Maxispread Bulk
Fertiliser Spreaders

TS4500, TS6000
TS8000, TS10000
TS12000, TS14000
TS16000, TS25000

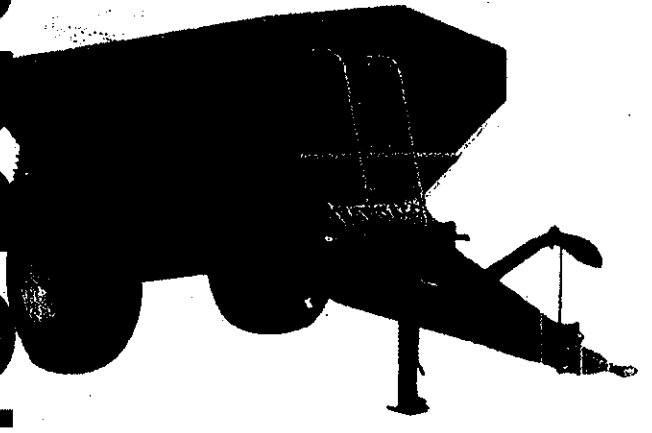
LANDACO
EQUIPMENT

OPERATOR'S HANDBOOK

654

plant: 07100 001

Spreader - 5 ton.



LANDACO
EQUIPMENT
Elstan Pty Ltd ABN 31 071 019 068

Pre-Delivery Inspection Certificate

Customer Name: _____

Address: _____

_____

Model: _____

Vin No: _____

The following items have been inspected and satisfy our Quality Control:

Welding	☐
Drive System	☐
Belt & Rollers	☐
Belt Tracking	☐
Tyres/Pressure	☐
Wheel Studs	☐
Paintwork	☐
Decals	☐
Hydraulics Tested	☐
Spinners	☐
Park Jack	☐
Ladder	☐
Tarpaulin	☐
Hydraulic Overdrive	☐
Auto-Door	☐
Other	☐
Manual	☐

Your Landaco Spreader has been thoroughly inspected at three stages during manufacture and this final inspection certifies the Spreader is leaving our factory in perfect condition and working order.

Inspected by: _____ (initials) Date: _____

Postal Address: PO Box 8184, Wagga Wagga, NSW 2650
Office & Factory: 7 Wentworth Street, Wagga Wagga, NSW 2650
Phone: (02) 6931 9888 FREECALL: 1800 358 600 Fax: (02) 6931 9777
Email: salesandservice@landaco.com.au Web: www.landaco.com.au

Hazards and Risk Management

It is expected that Landaco Spreaders are operated by a single driver/operator.
A certain amount of common sense is required when operating any machinery and the following hazard identification and risk management program anticipates an operator will exercise good judgement at all times.

POTENTIAL HAZARD

Possible hazards include:

Item One: Person making contact with rotating spinners

Item Two: Person climbs bin and falls into bin

Item Three: Person injured (mainly back injury) trying to hook spreader to tractor draw-bar

RISK ASSESSMENT - SCORE BASED ON 1 [VERY LOW] THROUGH 10 [HIGH RISK])

Item One: 3

Item Two: 1

Item Three: 2

CONTROLS

Item One: Large safety rail constructed and fitted to project outside the area of rotating discs.
Hydraulic oil flow should be turned off before stepping down from tractor, thus turning off the spinners.
Additional control flow valve fitted to the front of spreader, allowing secondary hydraulic shut-down.

Item Two: Substantial ladder fitted to spreader to facilitate climb for inspection purposes, and provides additional holding points.
Without the ladder, an operator might use other parts of the spreader as climbing steps, such as tyres, and either fall off or fall in.

Item Three: A heavy duty jack is fitted to all Landaco Spreaders making it easy to set and adjust the height of the tow bar to that of the tractor.

Checked for safety: _____ (initials)

Agricultural Machinery Product OHS Compliance Notification Form

Company Name: Landaco Equipment

A hazard identification, risk assessment and risk control procedure has been carried out on a representative example of the under-mentioned product(s) in accordance with the Occupational Health and Safety requirements of all states and territories of Australia and where found necessary the appropriate risk control measures have been incorporated in the product specifications.

The operator's handbook contains the necessary health and safety information and safety warnings are applied to the product where necessary.

Product Description: Fertiliser Spreader

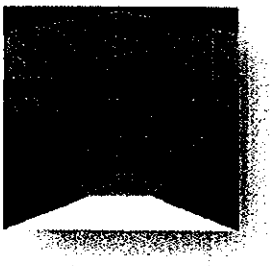
Details of the unit assessed for the purpose of compliance

Model Number: _____

Vin Number: _____

Date of Inspection: _____

Location of inspection: Wagga Wagga



LANDACO EQUIPMENT

Elstan Pty Ltd ABN 31 071 019 068

For all your spreading requirements:

Phone: 02 6931 9888

Fax: 02 6931 9777

Email: sales@landaco.com.au

Web: www.landaco.com.au

Postal Address: PO Box 8184
Wagga Wagga NSW 2650

Office & Factory: 7 Wentworth Street
Wagga Wagga NSW 2650

Please provide the model and VIN Number of your machine when making enquiries.

Thank you for buying a Landaco Spreader.

Whether you purchased this unit through a Dealer or some other source, we invite your comments and suggestions.

If you have enquiries about the use of your spreader, you may call our toll-free number **1800 358 600** during office hours.

In this handbook we will explain the principles of spreading and how to set up your spreader to achieve the best results. The reader may already have experience in spreading, or may be a contractor, but the following pages will show a new operator how to set up the spreader for maximum efficiency.

Please read the Safety and Risk Management section carefully before attempting to use your spreader, and keep our safety message in mind when using any farm equipment.

How to use your Landaco Spreader

The fundamentals of the spreading process for any material are as follows:

- Decide on the type of material and the rate you wish to apply it (ie. the amount of material to be spread per hectare or acre)
- After loading the spreader, select the appropriate height of door
- Whilst stationary, lower the ram supporting the gearbox so the paddle wheel is in contact with the spreader rubber tyre, and open the hydraulic valve to operate the spinners.
- Drive forward at a constant speed and commence spreading.

Application Rate

The amount of material being spread is affected by three factors:

1. The height of the door
2. The speed of the belt which delivers the material onto the spinners
3. The width the product can be effectively and evenly spread

The door height is set in millimeters, and is determined either from the *Quick-Set Rate Chart*, or using the appropriate calibration charts, or entering your requirements onto the computer application rate software program.

Spreading Width

The width of spread is determined by the speed of spinners and type of product.
If you require the material to be limited to a particular width and it is spreading too wide, reduce the speed of the spinners to obtain the required width.

Some products spread more evenly at certain spinner speeds.

Typical spinner speed is 700 – 900 rpm, and is either determined by observing an ideal spread width and pattern, or by using a Revolutions Counter (recommended option).

Spread Pattern

- **Too much in the middle -**
  One of the features of the Landaco spreader is the ability to adjust the spinner deck to obtain the best spread pattern. If on visual examination or by spread pattern trial of the material spread in the paddock you can see there is too much material immediately behind the spreader, release the two bolts at either end of the spinner deck and slide the spinner deck forward under the spreader a short distance. This will allow the material to fall from the belt closer to the centre of the spinners.

  Usually, the best results are obtained by having the deck forward for Lime and around the centre of the adjustment slide for super and manure. Reducing the spinner speed may also help.

- **Too little in the middle -**
  This usually shows as an "M" shape spread pattern, and may be corrected by:
  - Moving the spinner deck back to deliver the material closer to the edge of the spinners, or
  - Increasing the spinner speed

Spinner speed

It should be mentioned that there is a limit to the maximum effective speed of the spinners, beyond which the performance will deteriorate, as the speed with which the spinner contacts the crystals of fertiliser material will cause the material to shatter and become dust.

Choosing the right weather conditions

Heavy or damp materials such as gypsum and manure are less affected by wind than lighter materials such as lime and urea, so ideally you should select a relatively calm day for your spreading.

Driving pattern

Typically, the forward driving speed will be around 12-20 kph.

Whether driving a back & forth pattern or around and around pattern, it will be necessary to overlap the previous spread sufficiently to ensure an even spread of material.

All spreaders will deliver less material at the extremity than in the centre, so you will need to overlap a few metres for a balanced delivery, eg: assume you have spread superphosphate and find the material is spreading to 15m either side of the tractor centre line or beyond. However, on examination you find the volume of material is much lighter toward the edges than closer to the centre-line, so on the next pass these outer limits will need to overlap enough to provide even application of material across the whole width.

Safety and Risk Management

Safety begins with YOU!

Landaco have manufactured your spreader with both efficiency and safety in mind, and every effort has been made to minimise the risk of injury to the operator.

We now ask that you give careful consideration to the following measures which will ensure you enjoy the benefits of using this and any other machinery without incident over the years ahead.

Develop a routine of safety checks before doing anything with any machinery, and include the following points:

1. Ensure no other person is anywhere near the spreader, and watch for children who may be hiding in the bin or under the machine.

2. As the spreader has the capability of projecting material for a distance of 30 metres, **NOBODY** should be standing behind or in line with the spinners within at least 40 metres, as stones or foreign matter may be thrown further.

3. Wear safety glasses and gloves, and industrial non-slip work boots.

4. Wear ear protection and mask when required, or have available in tractor just in case.

5. Wear close fitting clothing. Never wear loose clothing or trailing cords or belts around machinery.

6. Ensure bin is empty of all unwanted material.

7. Check the spreader hydraulic lines for signs of leaks before putting under pressure, and tighten if necessary.

8. After connecting the spreader to your tractor, make sure the parking jack is raised and secured tightly. Use the jack to correct height when connecting, not your back.

9. Pre-start checks should include lubrication, checking wheel nuts for tightness (with vibration they can work loose over time and cause significant damage), check hydraulic hoses for damage.

10. Do not connect hydraulic hoses with tractor running.

11. Before returning to tractor, stand back and take a general look at the spreader and all connections to see if you have missed anything unusual.

12. Provided you are in a safe area, and have made sure nobody is anywhere near the spreader, turn on the hydraulic drive sufficiently to run the spinners at slow speed to make sure everything is operating correctly.

13. Turn spinners off, and drive carefully to place of operation.

14. Do not exit the tractor with the spinners still running.

15. Once stationary and parked, turn engine off and remove key before exiting tractor.

16. Do not attempt to disengage hydraulic hoses whilst under pressure.

17. Once spreading operations have been completed, remove all unwanted material from the bin and thoroughly clean your spreader to avoid corrosion from the residual corrosive fertiliser.

18. If you see something which needs attention, do it now in case you overlook it next time you want to use your spreader.

19. Do not remove safety rail from around the spinner deck.

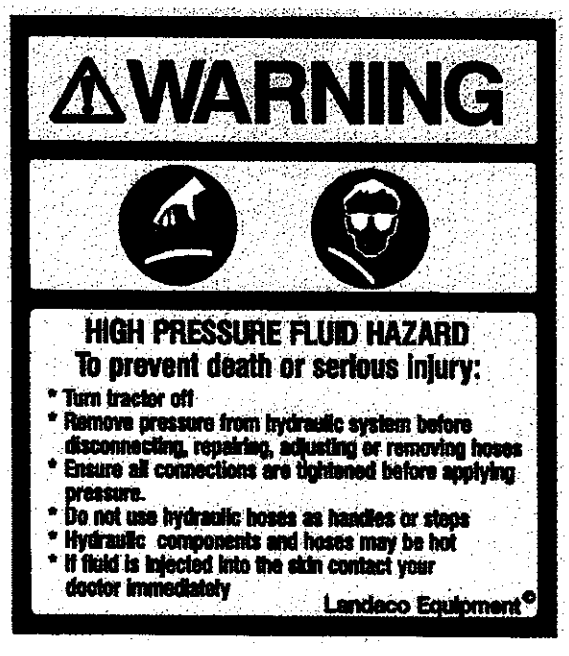
20. Read your manual carefully and review these safety procedures.

