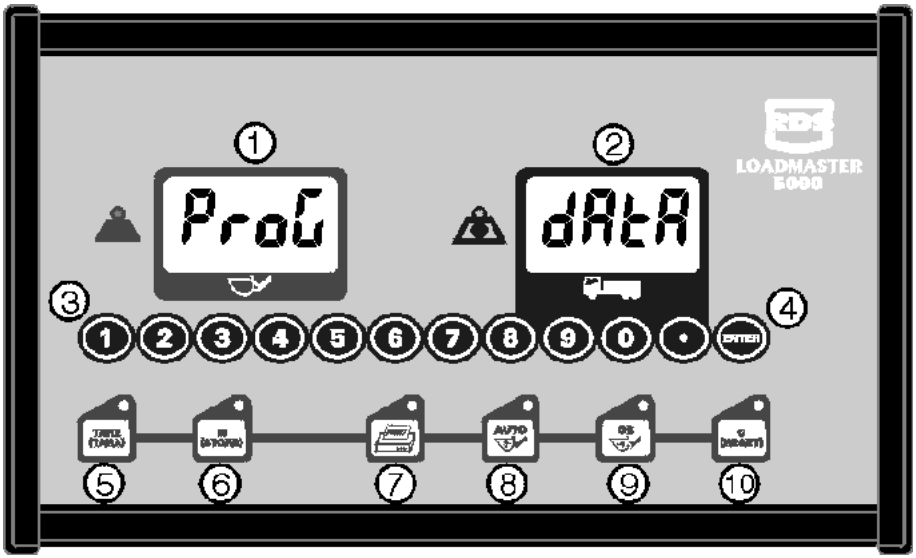
The left hand display shows the actual NETT WEIGHT LIFTED in a bucket or by a fork truck. This weight is displayed in Tonnes, tenths and hundredths of tonnes.

As each bucket load is lifted, the nett weight of that bucketfull is shown on the left hand display. If required, this displayed bucket weight can be added to an accumulating total, (and subtracted from the target load display), either automatically (AUTO ENTER ON) or manually by pressing an external Remote Enter Switch situated on the main lift lever.

The right hand display is the TARGET LOAD, used when loading a lorry or where a pre-determined total weight is required. The target weight can be set on the right hand display before loading commences.

As the Target Load display reduces, it eventually shows the weight which must be picked up in the last bucketload, to achieve the target load.

There is an Accumulated Total kept in the memory which accumulates the total weight of all lorry loads moved by the machine.



1. Current Bucket weight / Accumulated Bucket weight

2. Target weight / Weight left to load

3. Enter numeric data (set Target weight)

4. Confirm data entry

5. Tare

6. Select Memory Store / View memory total

7. Print

8. Auto Enter ON/OFF

9. Clear last bucket weight from memory

10. RESET - Zero load and reset to Target weight

Numeric Keys

Beneath the displays are two rows of push button switches. The top row is a full decimal keyboard used to key-in and ENTER the Target Weight and recall individual memory stores.

The bottom row of six switches are used to select various operating functions as described below.

Tare

Press to zero the weight readout of the empty bucket.

Operating conditions, including temperature, hydraulic system pressure, type of bucket or other loading attachment, and material consistency may alter, therefore the tare must be checked periodically during the operating shift.

Memory Stores

Press this button, then key in the store number that you wish to view or record subsequent totals to. Data can be allocated to any one of 500 individual stores. For example, they allow a record to be kept of :

- Weights loaded onto individual lorries.
- Weights of different products or commodities shipped.
- Weights recorded to different customers.

Individual memory stores are selected using the upper row of numeric keys.

Printing/Data Transfer

Press to print out a load ticket, or output data via one of the optional Data Transfer Kits. The type of output is preset from the Programme Mode. You can print out a,

- roll record of individual records for each lorry load.
- weigh ticket (with space for signature etc).
- summary printout of Grand Total, and totals of loads allocated to individual memory stores.
-

Auto Enter

Press to enable the instrument to *automatically* add the bucket load to the target load, as the lift mechanism passes the reference point. It is operative in 'Dynamic weighing' mode.

Clear Entry

Press to subtract the previous bucket load from the totals in the event of an accidental or erroneous entry.

Reset

Press to zero the total for the last load and reset to the target weight. It is also held while the instrument is powered on, to enter the Programme Mode.

The Remote Enter Button

The Remote Enter Button is the white pushbutton attached to, or adjacent to the main lift lever.

Press this button to add the bucket to the total weight. The instrument can also be set to AUTO ENTER in which case the remote enter button does not need to be pressed to record the bucket weight.

Press and hold the button for 5 beeps to reset the total for the last load.

Press and hold the button for more than 5 seconds to view the accumulated total for the store number currently selected.

The External Audible Alarm

The instrument has an internal audible alarm. An optional external audible alarm can also be fitted for noisy environments. The instrument sounds the following signals.

- **A single beep** when the load moves into the 'reference position', as the load moves out of the 'reference position', or when the individual bucket load is entered into the total.
- **Five beeps** when the Remote Enter Button is held pressed to reset the total.
- **Continuous beeps** when the alarm load is exceeded (it sounds until the load is lowered below the reference position).

