



# Agri-Spread Spreader Controller Operation

RDS Part No.:	S/DC/500-10-XXX
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## **Electromagnetic Compatibility (EMC)**



This product complies with Council Directive 2004/108/EEC when installed and used in accordance with the relevant instructions.

## **IMPORTANT, READ THIS BEFORE USING THE PS8000i**

The *PS8000i* installation is a part of the Precision Farming System ("the System"). It is very important that you follow the described calibration procedures before operating the *PS8000i* instrument. Calibration and operation of the *PS8000i* must be in accordance with these instructions. Use of the System is subject to the following disclaimer;

1. So far as is legally permissible RDS Technology ("RDS"), or its distributors, shall not be liable, whatever the cause, for any increased costs, loss of profits, business, contracts, income, or anticipate savings or for any special, indirect or inconsequential damage whatsoever (death or personal injury excluded).
2. The capabilities and functions of the Precision Farming System ("the System") are limited as set out in the specification of the System, details of which are contained in the Help files and product literature and which must be read before using the System.
3. Without prejudice to the generality of the above it is hereby acknowledged that the System is not designed nor intended to a) originate variable treatment plans or b) achieve or avoid any application rate outside application parameters, which in both cases shall be the responsibility of the operator.
4. The standard terms and conditions of RDS (except clause 7), a copy of which is available on request, apply to the supply and operation of this System.

## **Service and Technical Support**

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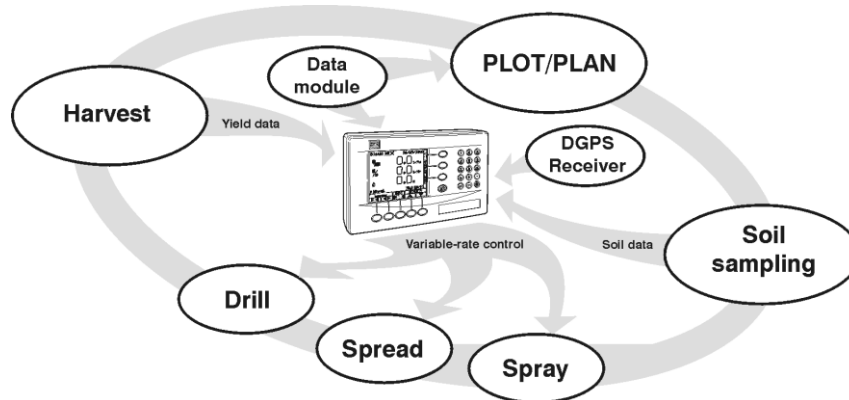
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## 1. Overview

### 1.1 The RDS Precision Farming System

The RDS *PS8000i* head unit is a fully DGPS compatible, multi-function cab computer for a wide range of applications and is the central component of RDS Precision Farming hardware (figure 1).

**Figure 1** The Pro-Series is the central component of RDS Precision Farming hardware



### 1.2 Installation and Inter-operability with other systems

An RDS control system comprises several component kits. This modular approach means that a suitable control system can be specified for a very wide range of implements. When re-configured with the appropriate control software, the head unit can be simply transferred between different implements.

The *PS8000i* can also output variable-rate instructions to other control systems including Vicon, Bogballe and Amatron systems, as well as acting on variable-rate instructions received from Fieldstar, Soy! Opti, Agrocom ACT, JD Greenstar, Raven and Hydro-N Sensor systems.

### 1.3 Control Software

Your *PS8000i* instrument is pre-loaded with "Apollo Fertiliser" spreader control software only.

With the purchase of a "secondary software module" - an electronic chip loaded into the back of the instrument, the Pro-Series can be instantly switched to perform another function e.g. from a Spreader Controller to a Data Logger for route navigation and soil mapping tasks. This is done from "Instrument Select" in the "USER OPTIONS" menu.

There are software modules for yield monitoring/mapping, route/soil mapping, variable-rate spreader control, variable-rate belt spreader control, variable-rate disc spreader control, and variable-rate seed drilling.

For information on connecting and configuring RDS PF hardware e.g. the Secondary Software Module, DGPS Receiver, cables etc, and data transfer to your PC, please refer to the "Data Logging and Transfer" manual.

### 1.4 Control System

#### Closed loop control

The Apollo Fertiliser *PS8000i* is a single channel controller, operating a control system comprising of a sensor to monitor the floor speed and a control valve to regulate the motor speed to the floor to enable closed loop control.