Injury may be caused by:

- Standing behind the spreader and being hit by flying objects and material.
- Damaged or faulty hydraulic hoses.
- Being close to spinners whilst they are operating.
- Falling into bin or falling off the ladder.
- Pinching fingers or hand under moving Ground Wheel Drive.

"Stay alert, stay alive - think safety first"

Safety Signs:



Specifications and Check List for operating your Landaco Bulk Fertiliser Spreader.

1. Ensure **ALL** bolts are securely fastened before operating.

2. Axle plate bolts: Torque to 150-ft. lbs. (203 N.m).

3. Wheel nuts: Torque to 260-ft. lbs. (352 N.m). Check daily.

4. Conveyor belt tension is factory set. See page 8 for in-field adjustments.

5. Grease bearings every 10hrs of operating and again at the end of each season prior to storing **(do not over grease).**

6. Tyre pressure - see table below :

Model	Tyre Size	Max. PSI
TS4500 TS6000	17.5L-24	28
TS6000	17.5L-24 or 16.9-24	38
TS8000 TS10000 TS12000	18.4-28	36
TS10000 TS12000 TS14000	23.1-26 (12ply)	25
TS16000	650/60-30.5	25
TS25000	23.1-26 (18ply)	37

7. Lubricating ground speed drive unit (GSD models only). See page 8.

8. Adjustment of Draw Bar. See page 8.

9. Adjustment of Spinners. See page 9.

10. Calibration Information. See pages 11 – 19.

11. Cleaning Machine. See page 10.

12. Safety & Risk Management. See pages 4 – 6.

Fine Adjustment of Conveyor

By viewing the front and rear roller you will be able to ascertain if the conveyor is tracking correctly. If the conveyor is sitting central on the roller the conveyor is running true.

Warning: Letting the conveyor run unevenly for any period of time may cause damage.

Make adjustment by turning the adjustment handles (positioned on the front apron of the spreader) eg: If the conveyor band moves to the left, add tension to the left tension adjuster.

If the conveyor continues to run incorrectly then check:

- That the triangle scraper is cleaning the front roller
- That all carry rollers are turning
- That the delta rollers are clean and turning freely

Lubricating Ground Speed Drive unit

By removing the lid of the GSD unit you will be able to access the chains. Pack them thoroughly with grease after cleaning out any fertiliser dust build-up.

Adjustment of Draw Bar

The standard spreader is delivered with a ring feeder drawbar. Eye size 40 - 50mm. The draw bar can be moved vertically and turned 180 degrees.

The draw bar should be mounted so that the spreader's spinner discs are horizontal. Always ensure that any hydraulic lines have enough slack to take up any sharp turns.

DANGER:

DO NOT OPERATE THE SPREADER WITH ANY PERSONS STANDING AT REAR OF SPREADER. DO NOT RIDE ON SPREADER WHILST OPERATING.

DO NOT OPERATE SPREADER IN CLOSED AREAS.

Adjustment of the Spinners.

In order to obtain best possible spreading it is necessary that the spreaders discs and spreader vanes are complete and in good condition. You should never use spurious or homemade spinner vanes, because a small change in design can give a considerable deviation in spreading.

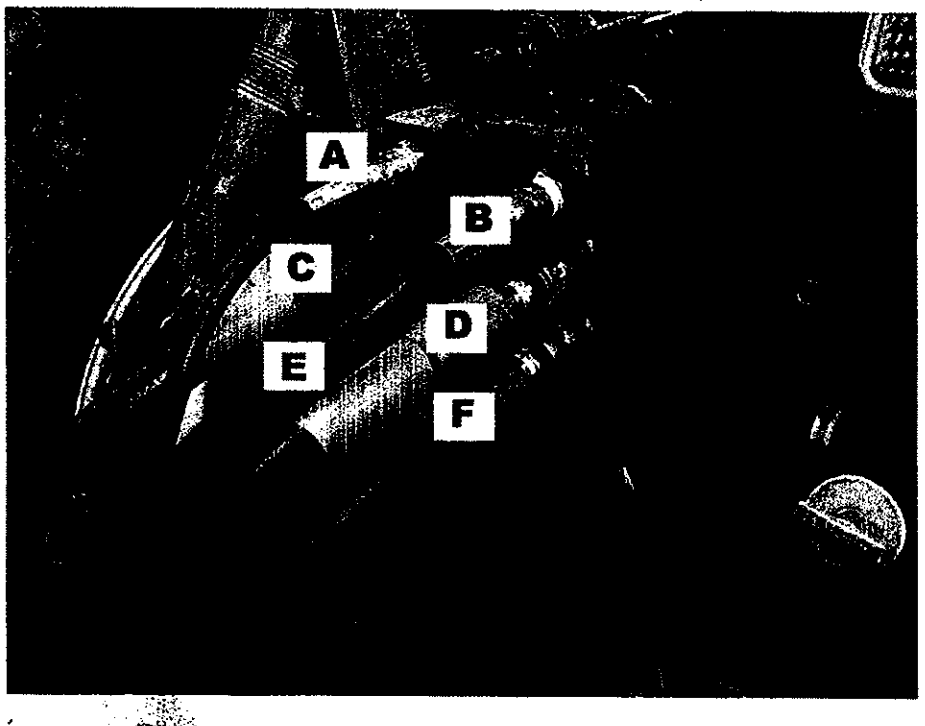
The Landaco Spreader spinners have the unique feature of material fall positioning, the ability to locate where the material falls in relation to the spinner centre. This feature helps you to eliminate banding or patchy spreading and so allows you to effectively spread all materials.

To adjust spinner deck position, loosen the four bolts and slide deck to the required position. Re-tighten bolts.

- **Best results from trials conducted are as follows:**
  Gypsum & Lime and Manures: Front half to centre of slide.
  Granulates: Front half of slide

- **Hose Position Table:**
  Lift Up Ram Circuit:
  A: Pressure Up - No Colour Code 3/8 Hose
  B: Pressure Down - No Colour Code 3/8 Hose
  Conveyor Overdrive Circuit (Optional Extra):
  C: Pressure (Flow) – Red/Green 3/4 Hose
  D: Return (Tank) – Blue/Green 3/4 Hose
  (Return line to dump to tank when fitted with an Auto Hydraulic Door)
  Spinner Circuit:
  E: Pressure (Flow) IN - Red 3/4 Hose
  F: Return (TANK) EX - Blue 3/4 Hose
  (Return line should be plugged to the dump to tank port when fitted with an Auto Hydraulic Door).

WARNING: *The information provided here is of a general nature. When connecting hoses,* ***ALWAYS*** *refer to your tractor supplier for advice. Failure to do so could result in damage to your tractor.*



Note:
Do not engage or run the conveyor motor with the paddle wheel fitted.

When using the mechanical ground drive unit for prolonged periods, remove the drive chain to reduce wear on the conveyor hydraulic motor and hydraulic resistance on the drive box.

Refer to operator handbook for safety instructions.

Cleaning and maintaining the spreader

Bolts on the draw bar, spinner discs and wheels should be frequently checked and tightened.

Cleaning of the spreader vanes and down-chute should be made daily. Especially in the mornings and in humid weather, the down-chute and the spinner vanes should be checked for accumulation of fertiliser.

Operator should be careful when cleaning with high-pressure cleaners not to spray directly at the bearings.

Grease just after cleaning. At the end of season spreading the machine should be well cleaned and greased.

SAFETY IS NO ACCIDENT!

Calibration

How to calculate the application rate:

There are various ways operators may choose to approach this, and the following method is considered one of the most simple.

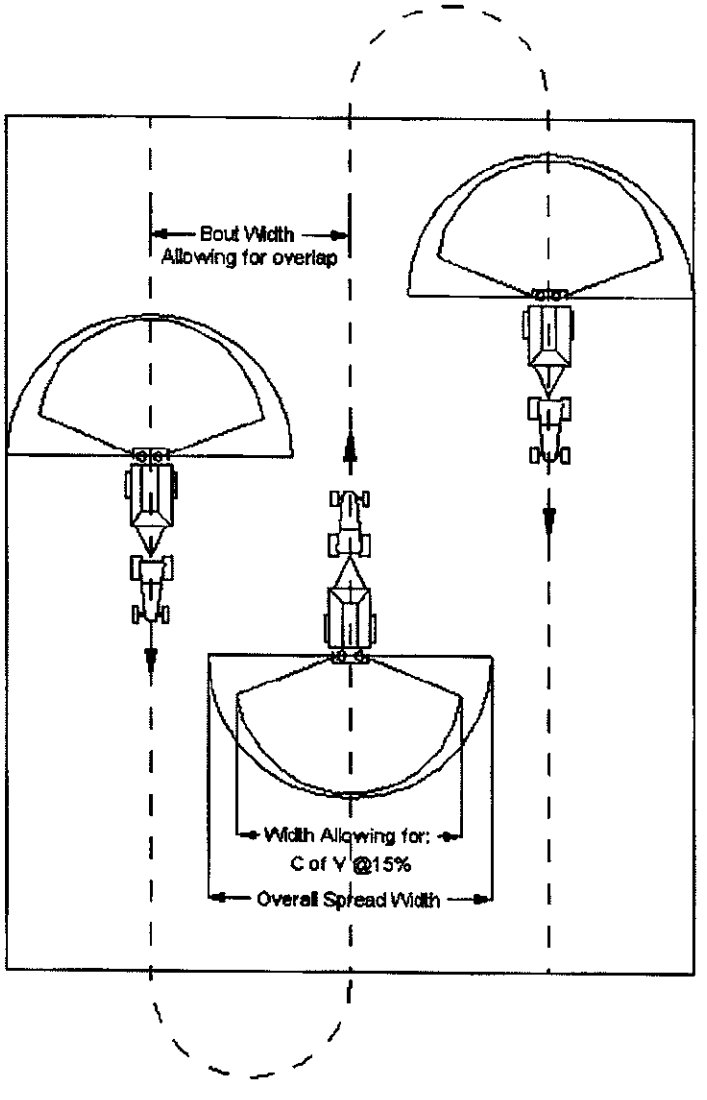
Step 1

Use the "Quick Set Guide" to determine an approximate door height for your material, and complete a trial spread of about 25 metres. Depending on the material, it may be necessary for more than one pass to produce a visual representation of the spread pattern.

From this, estimate the amount of overlap necessary for an even spread, and determine the bout width.

Note: Your Landaco spreader may well spread material 40 - 50 metres or more, but for all practical purposes, allowing for overlap, the bout width will be much less depending on the class of material, moisture content and specific gravity.

Fig. 1: Parallel Back & Forth Spreading Pattern



Step 2
Having determined the width of the width of your spread, you now need to know the amount of material being deposited over a fixed length. This is easily achieved by using the special Landaco collection bag or placing a small tarp of similar material under the spinner deck, and rotating the "Paddle Wheel" (the wheel which drives the belt) 10 times.

From the table below, we know the circumference of each size paddle wheel, so know the distance which will be covered by 10 turns.

Large Paddle Wheel = 1.806m
Medium Paddle Wheel = 1.587m
Small Paddle Wheel = 1.272m

Weigh the material collected from turning the Paddle Wheel.

Step 3
If we assume the large wheel has been used, we know that for 10 turns of the paddle wheel we will have traveled a distance of 18.06m, and will have spread to a width of (say) 25m.

That means we will have covered an area of 25m x 18.06m = 451.5 sq.m.