3.1 General operating requirements

The *Loadmaster 5000* has been designed primarily for ease and flexibility of operation to fit in with virtually any normal loading routine, but in order to achieve the best results the following important requirements must be met:

- **Warm Up:** Allow the machine and hydraulics to warm up to a steady operating temperature before weighing.
- **Level ground:** It is obviously impractical to always take readings when the vehicle is on perfectly level ground. However, weighings can be made at any point in the loading manoeuvre and should be made with the vehicle as close to the level as possible.
- **Vehicle movement:** If the site is level and free of ruts and pot holes, then weighing can be carried out, in either 'Dynamic' or 'Static' weighing modes, with the vehicle moving. Accuracy would be improved however, if all weighing was carried out with the vehicle stationary.
- Always fully retract the bucket to its stops, (or move the fork lift mast to upright).

There are basically two different ways of taking a weighing, in '**DYNamic**' or '**STATic**' mode. Both modes are available when set to 'DYN' mode in the programme mode. The instrument will switch to Static mode automatically when the arms are stopped at the reference position.

Dynamic weighing mode

'Dynamic' weighing means that the load is measured automatically as the loader arms pass through the 'reference position'. There is no need to stop the lift operation and therefore no interruption to the normal lift routine. The 'Dynamic' weight reading is automatically adjusted for any changes in the lift speed.

If weighing in the 'Dynamic' mode, the load must pass the reference position smoothly and consistently by lifting smoothly at a steady lift speed through the reference position until the instrument bleeps *twice*.

The weight can be automatically recorded (AUTO ENTER) or manually via the remote enter button.

Static weighing mode

'Static' weighing means that the load is measured whilst the loader arms are stopped in the 'reference position'. 'Static' weighing is useful for the last bucket load. The LOAD display is 'live' and will change as the load is changed. The bucket can be over-filled and then small amounts tipped off until the desired bucket weight is displayed.

The weight must be added by pressing the remote enter button.

3.2 Checking the Tare

If the dynamic or static tare value exceeds the limits of 0.00 ±0.02 tonnes (20kg), it must be reset. The tare should be checked several times during a working shift, and especially if it has remained idle for more than a few minutes, and has cooled down. The tare should be checked both dynamically and statically.

Set 'Dynamic' tare

1. Crowd the empty bucket right back
2. Press 

The audible alarm will sound and the left hand display will flash '**0.00**'. The righthand display will show '**tArE**' and the TARE L.E.D. will flash.
3. Lift the empty bucket at full engine revs through the reference position. The audible alarm will sound *twice* indicating that the tare reading has been taken, and the display will revert to normal.
4. Lift the empty bucket again. and check that the left hand display registers '**0.00**'±'**0.02**'. If the display is not within the above limits, then repeat the procedure from Step 1.

Set 'Static' tare

1. Press 

2. Lift the empty bucket up and stop it in the reference position. After a few seconds check that the lefthand display registers '0.00'±'0.02'.
3. Press the Remote Enter Switch. Ensure that the alarm acknowledges the tare entry and the display stops flashing.
4. Lower the bucket and lift back to the reference position. Check that the left hand display registers '**0.00**'±'**0.02**'.If the left hand display is not within the above limits, then repeat the procedure from Step 1.

3.3 Dynamic weighing mode

1. Press  to set 'AUTO ENTER' on. The switch LED will stay on.

2. Press  or press and hold the Remote Enter Button for five bleeps to reset the load to zero. The right hand display will reset to show the last target load which was set.

3. Fill the bucket and crowd it right back. Lift at constant engine revs through the reference position. The audible alarm will sound *once* at the weighing position and then *twice*. Stop lifting at any time after the audible alarm has sounded twice.

The left hand display will then show the individual bucket nett weight then the total of all the individual bucket weights so far. If the 'AUTO ENTER' function is switched on the last bucket weight will be automatically entered and subtracted from the target load. A bleep from the internal alarm confirms that the load has been entered. The right hand display will reduce to show the amount left to load.

If the displays show '**tOO SLOW**' then the load was lifted at a speed outside the calibrated speed range. Lift the load again at a faster speed.

If the displays show '**tOO HIGH**' then the load was lifted so slowly that the *Loadmaster 5000* assumed 'Static' weighing is being used and the load is above the reference position.

On the last bucket load you should stop the bucket at the weighing position The instrument will *automatically* switch to 'Static' mode, giving a 'live' readout of the bucket weight. This will enable you to tip off any excess material to meet the target weight (as described overleaf in section 3.4)

Inaccurate weighing

If you find that the *Loadmaster* readings are consistently different from the weighbridge readings, ensure that you follow the advice in section 3.1 - 'General Operating requirements'.

Re-calibrate the system if required. (Refer to section 4.5).

3.4 Static weighing mode

1. Press  or press and hold the Remote Enter Button for five bleeps to reset the load to zero. The right hand display will reset to show the last target load which was set.

2. Lift the load and stop at the weighing position. The audible alarm will sound *once* and the right hand display shows 'STAt'. After a short delay the live display shows the nett weight of that load. The figures may be changing so allow them to settle to get the true weight.