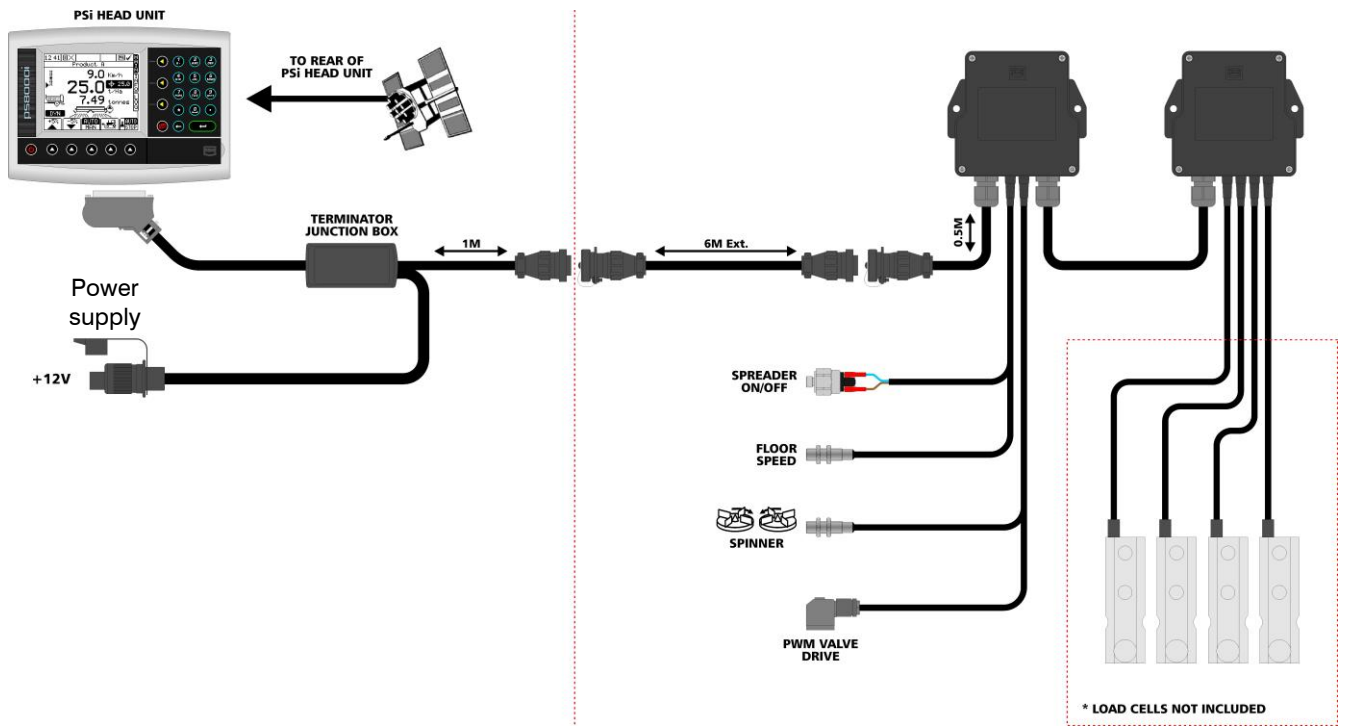
**Proportional control**

Also, forward speed measurement and cut out (in work or out of work) sensing enables full *proportional* control, i.e. to maintain a set application rate irrespective of forward speed (within limits).

The forward speed sensor may be fitted either to the tractor/self-propelled spreader or a trailed spreader. It may be either a simple magnetic sensor measuring wheel or propshaft rotation, or a radar sensor. Speed measurement via a GPS VTG message is also an option.

The cut out status is detected via a switch in the cab or by a hydraulic switch on the spreader.

**Figure 2** The 'Apollo FERTILISER' control system



**System configuration**

The *PS8000i* can be configured to accurately control any spreader, via a range of settings made in the calibration menu on initial installation. These settings are normally made by a technician, and should not need to be adjusted during normal operation. They are described in the separate Calibration manual supplied.

During normal operation, the operator needs only to set/calibrate the system for the product being applied. The operator can also 'fine-tune' the product calibration to account for variations in field conditions. These calibration procedures are described in this manual.

## **1.5 Spreader Control Modes**

### **1.5.1 Automatic Control Mode**

This gives fully automatic rate control. Floor Speed is automatically regulated as forward speed varies, to ensure that the actual application rate constantly matches a preset target rate. The application rate can be manually nudged up and down from the target rate as required for spot application in specific areas. Programmable alarms warn of high and low flow rates.

Field data ("job summaries") can be logged and are stored in the instrument memory. Up to 75 summaries can be stored. If you have a GPS receiver connected, as well as creating a job summary, you can also log the vehicle route and application data to a "dynamic log" file on the SD memory card. The job summary data is also appended to this file, which can be viewed using PC-based Precision Farming software programs.

### **1.5.2 Manual Control Mode**

This gives simple manual control of application rate, the floor speed can be manually controlled using an up or down arrow button. Field data ("job summaries") can be logged and are stored in the instrument memory. Up to 75 summaries can be stored.

### **1.5.3 VRT (Variable-rate treatment) Control Mode**

This enables the system to be controlled via treatment instructions prepared using PC-based Precision Farming software programs, in conjunction with DGPS position data. To enable fully automatic variable-rate treatment for Precision Farming applications, the *PS8000i* requires a suitable DGPS receiver and suitably formatted SD memory, card to implement treatment plans generated using PC-based Precision Farming software programs.

A work record file is automatically created on the SD card to log data confirming the actual treatment. The job summary data is also appended to this file, which can be viewed using PC-based Precision Farming software programs. Please refer to the "Data Logging and Transfer" manual Pt No. S/DC/500-10-573 for details of DGPS installation, setup and data transfer with the PC.