Use the following formula:

$$\frac{\text{Wt. of material collected}}{\text{Area covered}} \times 10{,}000 = \text{Application Rate(kg/ha)}$$

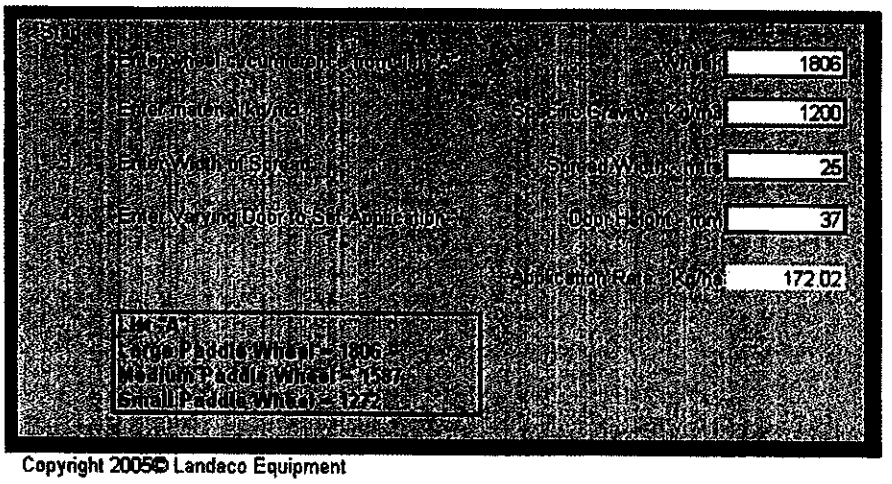
In our example, we will assume we collected 7.8kg of material during the 10 turns of the wheel, therefore:

$$\frac{7.8}{451.5} \times 10{,}000\text{(kg/ha)} = 172\ \text{kg/ha}$$

Using the Landaco Software Program:

We have already explained that the rate of spread is determined by the speed of the belt and the height of the door opening, so it is critical to know how far to open the door.

The "Quick Set Guide" is an easy approach, but you can also use the computer software program which is available on request. This will allow you to enter the specific gravity of the material being used, the size of paddle wheel selected, and you will instantly determine the spread rate for the height of door. **See example below:**



How do I calculate Specific Gravity of any material?

What we need to know is *what will be the weight of a cubic metre of material?*
A cubic metre is equivalent to 1000 litres, so an easy way to determine the Specific Gravity of a material is to weigh the material in a ten litre bucket and multiply by 100.

Example:

> I want to spread superphosphate.
> I have an 8 tonne Landaco spreader which has a volume of 6.5m^3.
> After weighing a ten litre bucket I find the weight of the super is 12kg, so there will be 1200kg of super for every cubic metre in my spreader. i.e. 6.5 x 1200 = 7800kg.

Product	Suggested Spec. Gravity	Opt. Spread Widths (m)
Ammonium Sulphate Granular	1.015	18-24
Ammonium Sulphate Standard	1.05	8-14
Chook Manure	0.40 (2.5m3/tonne)	8-12
Cow Manure (Screened)	0.66	8-12
DAP	1.00	18-25
Dolomite	1.60	8-14
Gypsum	1.20	10-12
Lime	1.35	8-14
MAP	0.96	20-25
Maxi Sulphur Super	1.19	20-25
RPR Rock	1.50	10-14
Superphosphate	1.20	20-25
Triple Super	1.15	20-25
Urea	0.75	18-24

Landaco Testing Procedure

As the manufacturer, we test our spreaders to determine the efficiency, width of spread and evenness of spread. The same method can be used by contractors or farmers who want to determine the accuracy of spreading.

This method involves laying out collection trays in a straight line at one metre centers, and making a number of passes over the trays, with all settings exactly the same. When the contents of each tray have been weighed and entered onto a computer program, the effective spread width (called the "Bout Width") can be shown for a particular *coefficient of variation* (CofV).

The CofV is usually set at 15%, and is an indicator of how evenly the spreader is spreading the material in the paddock.

WARNING:

Do not engage ground related unit when reversing.
This may cause damage to the drive system.

Quick Set Guide to get you started

The following list of suggested settings is given as a starting guide only.

Because each brand of fertilizer has a varying specific gravity, and each tractor may operate at different r.p.m, the all important spread width will vary with each circumstance. Therefore a definitive setting chart cannot be supplied.

However, collectively these factors will vary the end output by only about 5% or less, so the starting guide can be used with a certain degree of confidence.

Quick Set Guide for Approximate Height of Rear Door

QUICK SET RATE CHART

Rate kg/ha	Product	Density t/m³	Spread Width Metres	Wheel/ Ratio	Door Height mm
112	Super	1.15	25	LW/25:1	25
125	Super	1.15	25	LW/25:1	28
50	Urea	0.75	22	LW/25:1	15
80	Urea	0.75	22	LW/25:1	24
100	Urea	0.75	22	LW/25:1	30
300	Gypsum	1.00	14	LW/25:1	44
500	Gypsum	1.00	14	LW/25:1	72
1250	Gypsum	1.00	14	LW/25:1	180
2500	Gypsum	1.00	14	SW/25:1	255
1250	Lime	1.20	14	LW/25:1	150
1500	Lime	1.20	14	SW/25:1	127
2500	Lime	1.20	14	SW/25:1	212
2500	Manure	0.95	12	SW/25:1	230
5000	Manure	0.95	12	SW/10:1	157
8000	Manure	0.95	12	SW/10:1	252

LW=Large 25 Plate Drive Wheel SW=Small 17 Plate Drive Wheel

For additional spreading rates refer to your Landaco Manual or Calibration CD

Application & Measurement Conversion Chart

Weight

Given	Wanted	Multiply by:
kg	lb	2.20462
lb	kg	0.4539

Area

acre	hectare	0.404686
hectare	acre	2.47105

Application Rates

kg/ha	Bag(50kg)/acre	0.00809
Bag(50kg)/acre	kgs/ha	123.5

Note: To be used as a guide only

Landaco Equipment©

LANDACO TS4500 – 25000 MAXISPREAD 25:1 Standard GSD
SINGLE SUPER – 1150 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	18Mtr	20Mtr	22Mtr	24Mtr
Large GSD Wheel	15	94	85	77	70
	20	125	113	102	94
	25	157	141	128	117
	30	188	169	154	141
	35	219	198	179	164
	40	251	226	205	188
	45	282	254	231	211
	50	313	282	256	235
	55	344	310	282	258
	60	376	338	308	282
	65	407	367	334	305
	70	438	395	359	329
	75	470	423	385	352
	80	501	451	411	376
	85	532	479	436	399
	90	564	507	462	423
	95	595	536	488	446
	100	626	564	513	470

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
UREA – 750 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	15Mtr	18Mtr	20Mtr	22Mtr
Large GSD Wheel	15	73	61	55	50
	20	98	82	74	67
	25	122	102	92	84
	30	147	123	110	100
	35	171	143	129	117
	40	196	163	147	134
	45	220	184	165	150
	50	245	204	184	167
	55	269	225	202	184
	60	294	245	221	201
	65	319	266	239	217
	70	343	286	257	234
	75	368	306	276	251
	80	392	327	294	267
	85	417	347	312	284
	90	441	368	331	301
	95	466	388	349	317
	100	490	408	368	334

LANDACO TS4500 – 25000 MAXISPREAD 25:1 Standard GSD
LIME – 1100 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Large GSD Wheel	50	899	674	539	449
	60	1078	809	647	539
	70	1258	944	755	629
	80	1438	1078	863	719
	90	1618	1213	971	809
	100	1797	1348	1078	899
	110	1977	1483	1186	988
	120	2157	1618	1294	1078
	130	2336	1752	1402	1168
	140	2516	1887	1510	1258
	150	2696	2022	1618	1348
	160	2876	2157	1725	1438
	170	3055	2291	1833	1528
	180	3235	2426	1941	1617
	190	3415	2561	2049	1707
	200	3594	2696	2157	1797
	210	3774	2831	2265	1887
	220	3954	2965	2372	1977

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
LIME – 1100 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Small GSD Wheel	50	1276	957	766	638
	60	1531	1148	919	766
	70	1786	1340	1072	893
	80	2041	1531	1225	1021
	90	2297	1722	1378	1148
	100	2552	1914	1531	1276
	110	2807	2105	1684	1403
	120	3062	2297	1837	1531
	130	3317	2488	1990	1659
	140	3572	2679	2143	1786
	150	3828	2871	2297	1914
	160	4083	3062	2450	2041
	170	4338	3253	2603	2169
	180	4593	3445	2756	2297
	190	4848	3636	2909	2424
	200	5103	3828	3062	2552
	210	5359	4019	3215	2679
	220	5614	4210	3368	2807

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
GYPSUM – 1000 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Large GSD Wheel	50	817	613	490	408
	60	980	735	588	490
	70	1144	858	686	572
	80	1307	980	784	654
	90	1470	1103	882	735
	100	1634	1225	980	817
	110	1797	1348	1078	899
	120	1961	1470	1176	980
	130	2124	1593	1274	1062
	140	2287	1716	1372	1144
	150	2451	1838	1470	1225
	160	2614	1961	1569	1307
	170	2778	2083	1667	1389
	180	2941	2206	1765	1470
	190	3104	2328	1863	1552
	200	3268	2451	1961	1634
	210	3431	2573	2059	1716
	220	3594	2696	2157	1797

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
GYPSUM – 1000 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Small GSD Wheel	50	1392	1044	696	580
	60	1670	1253	835	696
	70	1949	1461	974	812
	80	2227	1670	1113	928
	90	2505	1879	1253	1044
	100	2784	2088	1392	1160
	110	3062	2297	1531	1276
	120	3340	2505	1670	1392
	130	3619	2714	1809	1508
	140	3897	2923	1949	1624
	150	4176	3132	2088	1740
	160	4454	3340	2227	1856
	170	4732	3549	2366	1972
	180	5011	3758	2505	2088
	190	5289	3967	2645	2204
	200	5567	4176	2784	2320
	210	5846	4384	2923	2436
	220	6124	4593	3062	2552

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
COW MANURE – 660 Kg/m3 Ave. @ 30% Moisture
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Large GSD Wheel	50	532	399	319	266
	60	639	479	383	319
	70	745	559	447	372
	80	851	639	511	426
	90	958	718	575	479
	100	1064	798	639	532
	110	1171	878	702	585
	120	1277	958	766	639
	130	1383	1038	830	692
	140	1490	1117	894	745
	150	1596	1197	958	798
	160	1703	1277	1022	851
	170	1809	1357	1085	905
	180	1916	1437	1149	958
	190	2022	1516	1213	1011
	200	2128	1596	1277	1064
	210	2235	1676	1341	1117
	220	2341	1756	1405	1171

LANDACO TS4500 - 25000 MAXISPREAD 25:1 Standard GSD
COW MANURE – 660 Kg/m3 Ave. @ 30% Moisture
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Small GSD Wheel	50	755	567	453	378
	60	907	680	544	453
	70	1058	793	635	529
	80	1209	907	725	604
	90	1360	1020	816	680
	100	1511	1133	907	755
	110	1662	1247	997	831
	120	1813	1360	1088	907
	130	1964	1473	1179	982
	140	2115	1586	1269	1058
	150	2266	1700	1360	1133
	160	2418	1813	1451	1209
	170	2569	1926	1541	1284
	180	2720	2040	1632	1360
	190	2871	2153	1722	1435
	200	3022	2266	1813	1511
	210	3173	2380	1904	1586
	220	3324	2493	1994	1662

LANDACO TS4500 - 25000 MAXISPREAD 10:1 High Speed GSD
TOP SOIL – 1500 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Large GSD Wheel	50	2957	2218	1774	1478
	60	3548	2661	2129	1774
	70	4140	3105	2484	2070
	80	4731	3548	2839	2365
	90	5322	3992	3193	2661
	100	5914	4435	3548	2957
	110	6505	4879	3903	3252
	120	7096	5322	4258	3548
	130	7688	5766	4613	3844
	140	8279	6209	4967	4140
	150	8870	6653	5322	4435
	160	9462	7096	5677	4731
	170	10053	7540	6032	5027
	180	10645	7983	6387	5322
	190	11236	8427	6742	5618
	200	11827	8870	7096	5914
	210	12419	9314	7451	6209
	220	13010	9757	7806	6505

LANDACO TS4500 - 25000 MAXISPREAD 10:1 High Speed GSD
TOP SOIL – 1500 Kg/m3
All values are in kg/ha

Drive Wheel	Door Opening	Width of Pass			
	(mm)	6Mtr	8Mtr	10Mtr	12Mtr
Small GSD Wheel	50	4198	3149	2519	2099
	60	5038	3778	3023	2519
	70	5877	4408	3526	2939
	80	6717	5038	4030	3358
	90	7557	5667	4534	3778
	100	8396	6297	5038	4198
	110	9236	6927	5542	4618
	120	10075	7557	6045	5038
	130	10915	8186	6549	5458
	140	11755	8816	7053	5877
	150	12594	9446	7557	6297
	160	13434	10075	8060	6717
	170	14274	10705	8564	7137
	180	15113	11335	9068	7557
	190	15953	11965	9572	7976
	200	16792	12594	10075	8396
	210	17632	13224	10579	8816
	220	18472	13854	11083	9236

gate adjuster **22C1**

SCANNED 653

plant: 07100 001

22C1 Gate Adjuster

Spreader 5 ton.