   If a second alarm is heard and the display shows '**tOO HIGH**', the load has been lifted too high and should be dropped back into the reference position.

3. Press the Remote Enter Button. The audible alarm will sound *twice*. The left hand display will then show the total of all the individual bucket weights so far. The right hand display will reduce to show the amount left to load.

Meeting the target load (Dynamic or Static Mode)

If the bucket load would cause the total to exceed the target, the target display will flash. With the loader arms held in the reference position, small amounts may be tipped off until the correct bucket weight is achieved. Allow the live display to give a steady reading.

Press the Remote Enter button to enter the bucket load.

Delete previous entry

To delete a load that is accidentally or erronously entered (either manually or automatically), press  .

The last bucket load which was entered will be deleted from the total. This can only be done once.

Inaccurate weighing

If you find that the *Loadmaster* readings are consistently different from the weighbridge readings, ensure that you follow the advice in section 3.1 - 'General Operating requirements'.

Re-calibrate the system if required. (Refer to section 4.5).

Resetting the Target Load

The right hand display is set to show the nett weight which it is required to load into a lorry.

Press 

or press and hold the Remote Enter Button for five bleeps. The left hand display will reset to zero. The right hand display will reset to show the last target load which was set.

Change the Target Load

1. Simply key-in the number for the target weight using the top row of numeric keys. The left hand display shows '**tArG**'. The right hand display shows the numbers pressed.
2. Press 

. The target load is now set and the *Loadmaster 5000* is ready for use.

If an error is made simply repeat the procedure.

If the Target Load facility is not required, set the Target Load to '**0.00**'.

Alarm Load

The *Loadmaster 5000* has an alarm load facility which can be programmed with the desired maximum weight. This will warn the operator if the bucket (or fork) weight exceeds a pre-set limit, and is normally only used on fork lift trucks.

If the Alarm Load is exceeded, the audible alarm will sound continuously until the load is lowered below the reference point.

To programme an Alarm Load refer to section 4.6.

3.5 Stores

There are 500 seperate stores available to records totals for different material or customers. Load totals are automatically added to the currently selected store total as the instrument is reset to zero.

Set Store number and view total

Press  to display the current store. The left hand screen displays 'Stor' and the right hand screen displays the store number from 1 to 500. If you do not press any other button the screen will return to the weight display.

Key in the store number and press  .The left hand display then changes to show '**r.XXX**' where '**XXX**' is the store number just selected. The righthand display shows the current total in that store.

Any loads lifted from now on will be allocated to the newly selected store and will be added to the Grand Total.

If you do not want to add loads into an individual store, select Store 0. In this case loads will be added to the Grand Total only.

View the current Store total

Continue holding the Remote Enter button after clearing the total (5 beeps). The accumulated total is displayed for the currently selected store.

Reset Store totals

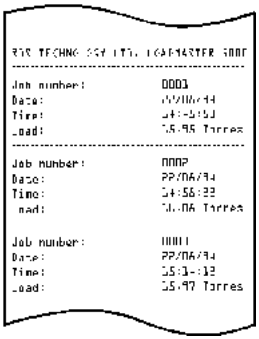
Individual store totals can only be reset from the programming mode. Refer to section 4.6.

3.6 Printing

The *Loadmaster 5000* can be connected to a RDS ICP100 In-Cab Printer or to a PSION Organiser in order to download all stored information.

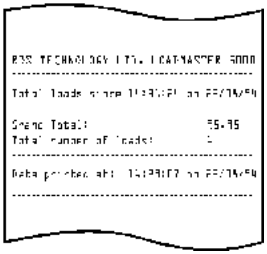
The type of printout depends on the printer mode selected in the programming mode but will be one of the following,

'REC' (4 line record)



When each load is completed and the *Loadmaster* is reset to zero, a printout is made *automatically* and includes;

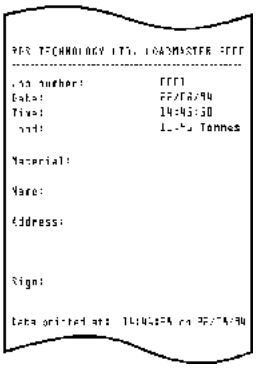
- Load number
- Time
- Date
- Nett weight of the load



A printout of the Grand Total of material loaded since the instrument was installed (or a power-on reset was performed) can also be generated with this print mode selected.

Press and hold 

'ROLL' (Load ticket)

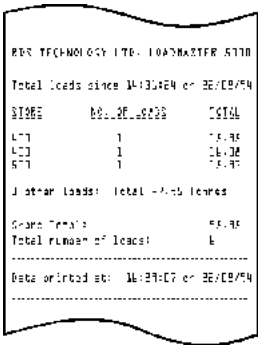


Press  to print a 'load ticket' including,

- Store number
- Job number
- Time
- Date
- Nett weight of the last load

A space is left for the operator to fill in the Material and the Customer name, Address and Signature.

'STOR' (Summary of all store totals)



Press  to print a summary including,

- Weight allocated to each store
- Total weight of all unallocated loads
- Grand total weight of all loads moved
- Total number of loads

Data transfer

The *Loadmaster 5000* can output data formatted for use in a database software package. The data may be transferred to a laptop or desktop PC either directly via a serial cable or via a PSION Organiser. Data transfer kits are available as an option including full instructions.