## 1.6 The Head Unit Keypad

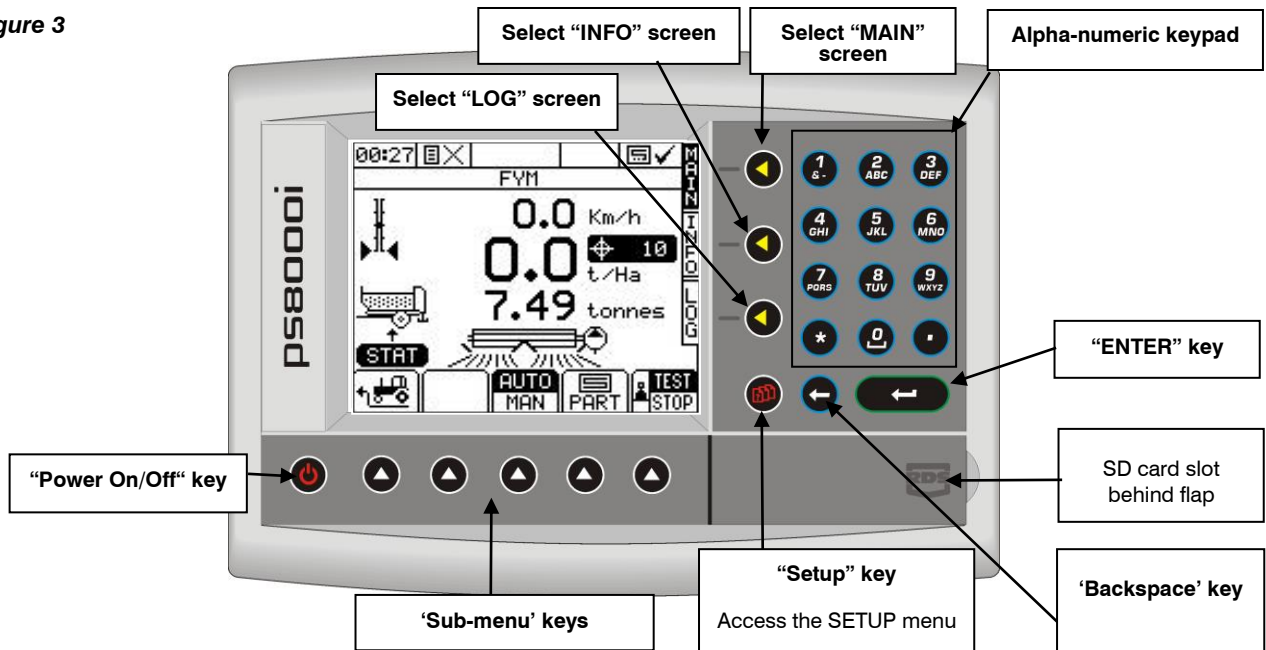
### 1.6.1 Menu keys

All instrument functions are accessed via the menu keys adjacent to the LCD display.


The four menu keys to the right of the screen (figure 3) access the primary screen pages (those viewed during normal operation). There are two primary screens, MAIN and INFO for normal operating functions, and a SETUP screen for calibration functions.

The five sub-menu keys below the screen control the various display functions and settings for each of the primary screen pages. Text or icons are displayed adjacent to the sub-menu keys to denote their function.

Figure 3





### 1.6.2 Startup


Press the  key. The startup screen, which shows the software version, will display for about 8 seconds then the MAIN screen is displayed.


### 1.6.3 Data Entry

Alpha-numeric values are entered via the right-hand keypad. You must press the key from 2 to 5 times to select the required letter. (Some keys have additional special characters not shown on the key legend).

The  key will either toggle between lower and upper case characters, or when preceding a numerical entry, sets a MINUS value.

The  key will toggle between 0 and a SPACE.

The  key will BACKSPACE the screen cursor if you need to re-enter a character.