INSTALLATION & OPERATION INSTRUCTIONS

VERSION 4.0

FARMSCAN

PART No: AM – 22C1V4

Contents

1.0 Introduction

1.1 General Outline

The 22C1 Gate Adjuster will automatically adjust the feed gate to deliver the selected Target Rate or can be used in Manual Mode where the operator can adjust the gate height to a known position.

Rates can be changed under GPS control when the Gate Adjuster is connected via the serial port to a Farmscan canLink terminal or other computer-based product with GPS rate map and appropriate controlling software.

The spreader may be calibrated using either of two methods. The first method requires that the material be weighed as it falls from the gate whilst the second method requires the calculation of a factor based on the spreader manufacturer's charts supplied in the spreader manual. The factor may be fine tuned after the first loads.

The 22C1 will also monitor Spinner RPM via a sensor mounted on one of the spinners. The spinner can then be monitored to maintain the correct width of spread as products change. An alarm can be set which will notify the operator when the spinner RPM drops below the set alarm point.

The built in Trip meter allows for records of up to 10 trips. Each trip will record the area covered and weight of product spread. The Total key allows a display of overall Area, Weight and Distance covered.

2.0 Installation

2.1 Monitor Installation

When installing the monitor use the brackets, securing knobs and mounting hardware supplied to mount the monitor. Keep the following points in mind when finding the best location for the monitor.

- The Monitor should be installed in the cab, clearly visible to the operator but not subject to intense heat or moisture.
- Keep the unit away from radios or other electronic equipment to minimize any risk of interference. As a precaution all connection cables should take an alternative route to other cables in the cab, especially antenna cables or clutch, solenoid and engine kill switch cables.
- Mount the unit firmly on the bracket using securing knobs supplied (AH-861). Don't use substitute bolts into the monitor.
- When installing the wiring loom ensure the green 12 way connector is inserted into the back of the monitor with the screws in the connector facing upwards.

DO NOT force the connector. If it does not connect easily check that the connector is being inserted the correct way.

- When running the tractor loom through the cab to the back of the monitor it may be easier if the Green plug was removed so the cable can be inserted through a smaller diameter hole in the cab wall etc.

Take note of the wiring of the green plug before removal.
Refer to the back panel to make sure the cable
Colours correspond when rewiring the plug.

- Use the cable ties supplied to secure the cable away from risk of damage.

2.2 Power connection

Do not connect power until all other installation is complete.

Connect **power cable** from tractor loom **direct** to 12-volt DC vehicle battery terminals to ensure a clean uninterrupted source of power.

DO NOT connect power cable to alternative power source such as the Starter Solenoid as damage may result.

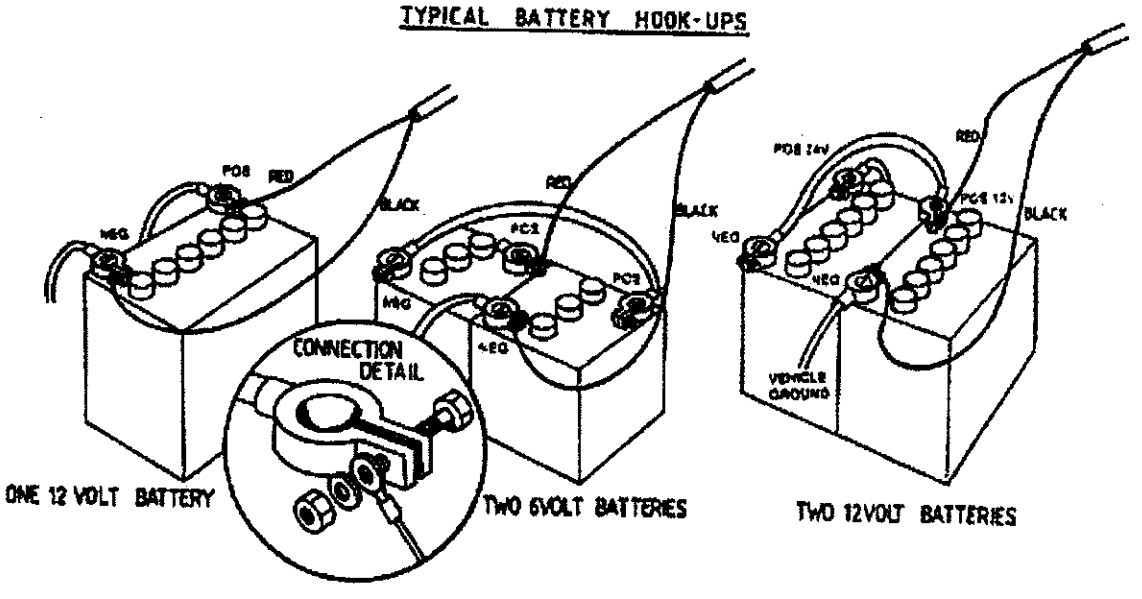
DO NOT connect other electrical equipment to the 22C1 monitor **power cable.**

Run the **power cable** away from radio antenna leads and mobile phones or wiring to solenoids or electric clutches.

Use cable ties supplied to secure power cable away from risk of damage.

Connections to battery terminals must be clean and tight.

WARNING - Disconnect Power Cable when arc welding



2.3 Wiring Loom Installation

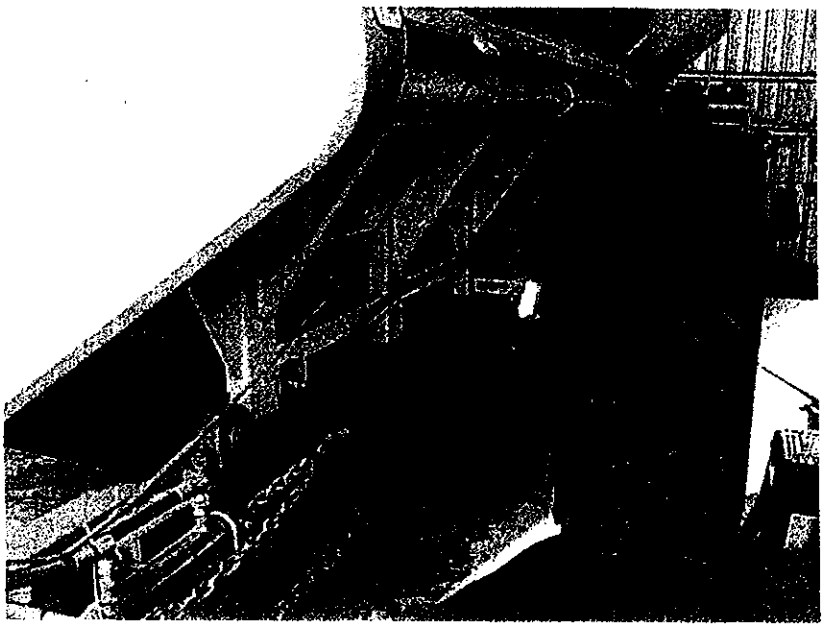
The wiring loom supplied is used for both the Truck mount version and the Tow behind version. The loom will need to be installed on the jockey wheel side of the spreader.

On the Truck mount spreader this is the Right hand side looking forward and the Tow behind version requires the loom to be fitted on the Left hand side looking forward.

The Tow behind version requires more cable to reach across the draw bar. For the Truck mount version this excess cable will need to be rolled up and fastened away from damage.

- Lay the loom out down the length of the machine and fasten with cable ties along the body of the spreader. The drawing below shows the best location for mounting the loom.

- Don't tighten the cable ties at this stage. This allows the loom to be adjusted so that the connectors align properly with the Actuator and sensors.



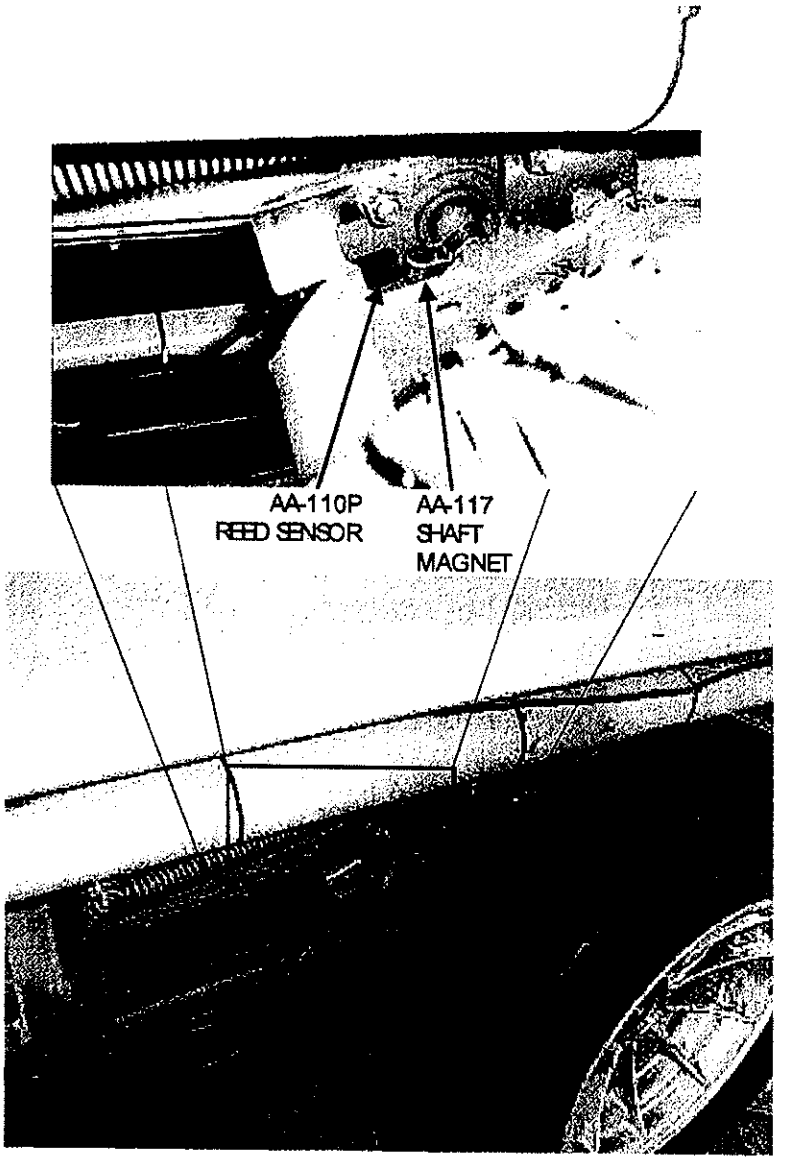
- When the sensors have been installed and connected to the loom, align the loom so that there is the least amount of excess cable near the sensors. When correct tighten the cable ties.

2.4 Wheel Sensor Installation

The Wheel sensor is installed on the jockey wheel that drives the belt. This requires the Reed switch sensor (AA-110P) to be mounted on the wheel sensor bracket supplied (AH-494) with the M4 x 20mm stainless steel bolts.

Follow the points below to mount the sensor.