The printer output must be set to '**dBASE**' in the programme mode.

4 - Calibration

The *Loadmaster 5000* must be set up and calibrated correctly and appropriately for the method in which the operator wishes to use it.

It may be advisable, before any calibration is carried out, to ride with the loader operator and explain the options of,

- Dynamic/static weighing
- Auto entry/manual entry
- The importance of smooth operation and how to avoid bouncing the machine whilst lifting.

Please discuss the loading sequence and loading routine with the operator(s) of the loading shovel in order that you can advise on the best weighing method.

You will require the operators help and cooperation during the calibration procedure so it is a great advantage if he appreciates the requirements of the system before calibration. This has the added advantage that it will get the machine up to normal operating temperature which is crucial before calibration is carried out.

There are various inputs which must be programmed into the *Loadmaster 5000*, relating to the machine and sensors installed. This data can only be viewed or changed when the *Loadmaster 5000* is changed from its normal 'Operating Mode' to one of two 'Programme Modes'.

Although all weight readings will be meaningless, the 'Sample Time' and 'Static Average Time' should be set first.

4.1 Entry into 'Programme Mode'

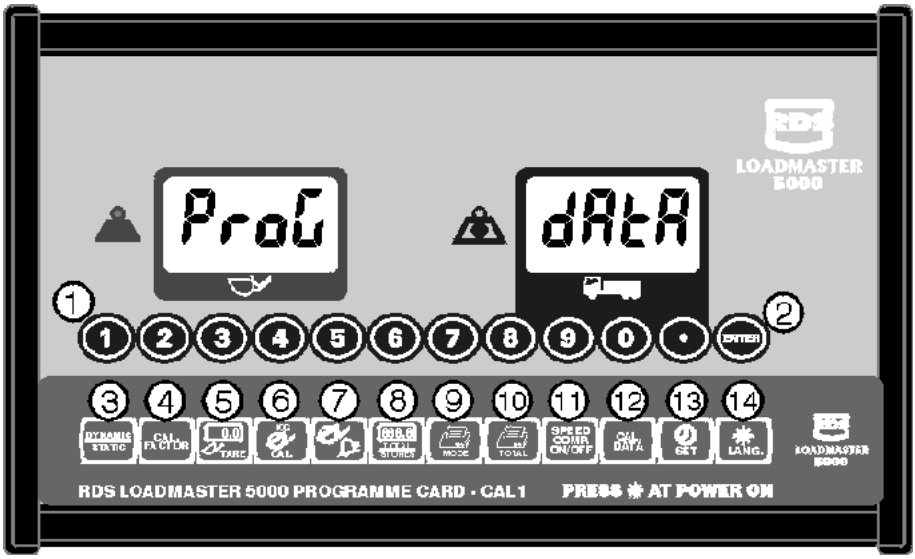
A front panel overlay is provided which indicates the new 'programme mode' functions of each of the 12 switches at the bottom of the instrument front panel (see overleaf).

1. Switch the instrument off and position the overlay card on the front panel of the instrument.
2. Press and hold 

whilst switching the instrument on.

B.1.4 The displays will show '**ProG' 'dAtA**' . This confirms that the instrument is now in 'Programme Mode'.

4.2 Programme Data - Calibration level 1



1. Enter numeric data

2. Confirm data entry

3. Set Weighing mode - DYN / STAT

4. Display Weight calibration factor for the selected weighing mode.

5. Perform tare

6. Perform weight calibration procedure

7. Set alarm load

8. Display / reset accumulated total

9. Set print mode

10. Print accumulated total

11. Enable Speed Correction

12. Display calibration data

13. Set clock / Date

14. Set Language / Enter/Exit Programme mode

4.3 Data Entry

Select the programme function to be checked, or entered, by pressing the appropriate key on the overlay. The left hand display will show the numerical value currently stored for that function. The right hand display will confirm the selected channel. If the programme function is correctly set, no action is required. Simply select the next function or exit to the operating mode.

Enter numeric data

To set new numerical programme function data, use the numerical entry keys which are the 12 keys in the top row. Simply key in the number to be set e.g. 2.17. As the first key is pressed, the left hand display will flash that number and the right hand display will flash '**Ent**' . As the full number is keyed in, it appears in the left hand display. Each key stroke is acknowledged by an audible beep.

When the number is correctly set, press 

to confirm the entry. The display stops flashing and the new data value is displayed on the left-hand display. If an error is made in setting the data, simply enter the incorrect value and then reprogramme with the correct data.

Enter non-numeric data

Some programme functions are non-numerical but allow various options to be selected. e.g. Dynamic/Static selection. When these functions are selected the display indicates one of the available options. If the correct option is displayed, no action is required.

If the option is to be changed, press and hold the appropriate function key to toggle the display between each option. When the correct option is displayed, release the function key.

Secondary data

Some programme functions have a secondary piece of programme data which may be either numerical or an option.