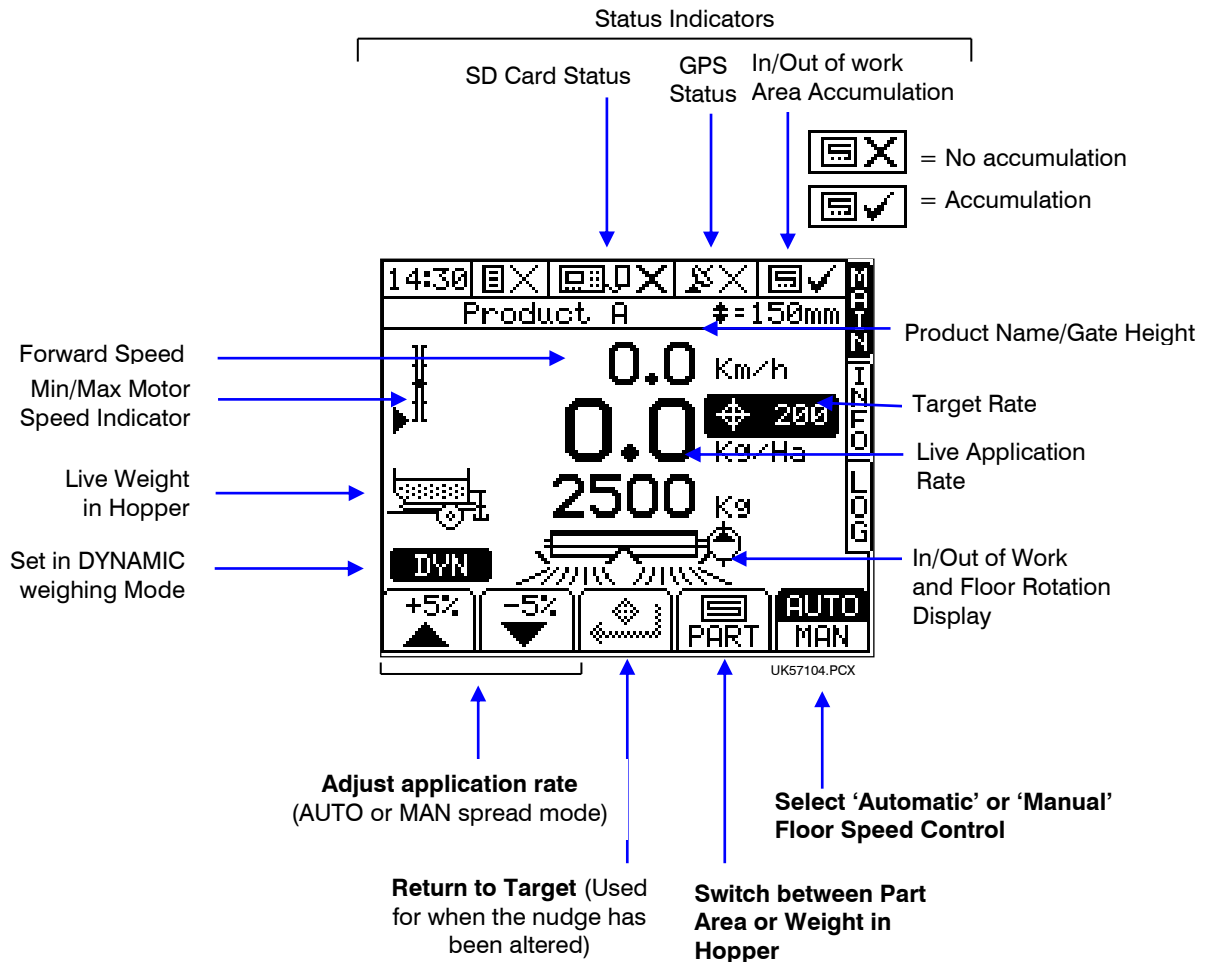
The  key is the ENTER key and is normally pressed to confirm the data entry into memory.



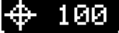
### 1.7 The MAIN screen page

The instrument will always default to the MAIN screen on startup. The MAIN screen displays the following information.

Figure 4



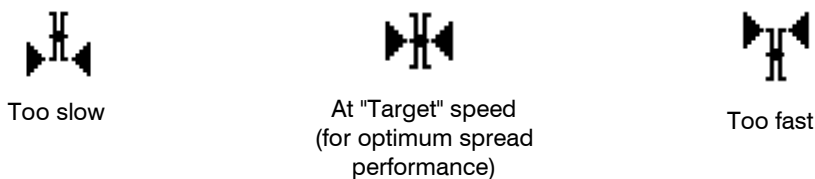
#### 1.7.1 Target Rate Indicator

The target rate is displayed by the  graphic in 'AUTO' spread mode. If the application rate has been adjusted above or below the target rate, then the target rate will be flashing.

There is no target rate icon in 'MAN' spread mode.

#### 1.7.2 Min/Max Motor Speed Indicator

The Spread performance Indicator shows the motor speed within the minimum and maximum parameters set for the motor speed range. The "Target Speed" is at the middle of the speed range.

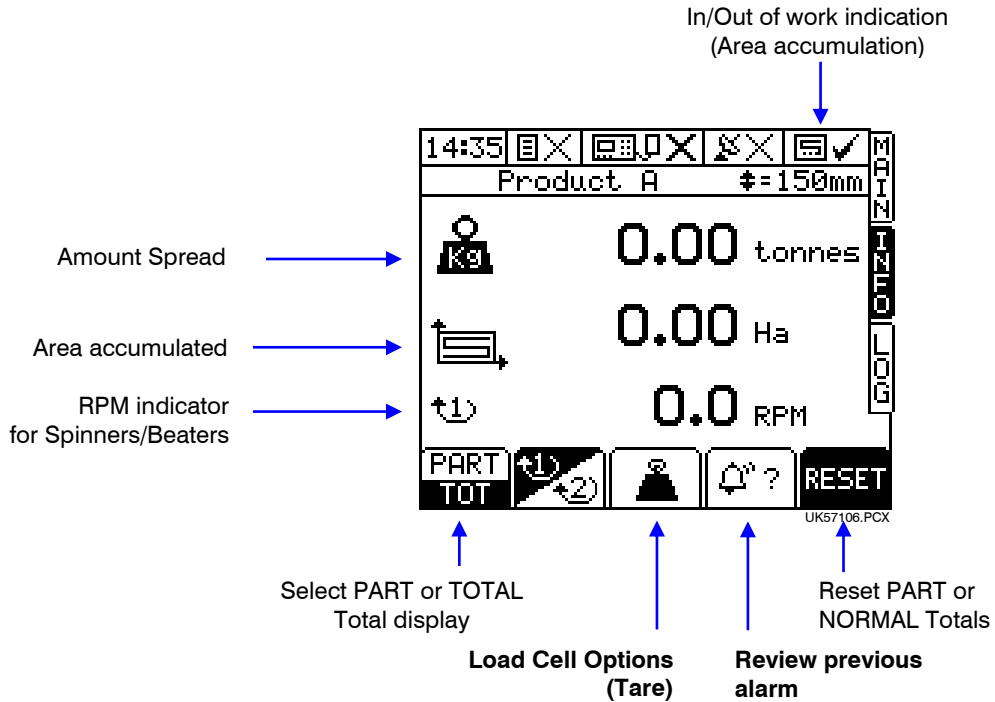


If the target motor speed is output of this range then the system will alarm that the forward speed is either too high or too low.