- Mount one of the Shaft clamp magnets supplied in the kit on the axle of the jockey wheel.
- The magnet should be mounted on the bare part of the axle that can be located between the two bearings holding the shaft.
- Mount the sensor on the bracket and find the bolt holding the bearing housing as in the picture. This bolt needs to be undone and the bracket slipped over the bolt before re-tightening.
- Align the sensor and the magnet mounted on the shaft. The sensor will need to be moved towards the magnet until there is a clearance of around 10 - 15mm. The sensor has long slots on its bracket that allow for such adjustment.
- When the sensor and magnet are properly aligned tighten the bolts holding the sensor to the bracket and the bolt holding the sensor to the bearing housing.
- The sensor connection tail can be connected to the two-way connector on the loom. (The wheel connector has a White and Black wire)



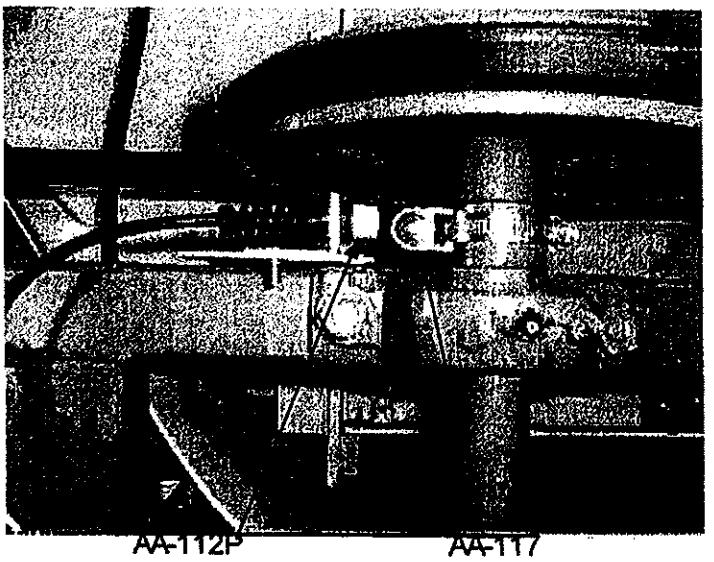
- The Truck mount version will be exactly opposite to these pictures. Locate the bearing bolt that will allow the bracket to be used in the same manner.

2.5 Spinner Sensor Installation

The Spinner sensor needs to be mounted on the spinner that is on the same side as the jockey wheel. The sensor bracket has two holes, which will allow the bracket to be mounted in the same way for both the Truck mount and the Tow behind versions. (The Pictures show installation on a Tow behind version)

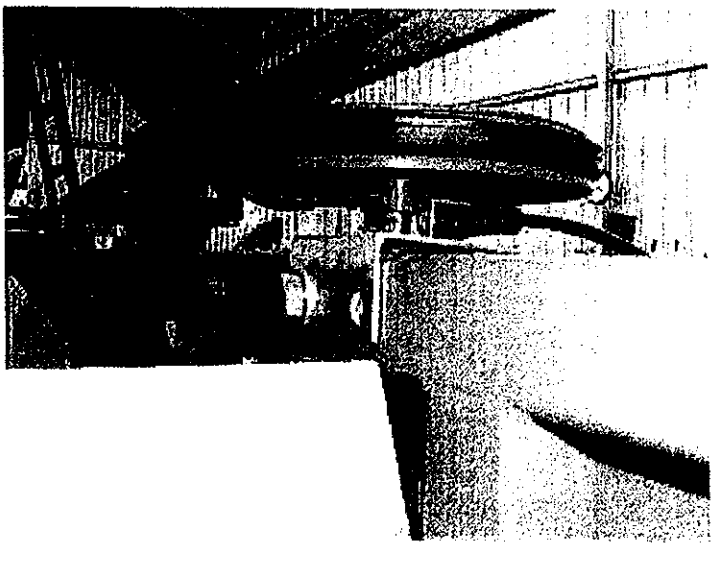
Follow the points below to mount the sensor

- Remove the outside bolt of the saddle clamp ontaining the bearing at the top of the spinner.
- Place the bracket to the back of the RHS frame which the bearing is bolted to and place the bolt through the bracket and then through the saddle clamp, tighten the bolt to secure the bracket and bearing. See pictures.
- Place a shaft magnet around the spinner shaft above the top bearing.



AA-112P COIL SENSOR

AA-117 SHAFT MAGNET



- Using two M4 x20mm bolts to mount the coil type sensor (yellow cap sensor) on to the bracket facing the shaft magnet.
- Align the shaft magnet and the sensor so that there is a clearance of approximately 5mm between the end of the sensor (yellow cap) and the magnet. (Slide sensor away from magnet if spinner rpm readout is unstable)
- Tighten the 2 bolts to secure the sensor and tighten the shaft clamp to hold the magnet in place.
- Connect the sensor tail to the loom. (The loom connector is a two-way connector with Green and Black wires).

2.6 Linear Actuator Installation

Mount the Linear actuator using the two large brackets (AH-495 & AH-496). The smaller bracket will be mounted at the bottom of the Feed gate and the larger bracket will be mounted on the side of the bin wall.

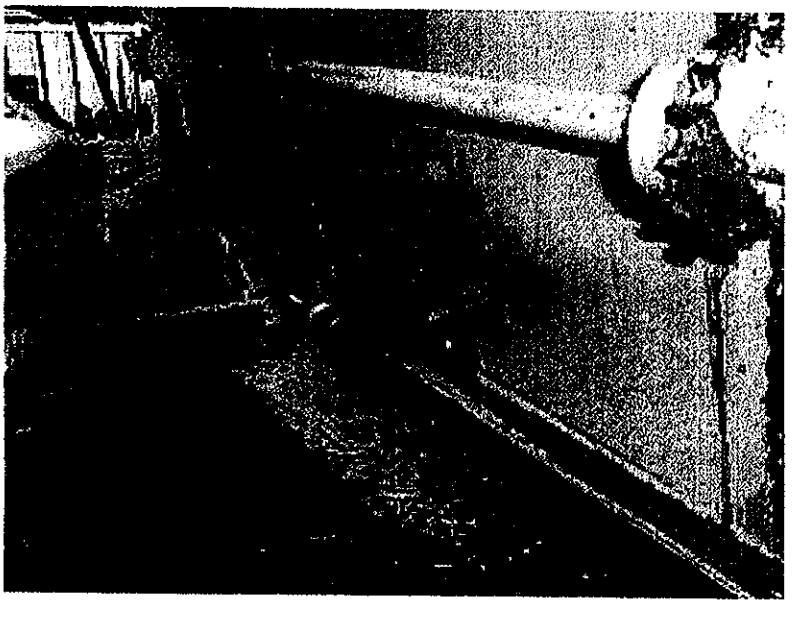
To mount the actuator correctly the actuator needs to be fully extended and both brackets need to be attached to the actuator. Check the following pictures to attach the brackets the correct way.

Provided in the kit is a 6 Way plug with two 1 metre lengths of cable attached. Use this to extend the actuator.

- Plug the 6-way connector into the actuator.
- Connect the wires across a +12 Volt battery, the polarity of these wires does not matter. Connect the wires one-way ad if the actuator retracts, then reverse the wires to extend.

Follow the points below to mount the Actuator.

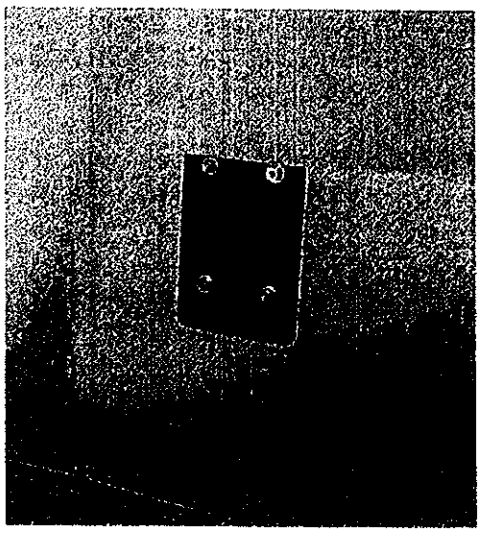
- Lower the Feed Gate down so that it is set 10mm above the belt. This is important because it will not allow the gate to ever hit and wear away the belt or bolts.
- Mark the centre of the gate and the equivalent position directly above it on the bin wall. This will help you centralise the actuator when marking the mounting holes
- Line the actuator up against the feed gate and the bin wall.
- Make sure the bottom bracket is positioned as low down the door as possible. (Hard up against the bend at the bottom of the gate). Ensure the tapered side of the gate bracket is downwards.
- When aligned make sure the top bracket is centralised around the centre mark and mark the holes in the brackets.
- When marked drill the holes out to 9mm.

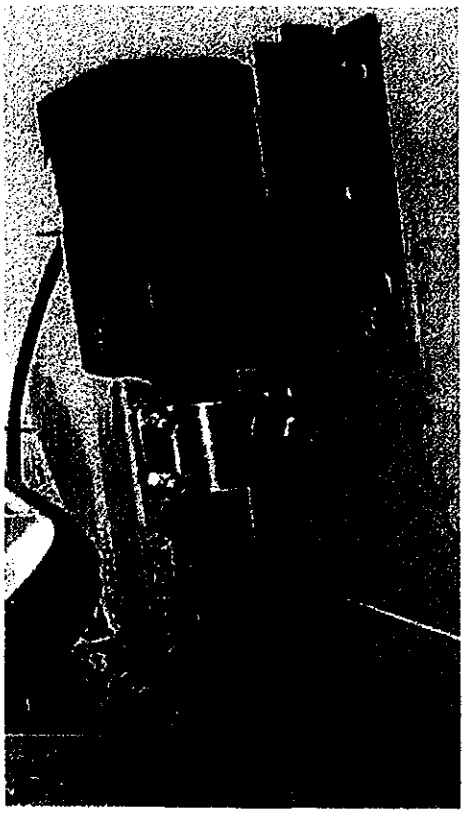


- Using the M8 Bolts supplied to secure the bottom bracket in place.

Linear Actuator installation continued

- Align the rectangular plate inside the bin with the back of the top bracket. One side of the bracket is shorter which will need to be mounted at the top of the bin so the bracket does not interfere with the bend in the bin wall. Use M8 bolts to fasten both of these brackets in place.





- Supplied in the kit is an extendible rubber boot that must be fitted over the actuator arm. This will help to stop Fertiliser and dirt entering the actuator through the arm. Fit the boot as shown below and use cable ties to secure it from moving.

- Do not remove sealed rubber casing or top cover from actuator under any circumstances.

3.0 Operation

3.1 Power On/Off Key

To switch the monitor ON, press the 

key

Whenever the monitor is switched ON the display will run through a start up routine displaying version of software and the program the monitor is running.

e.g.

FARMSCAN

VERSION 4.0

GATE ADJUSTER

The version number indicates which generation of functions and features are programmed into your unit.

If an upgraded program is installed, a new version number e.g. VERSION 3.10 will be displayed.

After momentarily displaying the current program and version number, the monitor will then display the Gate height and selected rate of application.

e.g.

20mm 70 kg/Ha

If stationary the monitor will immediately go into HOLD mode when first switched on, See section 3.11 RUN / HOLD function for an explanation of this alarm.

3.2 Imperial / Metric Key

Press the 

key to change any readout on display between metric and imperial.

e.g. TOTAL 10.0Ha

TOTAL 25.0Ac

NOTE: IMP/MET key is not active during calibration. All calibration factors must be entered in metric values.

3.3 Speed Key

Press the 

key to display the current working speed and the Spinner rpm.

e.g. 15 kph 764 RPM

An alarm can be set to notify the operator that the spinner RPM has dropped below a set point. The following display will appear accompanied by an audible beep to warn when the rpm has dropped below this point.

e.g. SPINNER SLOW

See section 4.10 for the details on how to set the spinner alarm point.

3.4 Total Key

The TOTAL key is used to display Total Area covered, Total weight applied and Total Distance travelled.

Area, Weight and Distance readings are only incremented when "UNIT OFF HOLD" & travelling with the jockey wheel engaged.

Press 

key once to display total AREA.

e.g. AREA 150.0Ha

Press 

key again to display total WEIGHT

e.g. WEIGHT 2.55 t

Press 

key again to display total DISTANCE

e.g. DISTANCE 2.325km

To Reset TOTALS press 

key once to start reset process.