To access the secondary data, press and hold the appropriate programme function key for 3 seconds. The display will change to show the secondary data or option. This secondary data or option is set in exactly the same way as the primary data. Once it is confirmed by pressing 

the display will revert to show the primary data after a 2 second delay.

4.4 Calibration Sequence

1. Get the machine up to normal operating temperature.

2. Lift a loaded bucket a number of times at full engine speed to check for consistency of reading. Set needle valve, Dynamic Sample Time, and Static Average Time to achieve this.

3. Weigh the empty machine over the weighbridge. Note the tare weight.

4. With the Loadmaster 5000 in normal operating mode, set both Dynamic Tare (using full engine speed), and Static Tare.

5. Lift the empty bucket a few times (also at full engine speed) and ensure that the load registered is 0.00 $^{+}/_{-}$ 0.03. Then check that the Static weighing is also 0.00 $^{+}/_{-}$ 0.03.

6. Load the bucket with slightly less than a full bucket load. Weigh the loaded machine over the weighbridge and calculate the net weight of the bucketful.

7. Set the *Loadmaster 5000* into its Programme Mode.

8. Select CAL LOAD. Follow instructions in section 4.6 - 'CAL LOAD' to programme Fast Lift, Slow Lift and Static Lift data.

9. Check the Programme Data (section 4.6 - 'Calibration Data Review') for sensible settings.

10. Select any required Printer option.

11. Set the Clock/Calendar

12. Revert to normal Operating Mode

13. Set Auto Enter mode as appropriate

14. Check-weigh the bucketful at various lift speeds and in Static to ensure correct and consistent weights throughout. If not, repeat the full 'CAL LOAD' procedure.

15. Go back into Programme Mode, check and note all the Calibration Data.

16. Check-load a number of lorries.

17. Check that the operator is happy.

18. Check that the quarry/plant manager is happy.

4.5 Subsequent Recalibration

If a *Loadmaster 5000* is reported as being "inaccurate", care must be exercised in recalibration.

The "error" may be due to:-
a) Incorrect Dynamic Tare
b) Incorrect Static Tare
c) Incorrect Dynamic Calibration Factor
d) Incorrect Static Calibration Factor
e) Incorrect Speed Correction Factor
f) Incorrect or Inappropriate Operation e.g. Weighing on the move over a rough site.

It is therefore vital that you get the most complete picture possible from the operator and then do the following checks in the following sequence.

1. Lift an empty bucket in dynamic mode at full revs and check that the tare is close to zero. 0.00 $^{+}/_{-}$ 0.03.

2. Lift an empty bucket and stop it in the Reference Position ("**StAt**"). When the display settles check that it reads 0.00 $^{+}/_{-}$ 0.03.

3. Load the bucket with some typical material.

4. Weigh this bucketful in dynamic mode at full engine revs. Lift 3 or 4 times to check for consistency. Note the load displayed.

5. Lift the same load at lower engine revs. If the displayed weight differs a great deal from the full revs weight, it suggests that the Speed Correction Factor ("**SP.Gr**") is wrong.

6. Lift the same load to and stop it in the Reference Position and allow the display to settle. If the displayed weight differs a great deal from the full revs weight, it suggests that the Static Calibration Factor is wrong.

7. If all the displayed weights agree with one another then a full recalibration may be required. Refer to section 4.4.

8. An alternative method is to switch the Speed Correction OFF. Then use the Loadmaster only in "dynamic weighing" at *full* revs. Load a number of lorries using this weighing mode and check weigh the lorries out over the weighbridge. Use this information to adjust the Dynamic Calibration Factor to give correct lorry weights.

N.B. If lorries are overloaded, the *Loadmaster* is displaying too little weight - increase the calibration factor.

Once the Dynamic Calibration Factor is correctly set, set both dynamic and static tares. Then pick up and weigh a bucketful of material again in dynamic mode at full engine revs. Use this displayed weight as the CAL LOAD to carry out the full Calibration Procedure (section 4.4).

4.6 Calibration functions

Weighing Mode

The option to be set on this channel is the weighing mode which can be selected between:-

"Dynamic" which means the load is measured as the load is being lifted without the need to stop the load in one particular position. If the dynamic mode is selected, the *Loadmaster 5000* will also automatically recognise and weigh statically.

"Static" which means the load must always be lifted to, and stopped in the reference position. The weight display is live when static weighing is selected.

Press the key and the left hand display will show which mode is currently selected. Press and hold this function key to change between modes.

Calibration Factor

Select this function and the right hand display shows '**CAL.F**'. The left hand display shows the value currently stored as the Calibration Factor for the selected weighing mode.

The Calibration Factor can either be entered manually or will normally be calculated automatically by the *Loadmaster 5000* during the calibration procedure.

The instrument will calculate a "Dynamic" Calibration Factor and a "Static" Calibration Factor. To see these factors the weighing mode must be set to "**Dyn**" or "**Stat**" accordingly.

Tare

Select this function and the displays shows '**FASt' 'tArE**".

A full tare procedure can now be carried out.

Ensure that the bucket is empty and is crowded back fully. Pull the Lift lever back to the stop and then press the throttle pedal to gain maximum revs.