### 1.8 The INFO screen page

Additional work measurement functions are displayed on this page.

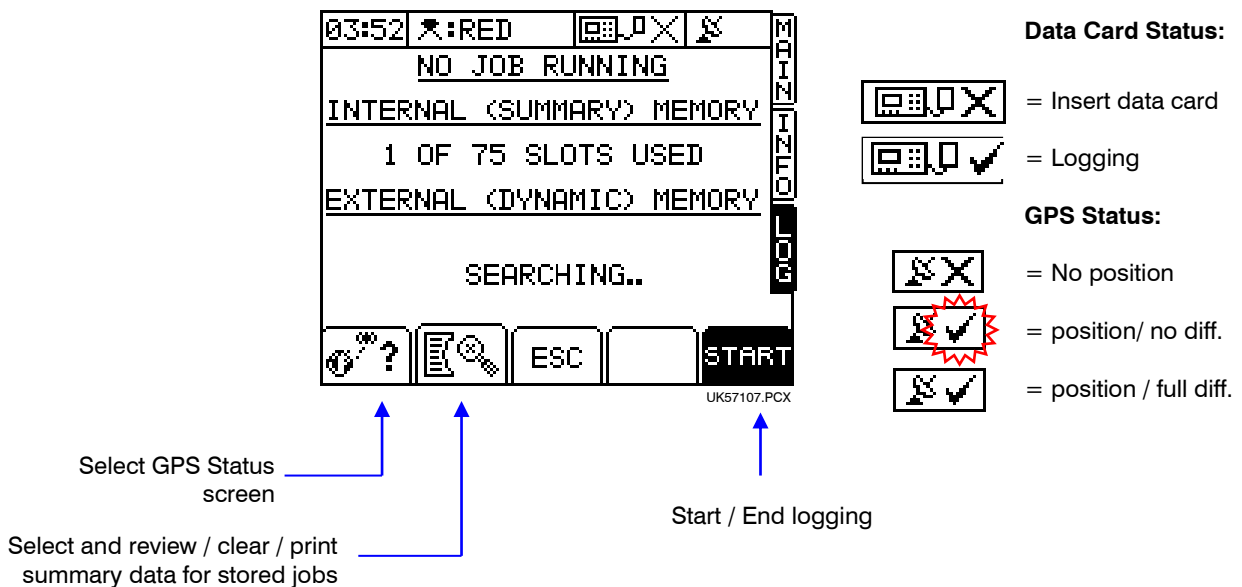
Figure 6 The INFO screen



### 1.9 The LOG screen page

This page controls data logging (Field Summary data), and P.F. functions, and data transfer (e.g. printing a job summary).

Figure 7 The LOG screen



Please refer to the "Data Logging and Transfer" manual for further information.

### 1.10 The SETUP screen page


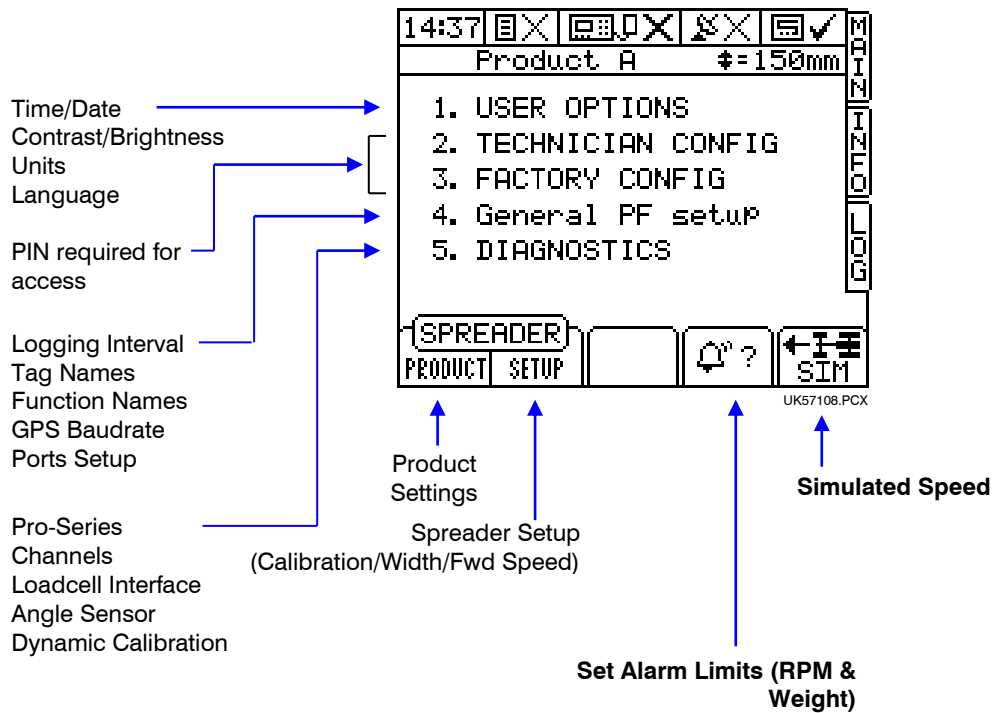
The  key selects the SETUP menu for calibration factors and calibration settings specific to particular products being spread and nozzle types fitted.