Both Total Area, Total Weight and Total Distance are reset simultaneously; this can be done at the start of a spreading program to keep overall records.

E.g. RESET TOTAL?

Press 

again to complete reset process OR **to abort reset process**, press any other key.

After reset of TOTALS you will have the **option** to reset all trip memories at the same time

e.g. RESET ALL TRIPS?

Press 

again to reset all trips OR **to abort reset of all trips**, press any other key.

3.5 Trip Key

The TRIP key allows the display of a sub total for area covered and weight applied. The TRIP function has 10 resetable memories to keep a tally of the areas and weights for 10 different plots or loads.

To display the current TRIP AREA press 

key once.

e.g. TRIP 1 12.5Ha

Press 

key again to display TRIP 1 weight

e.g. TRIP 1 0.85 t

To reset Trip memory on display, press 

key to start reset process

e.g. RESET TRIP 1?

Press 

key again to complete reset process OR **to abort reset process**, press any other key.

To change to another Trip memory, press the  or  arrow keys to change the current trip number on display.

e.g. TRIP 2 0.00 t

NOTE:

Previously engaged trips can be viewed or reactivated by using the UP and DOWN keys to display and hence activate any one of the 10 trip memories 1-10. Whichever trip number is displayed will be active when working.

3.6 Rate Key

The Gate Adjuster can be operated in AUTOMATIC or MANUAL mode.

AUTOMATIC MODE - Requires the correct pulse/kg calibration factor. See Section 4.7

In AUTOMATIC Mode, the RATE key displays the current gate height and the selected spreading rate.

The gate height displayed is the distance from the belt to the bottom of the gate. The height reading will increase or decrease as the actuator moves to attain the selected rate.

The Rate readout is the amount of material being spread per Hectare or Acre.

Press the 

key to display the Rate readout.

e.g. 20mm ⊙ 70 kg/Ha

The Rate that is displayed is the Target Spreading Rate. Based on the Pulse/kg calibration factor, the actuator will increase or decrease the feed gate opening to attain the Target rate. See section 4.5 Target Rate for information on setting the Target rate.

To increase or decrease the spreading rate while operating use the  or  keys. The amount of change in the rate from each press of the arrow keys can be set to any amount, e.g. 5, 10, 20kg per step up or down from the standard Target Rate. This is referred to as the **STEP SET**.
See section 4.6 for instructions on changing the Step Set.

When the Rate has been changed an arrow will appear on the display. This arrow reminds the operator which way the rate has been adjusted from the Target rate. To return back to the base Target Rate quickly, press the RESET key.

e.g. 40mm ↑ 70 kg/Ha

If the gate cannot achieve the desired rate, the monitor will display one of the following alarms.

e.g. RATE TOO LOW

or RATE TOO HIGH

There is also an alarm, which will appear to warn the operator when there is a Gate Jam. The monitor will continuously beep and display "GATE JAM" until the problem is rectified.

e.g. GATE JAM

"GATE JAM" may be caused by a rock or something caught in the feed gate or the gate may have reached the upper or lower limit, if an unattainable Target Rate is selected.

Rate Key cont'd...

MANUAL MODE – Press the RATE key to switch to MANUAL mode. The monitor will display the gate height only.

e.g. 40mm MANUAL

In MANUAL mode, the RATE key displays only the GATE height and allows the operator to adjust the gate to any position using the ↑ or ↓ arrow keys.

3.7 Test Key

The TEST key provides a means of testing that the sensors and actuator are working correctly. The test function is also used in the calibration procedures.

Press the TEST key and the DISTANCE TEST will appear.

e.g. DISTANCE TST 0

The distance test enables the operator to test the wheel sensor mounted on the jockey wheel. Each time the magnet passes the sensor the monitor will beep and count the pulse.

To reset the pulse-count back to zero press the RESET key.

Pressing the TEST key again wll display the SPINNER TEST.

e.g. SPINNER TST 0

The spinner test will beep and count up each time the magnet on the spinner shaft passes the coil sensor.

NOTE: The sensor will only activate when the magnet passes the sensor quickly. Turning the spinner by hand may not activate the test function.

To reset the spinner count press the RESET key

Pressing the TEST key again will display the ACTUATOR TEST.

e.g. ACT. TST 128

The Actuator test should increase or decrease a number as the Actuator is extended or retracted using the ↑ or ↓ key.

The Actuator is Okay if the number changes continuously from gate up to gate fully down

(10mm above the belt)

3.8 Cal Key

Pressing the CAL key will step through a series of set up factors that need to be entered for the monitor to work correctly. The Calibration section of this manual explains each of these set up factors in greater detail.

3.9 Timer Key

The TIMER Key allows display of the ELAPSED TIME of machine operation.
The ELAPSED timer can be RESET to zero at any point. When the monitor ges ON HOLD the elapsed timer will stop (and the colon between the Hours & Minutes stop flashing) and will restart when the monitor is taken OFF HOLD.

If required, the ELAPSED timer may be programmed with an elapsed time alarm point which can serve as a warning of a due maintenance interval.

Press the TIMER key to display the elapsed timer.

e.g. ELAPSED 15:34

To reset Elapsed Timer press the RESET key

TIMER ALARM

An elapsed time alarm may be set to activate after the ELAPSED display **counts up to a set point**.

To set Timer Alarm press TIMER key again to display SET TIMER.

e.g. SET TIMER 20:00 (20 Hours)

Use ↑ or ↓ arrow keys to set duration of time to elapse before alarm will activate.
When the alarm activates, the monitor will display:

TIMER EXPIRED

To cancel Timer press TIMER key to display SET TIMER then press RESET to set timer value to zero.

To start Timer press TIMER key to display ELAPSED TIME then press RESET to start timer counting up from zero.

3.10 Print Key

The Gate adjuster has a print facility that will print out Trip Area, Weight and Distance for each Trip (1-10) or all trips. Use the optional 2040 Printer Kit connected to the adapter cable provided in the kit.

Press the PRINT key and the monitor will display the current trip to be printed.

e.g. PRINT TRIP 1?

To print another Trip e.g. Trip 2, Press the Trip key and use the or arrow keys to select the required Trip then press Print again.

To print all the Trip information, select Print then use the or arrow keys to change the display to Print all trips.

e.g. PRINT ALL TRIPS?

When the correct option is displayed press PRINT key again and the display will say PRINTING and the printer will begin to operate.

If there is no trip data the monitor will display NO TRIP DATA and printing will cease.

Note: Each TRIP data takes approx. 16 secs to finish printing. Printing ALL TRIPS will take approx 3 mins.

3.11 Run/Hold Function

The Run / Hold function is activated by lifting the jockey wheel. Whenever the jockey wheel is stationary the monitor will go ON HOLD stopping the Trip, Total and Elapsed time functions from accumulating.

The MONITOR ON HOLD message will re-appear every thirty seconds accompanied by an alarm to remind the operator the monitor is not accumulating.

e.g. UNIT ON HOLD

When the jockey wheel is engaged and rotating the monitor will go OFF HOLD and the trip and total functions will begin to accumulate.

e.g. UNIT OFF HOLD

3.12 Automatic Mode

Automatic mode allows the operator to close or open the gate while stationary or during spreading.

To **CLOSE** or **OPEN** the gate whilst **STATIONARY** or when the jockey wheel is raised, press the 

key.

e.g. 50mm ⊙ 500kg/Ha

Use the  arrow key to move the gate to the minimum height (10mm) and the  arrow key to open the gate.

e.g. 25mm ↓ 250kg/Ha

e.g. 75mm ↑ 750 kg/Ha

To **CLOSE** or **OPEN** the gate whilst **SPREADING**, press the 

key.

e.g. 20mm ⊙ 70kg/Ha

Use the  arrow key to move the gate to the minimum height (0kg/Ha) and the  arrow key to open the gate.

e.g. 10mm 0kg/Ha

e.g. 20mm ⊙ 70kg/Ha

When the gate is closed, lift the jockey wheel to prevent wear on the belt.

3.13 Manual Mode

Manual mode allows the operator to close or open the gate while stationary or during spreading.

To select Manual Mode press the 

key until display shows MANUAL.

e.g. 50mm MANUAL

To **close** or **open** the gate whilst **stationary** or when **spreading**, press the 

key.

e.g. 20mm MANUAL

Use the  arrow key to move the gate to the minimum height (10mm) and the  arrow key to open the gate.

e.g. 10mm MANUAL

e.g. 55mm MANUAL

When the gate is closed, lift the jockey wheel to prevent wear on the belt.

3.14 Bin Level Sensor (Optional)

The optional A-2220P Bin/Tank Level Sensor can be fitted to the bin to detect a low bin level and give a visual and audible warning to the operator.

e.g. BIN LOW

To cancel BIN LOW message on the screen:

- Press any other key.
- Re-fill bin
- Put UNIT ON HOLD.

Note: BIN LOW message will re-appear if monitor goes OFF HOLD and bin is still empty.

INSTALLATION

Install the sensor through the bin wall by cutting a 35mm clearance hole.

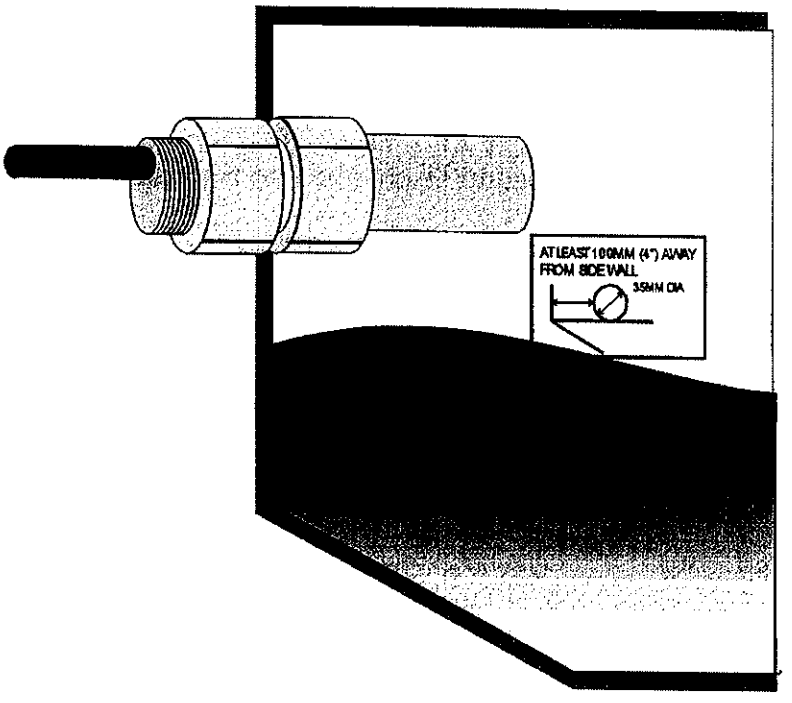
The sensor must be at least 100mm (4inches) away from any adjacent sidewall.

Bin Level Sensor INSTALLATION cont'd...

Install the sensor at the bottom of the bin.

Some bins empty from one side first, so it pays To observe the unloading characteristics before making any holes.

When the sensor is plugged into the harness, the light at the rear (cable entry side) of the sensor glows brightly when the sensor is uncovered and dims when the sensor is covered.



4.0 Calibration

4.1 General Outline

Variable factors need to be entered into the calibration memory before operation.

Press the CAL key to step through the calibration functions.

All calibration factors must be entered in METRIC units only. To adjust the factor displayed, use the ↑ or ↓ arrow keys to change the displayed value.

Holding the ↑ or ↓ arrow keys will cause the numbers to change faster.

Press the CAL key after the required figure is set. The monitor will then proceed to the next calibration function.

To exit from the calibration routine, Press any other operation key (e.g. Rate) will return the Monitor to normal operation.

4.2 Memory Backup

An inbuilt memory backup system will hold all calibrations and accumulated totals in memory whenever the power is switched off.

Memory will last for at least 3 months after disconnection from the 12 Volt DC. Power Source.

4.3 Calibration Warning

A Calibration checking system incorporated into the system will warn you if any calibration factors are lost from memory or change value without your knowledge.