As the loader arms pass the reference position, the alarm will bleep and the display will show a figure which may or may not be 0.00. Press the Remote Enter switch on the lift lever to enter this tare reading.

The displays now shows **'StAt' 'tArE'** . Lift the empty bucket up to and stop it in the reference position. The display will settle after a few seconds. Once it has settled press the remote enter button. The displays shows **'tArE' 'dOnE'**

Cal Load

Once the tare weight has been set, the main calibration procedure is carried out with this function selected.

1. Lift a known weight in the bucket or otherwise lift a full bucket and record the bucket weight on the weighbridge. Select the CAL LOAD function. The right hand display shows [LOAd] and the left hand display may or may not show a weight.

2. Key in the actual nett weight of material in the bucket and ENTER it using the upper row of numerical keys. The right hand display now shows [FASt].

3. Lift the bucket at maximum engine revs until the bleeper has sounded twice. The left hand display will show a number and the right hand display will change to say [Entr].

4. Press the Remote Enter Switch on the lift lever to Enter the fast lift load. The right hand display will change to say [Slo].

5. Lift the bucket at slow engine revs until the bleeper has sounded twice. The left hand display will show a number and the right hand display will change to say [Entr].

6. Press the Remote Enter Switch on the lift lever to Enter the slow lift load. The right hand display will now show [StAt].

7. Lift the bucket and stop lifting when the alarm gives a single bleep and the right hand display shows [Entr]. The load should now be in the "reference position". If the load is lifted too high the displays will show [tOO] [HIGH] and the alarm will sound. In this case lower the load back a little into the reference position. The left hand display is now "live" and will change if the load is changing.

8. Wait for the display to settle, then press the Remote Enter Button on the lift lever. The displays will now show [CAL] [donE].

Alarm Load

Select this function if an alarm load is required. Key in the weight at which an alarm is required and ENTER. If this facility is not required, set an alarm load of 0.

Accumulated Total / Store Totals

Select this function to display the Accumulated Total. That is the total of all lorry loads since the function was last reset.

To reset the Accumulated Total and **all** Store Totals to zero, press and hold this function key for 7 bleeps of the internal alarm.

To view, or to Reset, any of the "Store" totals individually, simply key in the Store Number which you wish to see and press [Enter].

The right hand display will show the Store Number and the left hand display will show the total allocated to that store.

To Reset the Store Total, with the store total still displayed, press and hold the [ACC' TOTAL] switch until the Store Total goes to zero.

Print Mode

Select this function to set the style of print-out required.

Press and hold the PRINT MODE key to cycle between the options. These are:

[OFF] If no printer is connected, ensure that the print mode is set to OFF.

[tIC] **Ticket:** This mode is for use with the RDS ticket type printer. In this case a pre-printed weigh ticket is inserted into the printer and, on the print instruction, the load details are overprinted on the ticket.

[rEC]. **Record:** This print mode is for use with the RDS roll printer. When each lorry load is completed and the *Loadmaster 5000* displays are reset to zero, a two-line record is automatically printed out giving load number, time, date, and nett weight of the load.

[roLL]. **Roll:** This print mode is for use with the RDS roll printer. A weight ticket is printed out, on the print instruction, giving date, time, nett weight and providing space for further details of the load to be added manually.

[Stor] **Store:** This print mode is used to give a full printout of the weights allocated to each Store, the total weight of any unallocated loads and the grand total weight of all loads moved. This printout is obtained from the normal operating mode simply by pressing the print button.

dbAS **Database:** The *Loadmaster* can output data formatted for use in a database software package. The data is generated by pressing the PRINT switch and must then be transferred to a laptop or to a desktop PC using a direct link or PSION organiser to transfer the data.

The "**dbAS**" output is four lines of data, each line being 22 fields.

Field 1 Time of printout HH:MM:SS,

Field 2 Date of printout DD/MM/YY,

Field 3 No. of loads in unallocated stores,

Field 4 Weight of loads in unallocated stores,

Field 5 No. of loads in Store 1

Field 6 Weight of loads in Store 2

Field 7 No. of loads in Store 2

Field 8 Weight of loads in Store 2

etc.

Each field is seperated by a comma ('comma delimited' format) and is always the same number of characters.

Print Accumulated Total

If a printer is installed or a PSION Organiser is connected, pressing the PRINT ACC total key in the "Programme Mode" will give a print-out of the total number of loads, accumulated total, time and date.

Speed Correction On/Off

When a full calibration procedure has been carried out using a Calibration Load at Fast Speed, Slow Speed and in Static, then the Speed Correction will automatically have been switched on.

If there is a problem with the weighing system it will help the diagnosis if the speed correction is switched "**Off**" and dynamic weighing is then carried out at maximum engine speed.

Press the SPEED COMP ON/OFF key to see the current status. To change the status of this function, press the ENTER key. The right-hand display will toggle between On and Off each time the ENTER key is pressed.

N.B. If no correction data has been entered, it will not be possible to switch the correction on.

Calibration Data Review

This function gives a full record of all the calibration and operation data currently programmed into the *Loadmaster 5000*.

It is good practice to make a note of all this data in the Calibration Data Record page at the back of this book. If there are any problems with the functioning of the *Loadmaster 5000*, a comparison of this Calibration Data with other installations on similar machines may highlight any problem area.