Figure 8 The SETUP screen



You should not need to enter menus 1, 2 and 3 in normal use. These settings are generally made only on initial installation. Menus 2 and 3 can be protected with a personalised PIN number to prevent unauthorized access. Calibration settings that need to be changed during normal use are shown on figure 8.

### 1.11 Units

Information can be displayed in Metric or Imperial units by selecting the desired option via the SETUP menu.

Function	Units	
	Metric	US Imperial
Forward Speed	km/hr	miles/h
Application rate	kg/ha tonnes/ha	lbs/acre tons/acre
Part/Total Area	hectares	Acres
Tank volume/ Part/Total volume applied	Tonnes	lbs

## 2. Operation

### 2.1 Product presets

You can select any one of up to eight different product presets via the 'PRODUCT SELECTION' screen. For each preset, you can programme the product name and individual settings, or perform/adjust the volume calibration as follows,

#### 2.1.1 Selecting a product




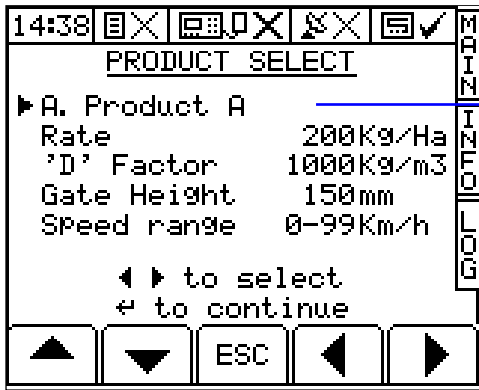
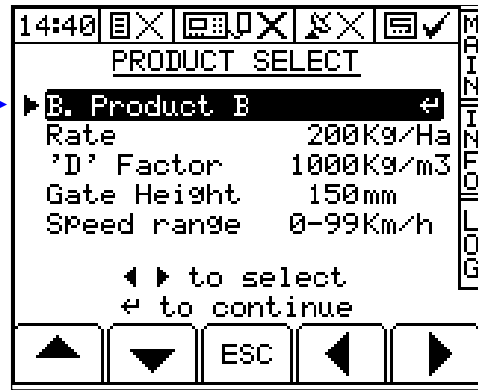
1. Press the  key and then press the  key (fig. 8).
2. Select the product using the arrow keys (default names are 'Product A' to 'Product H') and press  to confirm.

Figure 14a



UK57114A.PCX

Figure 14b



UK57114B.PCX

3. Press the MAIN key to return to the "MAIN" screen page.

#### 2.1.2 Editing a product name

The 8 default product descriptions are 'Product A' to 'Product H'.

From the 'USER OPTIONS' menu, select 'CUSTOMISE' and then select 'EDIT PRODUCT NAMES'.

Select the product name using the arrow keys, and edit the name using the alpha-numeric keypad. Pressing the \* key will switch between upper and lower case characters.

#### 2.1.3 Programming a product 'D' factor

The D factor is the calibration factor that is altered while the spreader is dispensing product. It stands for the product Density, the weight of 1m<sup>3</sup> of product in Kg. While spreading, this number will be automatically updated to suit the current product, the system will then automatically compensate in order to maintain the correct application rate and spread performance.

**NOTE:** In normal circumstances the D factor should be anywhere between 450 kg/m<sup>3</sup> and 1500 kg/m<sup>3</sup>. As the system will automatically calculate this number based on the load cell readings it is usually not necessary to modify it unless starting to spread a new unknown product.

#### 2.1.4 Gate Height

The gate height for the selected product is displayed here.

Note: When a new product is selected on the Product Select screen the instrument will prompt the operator to re-confirm the spreader gate height.

#### 2.1.5 Speed Range

The operating speed range for the selected product is displayed here. This is defined by the characteristics of the minimum and maximum floor speed, gate height and product calibration factor. The auto calibration will attempt to calculate a gate height that allows the target forward speed to be in the middle of this range.

## 2.2 Automatic Rate Control



Select 'AUTO' from the 'MAIN' screen. The flow rate will be automatically adjusted as forward speed and/or applied width varies, to ensure that the application rate constantly matches the preset target rate.

### 2.2.1 Setting the Target Rate

From the "MAIN" screen simply key-in the desired target rate and press .

### 2.2.2 Overriding the Target Rate

1. Press to override the target rate.

The preset target rate can be overridden in  $\pm 5\%$  steps while spreading, e.g. boundaries or other crop conditions.

While overridden, the target rate indicator will flash.

2. Press to return to the target rate.

The instrument will automatically alarm if the application rate cannot be maintained within a specified % of the target rate (the % band is programmed via the 'Alarm Setup' screen in the Setup MENU).

When the alarm threshold is reached, the instrument beeps, and an alarm screen displays the message "UNDER APPLICATION" (e.g if the forward speed is too high), or "OVER APPLICATION" (e.g. if the forward speed is too low).