If for any reason a calibration factor does change value, a continuous series of beeps will sound and the display will indicate which calibration factor has altered.

In this case the operator must press the CAL key to check and re-enter the correct factor. Save this factor by pressing CAL key again. Press any other key (e.g. Speed) to return to normal display.

4.4 Setting up the Actuator

In order for the actuator to work correctly over the full range of the gate travel, the open and closed positions need to be set.

This will only need to be performed ONCE when the Actuator is first installed, but must be done before attempting to set any other calibration factors. The set up section for the actuator can be found by switching the monitor ON, pressing CAL key to display TARGET.

Press and hold the CAL key and the closed position can be set.

e.g. ZERO POS'N 0

Press the ↑ or ↓ arrow keys to make the actuator close the feed door down to 10mm above the belt

At this point the monitor does not know which way is up or down so use either arrow key to determine which key closes the door.

When the door is closed to 10mm press the CAL key again.

The display will now ask for the zero height. This value is the distance from the bottom of the gate to the belt. (e.g. 10mm)

Use the ↑ or ↓ arrow keys to enter the size of the gap.

e.g. ZERO H'T 10mm

Press the CAL key again to display the Max position readout.

e.g. MAX POS'N 0

Use the ↑ or ↓ arrow keys to open the door to it's maximum readout position.

Be sure to stop the door 2 – 5 mm before the fully open position. This is to allow the actuator room to over shoot and prevent the gate from jamming and displaying

GATE JAM

Setting up the Actuator cont'd...

Once the door has reached it's maximum (less 2 – 5 mm), carefully measure the gate height following the same angle as the door.

Press the CAL key and enter the maximum height using the arrow keys.

e.g. MAX H'T 260mm

Press the CAL key again and the monitor will change back to the normal calibration routine displaying the Target Rate.

The options available from Target Rate onwards are part of the normal calibration options. These factors can be accessed by pressing the CAL key at any time.

4.5 Target Rate

With Target displayed, the ↑ or ↓ arrow keys can be used to set the Base Target spreading rate.

e.g. TARGET 100kg/Ha

Press the CAL key to proceed to Step Set.

4.6 Step Set

The Step Set is the amount the target rate can be changed up or down when using the arrow keys to change the rate on the go. e.g. 5kg, 10kg, or 50kg steps.

Use the Arrow keys to set the steps as desired.

e.g. STEPSET↓↑ 10kg

Note: If operating under GPS Rate map control, the step set may be used but your selection will be automatically overridden anytime the computer commands the rate to change.

Press the CAL key again to proceed to the Pulse/kg factor.

4.7 Pulse/Kg Factor

For AUTOMATIC gate operation, the Pulse/kg factor must be correctly set for each product type.

The correct Pulse/kg factor can be established by following the Calibration Procedure below or by using the table on Page 28 for MARSHALL Spreaders as a guide only.

After the first load of a known weight, the factor can be fine tuned by taking the Monitor Weight reading multiplied by the Pulse/kg factor divided by the ACTUAL Weight.

Calibration Procedure

Follow the steps below to work out the Pulse/kg factor.

Press the CAL key to display Pulse/Kg

Press the TEST key to select the Pulse/kg Calibration screen.

e.g. ↓↑ 40mm COUNT 0

Use the ↑ or ↓ arrow keys to set the door to roughly a normal working height for that material. e.g. 40mm

When the door is set find a means of catching material delivered off the belt when turning the jockey wheel by hand.

Turn the jockey wheel until the Belt is fully primed with material falling evenly off the entire width of the belt. Stop turning when the jockey wheel magnet and sensor are aligned.

Press the RESET key to zero the count of wheel rotations.

e.g. ↓↑ 40mm COUNT 0

Now prepare to catch material and proceed to turn the jockey wheel at least 10 turns stopping exactly on a pulse count. (When magnet and sensor are aligned)

Accurately weigh the material with digital scales.

DO NOT RESET THE COUNTER.

Calibration Procedures cont'd...

Now press the CAL key and weight will be displayed.

e.g. WEIGHT 0.000kg

Use the ↑ or ↓ arrow keys to enter the correct material weight into the monitor.

e.g. WEIGHT 1.760kg

Press CAL again when the weight is entered and the monitor will automatically calculate the new Pulse/kg factor. (Step through CAL options again to display new Pulse/Kg factor)

This Pulse/Kg Factor is accurate only for 50% more or 50% less than the required Target Rate.

A new Pulse/Kg Factor must be obtained, even for the same product, if the new Target Rate is 50% above or 50% below the previous Target Rate.

The above procedure will need to be carried out for each new product. Once the factor is established, it will be the same each time the same product is used unless material consistency differs greatly.

Record your Pulse/kg factors for future reference.

Product	*Pulse/Kg*

Calibration Guide

Located on Page 29 is a chart that has a Pulse/kg factor that has been calculated based on the Marshall charts.

4.8 Width

The Width is the effective width over which material is being spread. Use the  or  arrow keys to enter the width in metres.

e.g. WIDTH 16m

Press the CAL key to proceed to setup the distance.

4.9 Distance

The Distance factor is the distance covered per rotation of the jockey wheel.

Carry out the procedure below to establish this value.

Press the TEST key until DISTANCE TST is displayed.

e.g. DISTANCE TST 0

Engage the jockey wheel and crawl the spreader forward and stop when the DISTANCE TST beeps and counts up. (When the jockey wheel magnet and sensor are aligned)

Peg the ground at the bottom centre of the spreader main ground wheel tyre.

Drive forward in a straight line until the monitor has counted to approximately 10, stopping exactly on a beep count.

(If you go past a beep don't reverse; go forward to the next beep.)

Measure the distance from the peg to the bottom centre of the same tyre.

Divide the distance traveled by the number of jockey wheel rotations as displayed.

e.g. 15.7m ÷ 10 = 1.570 Distance Factor

Press the CAL key to display Distance and use the  or  arrow keys to enter the distance factor.

e.g. DISTANCE .570m

Press the CAL key to proceed to Spinner alarm.

4.10 Spinner Alarm

The Spinner alarm is the slow rpm alarm point for the spinner. Whenever the spinner rpm drops below this value the monitor will beep and warn the operator that there is a problem with the spinner.

Use the  or  arrow keys to enter this value or set zero for no alarm.

e.g. SPINNER ALM 650

Press the 

key again to set up the Remote Run / Hold.

4.11 Remote Run/Hold

The Run/Hold function may be activated either by the Wheel signal or by an external connection to the rear of the monitor.

This requires Pin 12 of the 12 way green connector at the back of the monitor being connected as follows :-

Unit is OFF HOLD (in RUN mode) when connection is to EARTH

This function may be enabled or disabled by setting the Remote Hold ON or OFF

Use the  or  arrow keys to change between the options below.

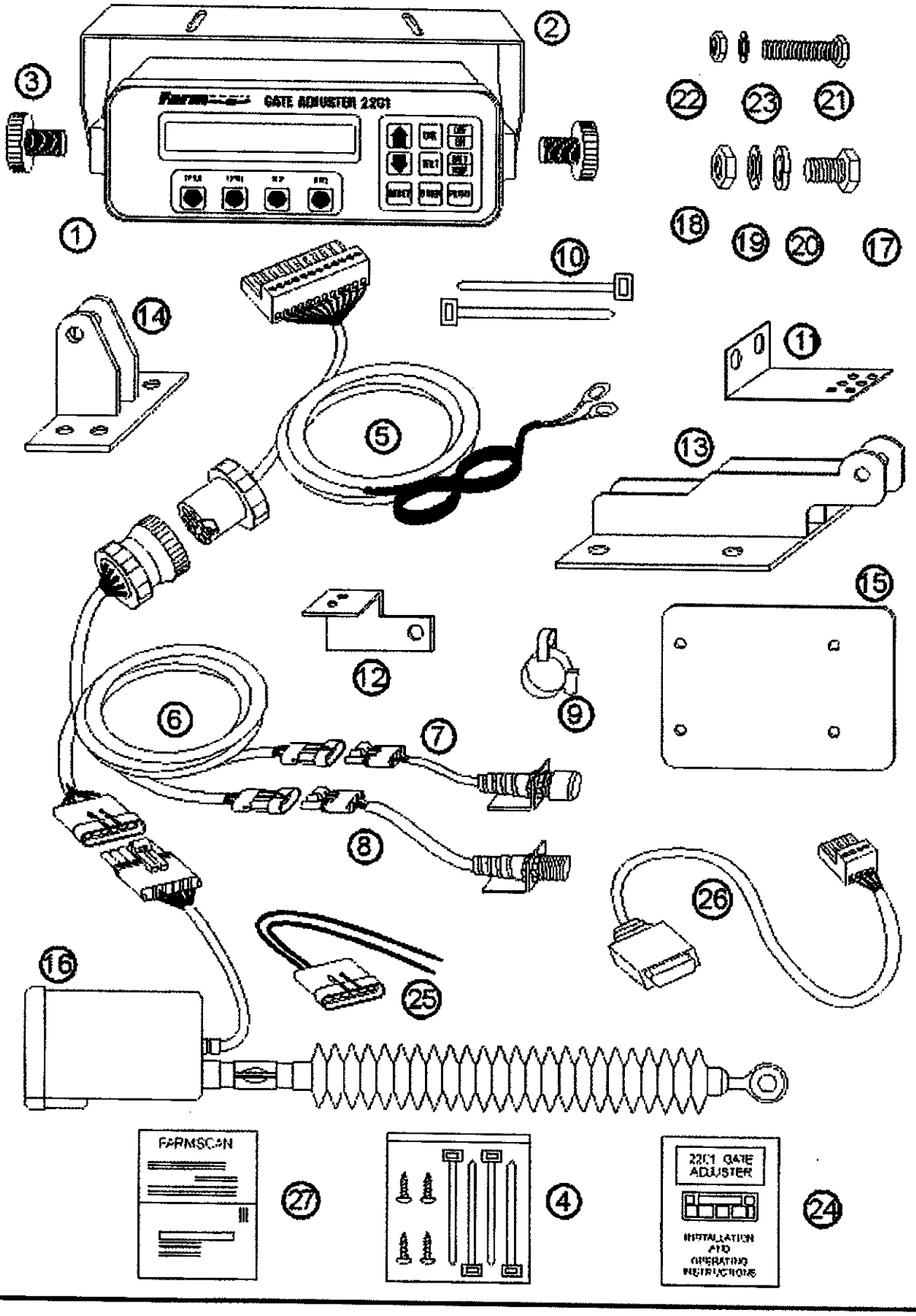
e.g. REMOTE HOLD ON

REMOTE HOLD OFF

5.0 Parts List

REF	PART No.	DESCRIPTION	QTY
1	A-22C1	GATE ADJUSTER MONITOR	1
2	AH-406	MOUNTING BRACKET	1
3	AH-861	SECURING KNOBS	2
4	AH-408	UNIVERSAL HARDWARE PACK	1
5	AC-22C1-T	22C1 TRACTOR LOOM	1
6	AC-22C1-TB	MARSHALL SPREADER LOOM	1
7	AA-110P	REED TYPE SENSOR (WHEEL)	1
8	AA-112P	COIL TYPE SENSOR (SPINNER)	1
9	AA-117	SHAFT MAGNET & CLAMP	2
10	HG-706	CABLE TIES	20
11	AH-493	SPINNER SENSOR BRACKET	1
12	AH-494	WHEEL SENSOR BRACKET	1
13	AH-495	ACTUATOR TOP BRACKET	1
14	AH-496	ACTUATOR BOTTOM BRACKET	1
15	AH-497	ACTUATOR TOP BRACKET BACK PLATE	1
16	A-122	LINEAR ACTUATOR	1
17	HS-M8X25SS	M8 X 25mm BOLT	8
18	HN-M8SS	M8 NUT	8
19	HW-M8	FLAT WASHER	8
20	HW-M8SS	SPRING WASHER	8
21	HS-4X20SS	M4 X 20mm BOLT	4
22	HN-M4SS	M4 NUT	4
23	HW-M4SS	FLAT WASHER	4
24	AM-22C1	22C1 MANUAL	1
25	AC-079	ACTUATOR TEST CABLE	1
26	AC-080	PRINTER ADAPTOR CABLE	1
27	AM-200	2 YEAR WARRANTY CARD	1