Press and hold the CAL DATA key for five seconds to access this Calibration Data. Press CAL DATA again to cycle on to the next function.

Speed Gradient **Sp.Gr**

The speed gradient is the speed correction factor as calculated by the *Loadmaster 5000* as a result of the calibration procedure. It will normally be between 0 and 5 and will normally be positive.

Maximum Speed. **SP.HI**

This data is simply a unit-less number relating to the speed of lift at full engine revs. This number is likely to be between 20 and 200. If this number is less than 20, it indicates that the reference position magnet and sensors should be mounted further out from the loader arms pivot point. The magnet should be mounted no less than 250mm from the pivot point.

Minimum Speed. **SP.LO**

This data is simply a unit-less number relating to the speed of lift at low engine revs. This number is likely to be between 5 and 50 but must be a lower number than the Maximum Speed figure.

Temperature Gradient **t.GrA**

This is the temperature correction gradient. This will be 0.000.

Dynamic Weighing Sample Period. **Fr.tI**

As the loader arms pass between the direction and reference position sensors, the *Loadmaster* measures and averages the signal from the Load Sensor for this "sample period".

The shorter the sample period, the quicker the weight reading will appear on the display but a pulsing load reading will give erratic readings.

A longer sample period will give better averaging of the load sensor reading and will give more consistent results but may take an unacceptably long time to display the weight after the load has passed the reference position sensor. The sample time is normally set at 3 (which is roughly equivalent to 0.8 seconds) but can be set to any value between 1 and 15 (roughly 2 seconds).

If the sample time is altered, it may be necessary to re-run the calibration procedure.

N.B. The load sensor must be protected by a needle valve to smooth out hydraulic pulsing as much as possible. If the sample time needs setting above say 12 in order to get consistent load readings, this may suggest that the needle valve should be closed down a bit. Do not use the sample time facility to compensate for an incorrectly set needle valve!

Delay to "Static" Time. [dSt1].

This number is the time delay, in seconds, between the loader arms reaching the Reference Position sensor and the *Loadmaster* displaying a Static weight reading. If the loader arms leave the Reference Position before this delay period has elapsed, then a Dynamic weight reading is taken.

This delay is normally set to 3 seconds. On a very slow lifting machine, e.g. skip lorry, then this delay should be increased. On a very fast lifting machine e.g. fork lift, then this delay should be reduced. (The minimum delay is 2 seconds).

Static Average Time. [St. A]

This is the time period over which "Static" weight readings are averaged. The average time can be set to any value between 0 and 50. Too short an averaging time may result in the "Static" weight display continually fluctuating and not settling. Too long an average time will mean the display updates infrequently and may change in large steps.

The Static Average Time is normally set to 5.

Print Out of Calibration Data

If a printer is installed or a PSION Organiser is connected to the *Loadmaster*, a full print out of all the Calibration Data can be produced by pressing and holding the [CAL DATA] switch for 8 seconds. The left hand display will show [Prnt] and the information will be produced.

Time Set

This function is used to see the internal clock/calendar.

1. Press the Time Set Key. The left hand display shows the time in 24 hour clock format, Hr.Min, and the right-hand display shows [Hour].
2. Key in the current time and the displays will flash.
3. Press ENTER. The left hand display now shows the Date in UK format, Day. Month, and the right hand display shows [dAtE].
4. Key in the date and month, then ENTER. The left hand display now shows the year and day of the week Monday = day 01, Sunday = day 07.
5. Key in the year and day and ENTER.

Language

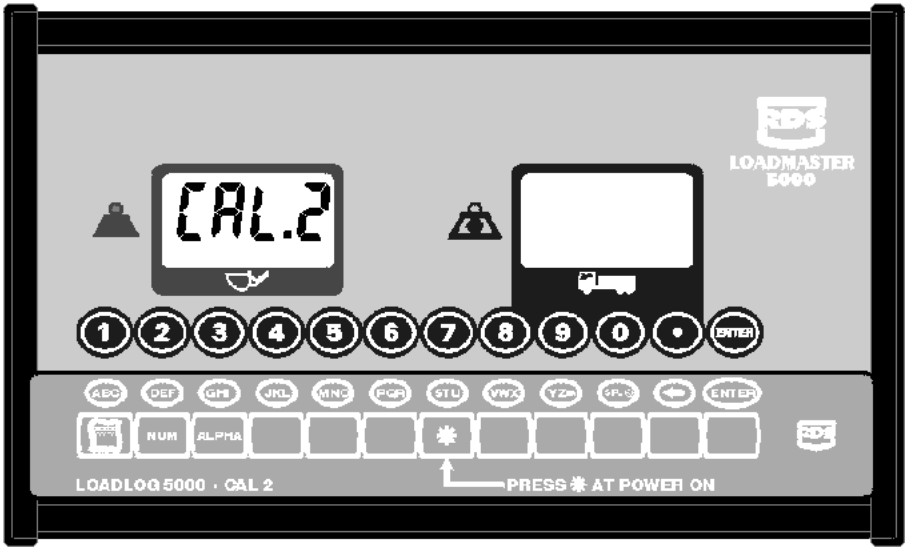
The *Loadmaster 5000* can be set to give display prompts and printouts in English, French, Spanish or German.