Pressing any of the lower 'OK' keys will cancel the alarm screen and return to the 'MAIN' operating screen.

**NOTE:** *If you continue spreading at the same speed, the instrument will not automatically re-alarm. It will however, re-alarm if the spreader is switched off and back on again.*

## 2.3 Manual Rate Control



You do not normally need to select this mode, however in the event you experience a problem with automatic control (if for example the forward speed sensor had stopped working), you can still control the application rate manually.

Select 'MAN' from the 'MAIN' screen. To maintain the required application rate, you must maintain a constant forward speed. You can also log and store field data ("job summaries") as you go, and print them out or download them to a PC or printer when convenient.

Press to adjust the application rate.

**NOTE :** *The speed range indicator functions as normal, however there is no forward speed or rate alarm in manual mode.*

## 2.4 Beginning Work

Ensure that the instrument is on the main screen, and that AUTO mode is selected. Turn on tractor hydraulics and engage the spinner drive. Turn on the CUTOUT SWITCH (red button) located by the instrument. Start the spreader moving and the belt will begin to turn. The MAIN screen will now display an instantaneous application rate, and area accumulation will begin.

The floor speed will now be related to forward speed, if the forward speed doubles then so will the floor speed.



= Out of Work (No accumulation)

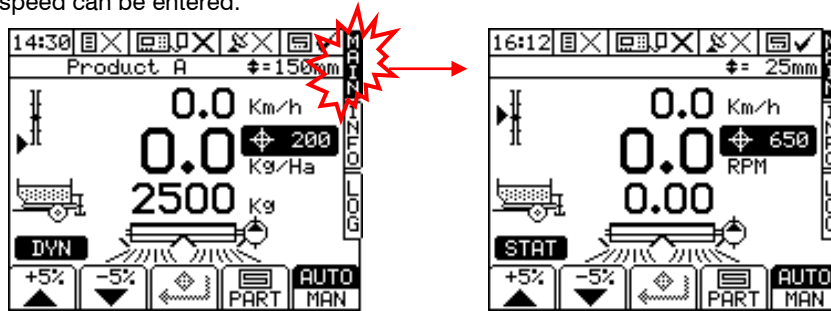


= In Work (Accumulation)


To turn the spreader off, turn off the cutout switch. The floor belt will stop turning and the area accumulation will stop.

## 2.5 Setting Spinner Speed


The Spinner Speed can be controlled by the system. From the MAIN Page, press the MAIN button and the screen will change to RPM Control. Using the keypad in the same way as setting the application rate, the spinner speed can be entered.



## 2.6 Tare Load Cells

As product and debris builds up on the spreader, it is important to tare or remove this debris to ensure that what is loaded in the spreader hopper each time is an accurate reading. This can be achieved by entering the INFO page and selecting the Weighing icon  in the centre of the page.



Using the  key, this will set the live hopper weight back to 0kg. It is important however not to do this while there is still product in the main body of the spreader, only for discounting product that is stuck to the chassis or the mud flaps.


## 2.7 Part / Total Accumulation and RPM display

You can record the area and volume spread for a particular job using the "PART" Total function. In addition the area and volume will be recorded to the "TOTAL" memory register.

Select the "INFO" screen to display the accumulated totals and the RPM display.



 Select 'PART' to display the Part Area and Part Volume accumulation,

 Select "TOTAL" to display the Total Area and Total Volume accumulation.

### 2.7.1 Reset Totals

Select the "PART" or "TOTAL" display.

Press the **RESET** key.

Press  to zero the totals or press **ESC** to return to the "INFO" screen.


## 2.8 Alarms

There are a number of alarms, most being programmable by the operator. Note that setting alarm limits to zero will disable that alarm function.

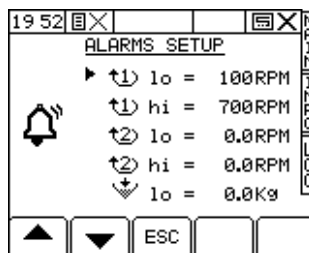
Press any of the lower 'OK' keys to cancel an alarm and return to the MAIN screen.

<b>Application Rate</b>	'UNDER APPLICATION' 'OVER APPLICATION'	This alarm is based on % variance from the target rate. It therefore alerts the operator to speed up or slow down until the alarm condition is cancelled.  The limits can be set by the operator on the ' <b>Alarms Setup</b> ' screen in the SETUP menu. The default limits are $\pm 20\%$ of the target rate.
The following alarms can also be configured if so desired, but would normally be overridden by the application rate alarm if set (except for RPM alarm). The limits must be set in respect of flow sensor capacity / spread performance.		
<b>Forward Speed</b>	'FORWARD SPEED LOW' 'FORWARD SPEED HIGH'	The limits can be set by the operator on the ' <b>Alarms Setup</b> ' screen in the SETUP menu.
<b>RPM</b>	'RPM LOW' 'RPM HIGH'	The limits can be set by the operator on the ' <b>RPM Setup</b> ' screen in the SETUP menu.

### 2.8.1 Setting the Alarm thresholds

1. Press  to select the "SETUP" menu.

2. Select the "ALARMS SETUP" button at the base of the screen .




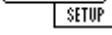
3. Select the appropriate alarm threshold using the arrow keys, and enter the value via the numeric keypad.