5.1 Parts Drawing



6.0 Calibration Chart

Marshall Multispread Calibration Chart

Models: 850T/G 880T/G 850TM/G 880TM/G 810 TM/G

PRODUCT	DRIVE SPROCKET SETTINGS Side A	Side B	DOOR HEIGHT RANGE (mm)	PULSE/KG FACTOR
Super Phosphate 1150 Kg/M³	*14:30*	*15:30*	*25:75*	*4.15*
	14:30	*20:28*	*25:75*	*2.62*
	30:14	*15:30*	*25:75*	*0.87*
Agras 950 Kg/M³	*14:30*	*15:30*	*25:50* *50:75*	*4.48* *4.18*
	14:30	*20:28*	*25:50* *50:75*	*3.10* *2.91*
Urea 750 Kg/M³	*14:30*	*15:30*	*25:50* *50:75*	*6.12* *5.86*
	14:30	*20:28*	*25:50* *50:75*	*4.27* *3.84*

TO FINE TUNE PULSE/KG FACTOR
AFTER FIRST LOAD
USE THIS FORMULA

$$\frac{\text{MONITOR WEIGHT x PULSE/KG}}{\text{ACTUAL WEIGHT}} = \text{NEW FACTOR}$$

7.0 Troubleshooting Guide

PROBLEM		CAUSE	REMEDY
1.	MONITOR DOES NOT TURN ON	Fuse Blown.	• Replace 20 Amp at rear of monitor. If there is no fuse then the monitor uses internal Poly-Fuses. These will cut out if the monitor is drawing too much current and will automatically restore power when the fault has been repaired.
		Monitor not connected correctly.	• Connect BLACK from loom directly to –ve side and RED to +ve side of battery. Check there is 12V between pins 10 & 11 on the green plug at the back of the monitor.
		Interference	• Make sure no other electrical device is connected to the monitor power cable. Do not share power with other devices such as foam markers, using 22C1 loom.
		Poor battery connections.	• Ensure battery terminals are clean & tight. Check in-line fuse holder (if fitted) for blown fuse or corrosion.
2.	MONITOR TURNS ON AND THEN TURNS OFF WHEN ACTUATOR MOVES. (Ensure Truck/Tractor engine is running)	Not enough power to the monitor.	• Run Power Cable directly to battery. Do not share power with other devices such as foam markers, using 22C1 loom
		Poor battery connections	• Ensure battery terminals are clean & tight. Check in-line fuse holder (if fitted) for blown fuse or corrosion
3.	LCD DISPLAY DROPS OUT OR GREY SQUARES APPEAR ON READOUT.	Not enough power to the monitor	• See TROUBLESHOOTING 2 above.
		Monitor not connected directly to battery.	• Connect BLACK from loom directly to –ve side and RED to +ve side of battery. Do not share power with other devices such as foam markers, using 22C1 loom
		Faulty battery.	• Replace battery.
		Poor battery connections	• Ensure battery terminals are clean & tight. Check in-line fuse holder (if fitted) for blown fuse or corrosion.
4.	MONITOR LOSING CALIBRATION VALUES.	Poor power connection or inadequate power source.	• Run Power Cable directly to battery. Do not share power with other devices such as foam markers, using 22C1 loom
		Poor battery connections	• Ensure battery terminals are clean & tight. Check in-line fuse holder (if fitted) for blown fuse or corrosion
		Interference	• Ensure 2-Way and other electrical equipment positioned 1m away from 22C1 monitor.
		Wire ignition leads causing interference (Petrol trucks)	• Fit carbon leads to ignition system.

PROBLEM		CAUSE	REMEDY
5.	UNSTABLE OR NO SPINNER RPM.	Spinner magnet is missing or incorrect distance from sensor.	• Ensure gap between sensor and magnet is 10 – 15mm. Move sensor away from magnet until reading is stable.
		Break in wiring loom.	• Press the TEST button until SPINNER TST is displayed. Disconnect spinner sensor from loom and short across loom pins. Monitor should beep and count each time the pins get shorted together if wiring OK. • If monitor does not count pulses, check for breaks in the loom by shorting the green and black wires together in the 9-pin break away plug and at the back of the monitor. • If no response directly at monitor, return monitor for repair.
		Interference in loom. (Usually accompanied by another action, such as machine moving or CB coming on).	• Ensure loom does not run close to other electrical cables. Ensure 2-Way and other electrical equipment positioned 1m away from 22C1 monitor
		Faulty or incorrect sensor. (Correct sensor has a YELLOW end cap)	• Unplug sensor and use a multimeter to check resistance of sensor pins is 50 – 70 Ohms. • Replaced with Farmscan Part No. AA-112P if faulty.
6.	UNSTABLE OR NO SPEED READOUT. (Can be checked by setting monitor to Distance and driving known distance)	Wheel magnet missing or incorrect distance from sensor.	• Ensure gap between sensor and magnet is 10 – 15mm.
		DISTANCE CALIBRATION FACTOR incorrect or zero.	• See Section 4.9 DISTANCE in manual.
		Break in wiring loom.	• Press the TEST button until DISTANCE TST is displayed. Disconnect wheel sensor from loom and short across pins of loom. Monitor will beep and count each time pins get shorted together if wiring and monitor OK. • If monitor does not count pulses check for breaks in the loom by shorting the White and Black wires together in the 9-pin break away plug and at the back of the monitor. • If no response directly at the monitor, return monitor for repair.
		Faulty or incorrect sensor. (Correct sensor is BLACK)	• Press the TEST button until DISTANCE TST is displayed and rotate the wheel. Monitor will beep and count each time wheel magnet passes sensor. • If no response unplug the wheel sensor and short pins of loom plug. • If monitor counts, replace sensor.

PROBLEM		CAUSE	REMEDY
6.	UNSTABLE OR NO SPEED READOUT. Cont'd.	Faulty or incorrect sensor. (Correct sensor is BLACK) cont'd.	• To test the wheel sensor, measure the continuity (resistance) of the sensor with a multimeter. The multimeter should show a closed circuit (short) only when the magnet passes the sensor. Replace with Farmscan Part No. AA-110P if faulty.
7.	INCORRECT AREA. (Note: Does not record hectares when "Monitor On Hold".)	Inconsistent speed.	• Drive at consistent speed and check that readout is fairly stable. If speed readout unstable see TROUBLESHOOTING 6 above.
		DISTANCE CALIBRATION FACTOR incorrect.	• See Section 4.9 DISTANCE in manual and ensure distance calibration factor measured correctly.
		WIDTH CALIBRATION FACTOR incorrect.	• Is machine not overlapping or under lapping. • Press CALIBRATE until WIDTH is displayed, using the ↑ ↓ keys enter realistic width.
		Jockey wheel making insufficient contact.	• Check if jockey wheel is bouncing excessively.
8.	GATE JAM WARNING (Reset the GATE JAM warning by pressing the CAL key then RATE key or by turning the monitor off and then on.)	Incorrect PULSE/KG factor. (Actuator moves using ↑↓ keys when stationary.)	• Check to see if actuator has stopped at full open or full closed position. • Check PULSES/KG calibration factor is correct, see SECTION 4.7 PULSE/KG FACTOR.
		Gate limits set incorrectly. (Actuator moves using ↑↓ keys when stationary.)	• If PULSE/KG factor is correct and target rate is realistic, check gate limits are set correctly. See SECTION 4.4 SETTING UP THE ACTUATOR.
		Gate jammed.	• Check the actuator has not jammed by removing the bolt at the base of the actuator and moving the gate by hand.
		Dirty or faulty plugs.	• Check the green 12-pin plug at rear of monitor is firmly inserted in to monitor. Check both the 9 pin breakaway plug and the 6-pin plug (near the actuator) have all pins fastened securely to wires (Pulling gently on wires will test). • Check contact quality of all pins, damaged or dirty pins will not give correct signal.
		No feedback from actuator. (The actuator will **ONLY** move **UP** or **DOWN** during ACTUATOR TST.)	• Press TEST on the monitor until ACTUATOR TST is displayed. Use the ↑↓ keys on the monitor to move the actuator, the monitor display should increase or decrease between values –917 & 20. • If values do not change then actuator feedback is faulty. • If actuator does not move then see TROUBLESHOOTING below.

PROBLEM		CAUSE	REMEDY
8.	GATE JAM WARNING cont'd.	No feedback from actuator....cont'd	Actuator only moves **UP** • Unplug the 6-pin plug at the actuator. The monitor should read a high value near 20. Short the BLACK and PURPLE wires together, taking care not to short the RED and BLACK wires together. • If the monitor reads a low value near -917 then return for repair or replace actuator with part A-122 if faulty. • If the value displayed does not change go to green 12-pin plug at the back of monitor, leaving actuator unplugged. Repeat test changes by shorting across pins 3 and 9 of 12-pin plug. • If there is no change in reading on the monitor then return the monitor for service. • If actuator test displays a value near -917 check wiring loom for breaks. Actuator only moves **DOWN** • Using a multimeter **ONLY** check for 12V between the RED and BLACK wires at the actuator plug. • If there is 12V, return actuator for repair or replace actuator with part A-122 if faulty. • If there is no 12V then go to green 12-pin plug at the back of monitor. Test for 12V between pins 8 and 9 of the green 12-pin plug. • If there still is no 12V then return monitor for repair. • If there is 12V then check the wiring loom for breaks.
		No Power to actuator.	• Connect BLUE and YELLOW wires from actuator (or use ACTUATOR TST cable supplied with kit) directly to battery. If actuator does not move, reverse wires. **WARNING: ACTUATOR WILL MOVE SUDDENLY.** • If actuator does not move return actuator for repair or replace actuator with part A-122 if faulty. • If actuator moves re-connect 6 pin plug to monitor, press TEST on the monitor until ACTUATOR TST is displayed. Pressing the ↑↓ keys will send 12V to the actuator along the BLUE and YELLOW wires.

PROBLEM		CAUSE	REMEDY
8.	GATE JAM WARNING cont'd	No Power to actuator cont'd.	Using a test light or multimeter test for 12V between the YELLOW and BLUE wires connected to the 12-pin plug at the back of the monitor when pressing the ↑↓keys. • If there is no 12V return the monitor for repair. • If there is 12V check for breaks in the YELLOW and BLUE loom wires.
9.	TOO MUCH OR TOO LITTLE PRODUCT USED.	Incorrect DISTANCE CALIBRATION FACTOR.	• See TROUBLESHOOTING 6 above.
		Incorrect AREA recorded.	• See TROUBLESHOOTING 7 above
		Incorrect PULSE/KG CALIBRATION FACTOR	• See SECTION 4.7 PULSE/kg FACTOR in manual.
		Incorrect gate limits set.	• Reset the gate limits. See SECTION 4.4 SETTING UP THE ACTUATOR.
		Gate operating at significantly different height to calibration height.	• Recalculate new PULSE/kg factor for new target. See SECTION 4.7 PULSE/kg FACTOR in manual.
10.	MANUAL OPERATION (Version 2 Only)	To bypass automatic rate application.	• Press the CAL key until PULSE/kg is displayed. Set the PULSE/kg CALIBRATION FACTOR to 0 using the ↑↓ keys. In operating mode the ↑↓ keys will now adjust gate height and display gate opening size on the screen.

7.1 Summary of Alarms

Alarm Type	Reference
GATE JAM	Section 3.6 page 14 Section 4.4 page 22
UNIT ON HOLD	Section 3.11 page 17
UNIT OFF HOLD	Section 3.11 page 17
RATE TOO HIGH	Section 3.6 page 14
RATE TOO LOW	Section 3.6 page 14
SPINNER SLOW	Section 3.3 page 11
TIMER EXPIRED	Section 3.9 page 16
BIN LOW	Section 3.14 page 20