Press and hold the switch to cycle through the options. The display will show "**EnGl"**, "**FrAn**", "**ESPA**" or '**Deuc**'

Reset

To reset to normal operating mode, switch the *Loadmaster* Off and On again.

4.7 Programme Data - Calibration level 2



The second level of calibration is used to set up a customised printer heading for the data printouts. Place the CAL 2 Programme Card over the lower bank of switches.

Switch the power to the instrument on with the ✱ switch pressed. The left hand display will show "CAL.2".

Displaying The Current Heading

Press . The display will scroll the current title for the printouts across both displays.

Note that the printout is 42 characters long. Plan the new heading so that the heading is centralised or is split to meet the left and right margins.

Setting a new Heading

Numeric Characters

1. Press 

. The heading now stops scrolling and the first 8 characters are displayed across the two displays. The first character is flashing. (The heading will resume scrolling after 15 records if no switch is pressed).

2. Press 

to set numeric characters. The character which is flashing can now be changed to a number simply by keying in the appropriate number using the top row of keys.

3. Press 

to confirm the number entry.

Alphabetical characters

1. Press 

to set numeric characters. The character which is flashing can now be changed to a letter. Key 1 will set A if pressed once, B if pressed twice or C if pressed three times. Key 2 will set, D, E or F etc. The programme card shows the letters set by each key.

2. When the correct letter is displayed, press 

to confirm it.

   The next character will now flash.

Control Characters

In Alpha mode: Switch 9 is Y, Z, -

Switch 10 is Space, Full Stop, * (asterisk)

Switch 0 will Backspace to go back and change a character.

Check New Heading

When the new heading has been entered, press 

to scroll the new heading. Correct any errors by repeating the setting procedure.

Storing Calibration Data

Once the *Loadmaster 5000* has been calibrated and set up to give good results, the calibration data should be saved both as a written record in the back of this book and in the Loadmaster memory.

1. Switch the *Loadmaster* off.

2. Press and hold the 

switch whilst the power is switched back on.

3. The instrument will come on within the left hand display showing "**Stor**" (Store).

4. Hold the 

switch to cycle the display between;

"**Stor**" (Store) - Puts all current programme data into memory store.

"**rESt**" (Restore) - Replaces current programme data with data held in store. Leaves data in store intact.

"**XHG**" (Exchange) - Swaps current programme data with data in memory store.

To carry out the operation, select the appropriate function then press and hold 

the *Loadmaster* beeps and normal operation is resumed.

4.8 Fault Diagnosis

"Err" display message

The error message "**Err**" will appear on the left hand display if the load is lifted through the "Reference Position" and the *Loadmaster* does not receive a signal from the Load Sensor. This may be due to a faulty Load Sensor, faulty or damaged cable or connections.

The cable colours and functions are as follows:-

Colour	**Function**	**Inst. Conn**	**Sensor Conn.**
Red	+ve(10-30v)	4	1
Blue	0v	1	2
Green	Load Signal	5	3

Reference Position / Direction Sensor Status

It is possible to see the status of the reference position and direction position sensors. This will show whether the *Loadmaster* is recognising the two sensors correctly and is functioning in the correct sequence.

From the Operator Mode press and hold the 

switch for 8 seconds. A series of chevron indicators will appear across the bottom of both displays. These are "flags" indicating the status of the sensors.

The sensor flags on the left hand display have the following meanings.

Position 1	On when load is down.
Position 2	On when Dir. Snr. is on & Ref. Snr. is off.
Position 3	On when both Dir. Snr. & Ref. Snr. are on.
Position 4	On when Dir. Snr. is off & Ref. Snr. is on.
Position 5	On when weight has been calculated.
Position 6	On when weight is displayed.

The right hand display duplicates some of these "flags" and also shows that the *Loadmaster 500*0 is interpreting the sensors correctly.

Position 1	On when Direction Sensor is on.
Position 2	On when Reference Sensor is on.
Position 3	On when Reference Sensor has been passed.
Position 4	No flag.
Position 5	On when lift speed is being measured.
Position 6	On during the dynamic sample time. ("**Frti**").

To cancel this diagnostic facility, switch the power off and on again.

4.9 Calibration record

1. LOADMASTER 5000 SERIAL NO : .....

2. COMMISSIONING DATE : .....

3. SOFTWARE TYPE ISSUE : .....

4. DYNAMIC CAL FACTOR : .....

5. STATIC CAL FACTOR : .....

6. DYNAMIC TARE FREQUENCY : .....

7. STATIC TARE FREQUENCY : .....

8. TARE SPEED : .....

9. SPEED GRADIENT "**SP.Gr**" : .....

10. MAX SPEED " **SP.HI**" : .....

11. MIN SPEED " **SP.LO**" : .....

12. TARE SPEED : .....

13. AUTO STATIC PERIOD "**St. A**" : .....

14. SAMPLE PERIOD "**Fr.tI**" : .....

15. DEL-STAT TIME "**DSTI**" : .....

16. ALARM LOAD : .....