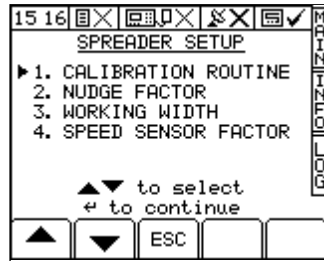
### 3. Calibration

#### 3.1 Product Calibration

Each product has its own calibration memory, so select the product that you wish to spread initially and then if it is the first time that this product is being spread, follow the calibration routine as per below.

##### 3.1.1 Spreader Setup Page

1. Press the  key and then press the  key (fig. 8).



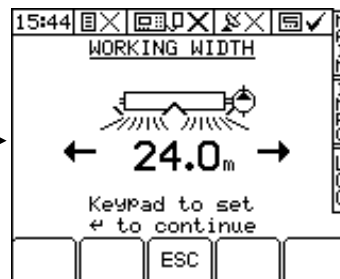
#### 3.2 Calibration Routine

Before spreading a product for the first time you need to establish an initial calibration factor for that product. Using the calibration procedure below the instrument will calculate the required gate height to achieve the target application rate given the target forward speed and product density.

Select Calibration Routine:



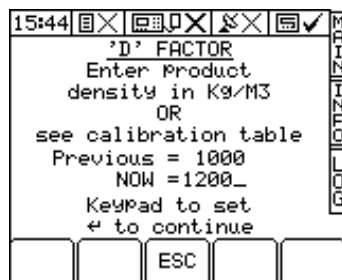
Enter Target Spread Rate



Enter Spreading Width



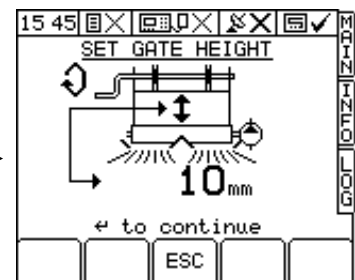
Enter Product Density in Kg



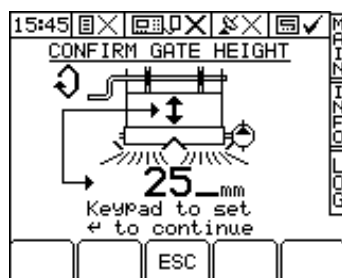
Use keypad to type in kg weight of 1m<sup>3</sup> of product



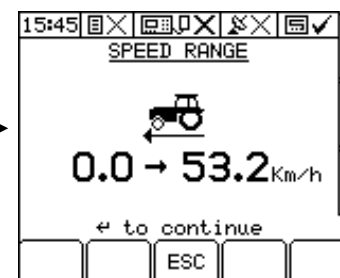
Enter Target Forward Speed



System will inform at what height to set the rear gate



Confirm this height or edit figure to actual gate height preferred



System will then inform operator of the forward speed range

System and Product now calibrated.



### 3.3 Nudge Factor

If the actual amount dispensed over the course of a hopper load is different from the theoretical amount dispensed (calculated by the instrument - displayed on INFO screen) then it is possible to nudge the calibration factor. The nudge procedure will adjust the 'D' factor by a percentage based on the variation between the actual amount and theoretical amount of product dispensed.

Example: The target application rate was 50kg/ha and over 1 ha the spread dispensed 55 kg. the product 'D' factor was 1200kg/m3.

Enter the target weight in kg: 50 and press enter

Enter the actual weight in kg: 55 and press enter

The instrument then displays

OLD CAL factor: 1200



NEW CAL factor: 1320


Error: 10%

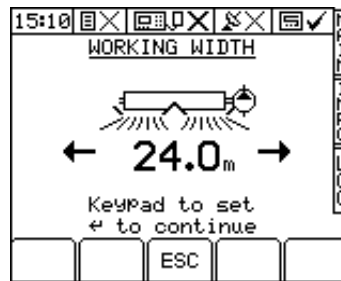
To accept the new CAL factor press enter.


### 3.4 Working Width

To set the working width of the system to ensure that the application rate and the accumulated area is correct -

Press the  key and then press the  key.

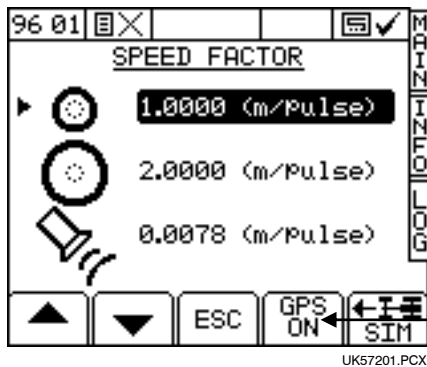
Select 1. Working Width from the menu and confirm using the  key.



Using the number keypad, the width can be programmed and then confirmed using the  key.

### 3.5 Forward Speed Sensor

#### 3.5.1 Select Sensor Option




Wheel Sensor - for flotation tyres

Wheel Sensor - for (larger) row crop wheels

Radar Sensor / RDS 'Satspeed' Interface

DGPS input (this option only appears when top port is configured for GPS input)

2. Move the arrow cursor to select the option and press  to confirm.


### 3.5.2 Wheel sensor calibration – ‘Autocal’


If the Spreader has a standard wheel sensor and magnets installed, you can programme the instrument with two speed sensor factors - for flotation tyres and for row crop wheels. Remember to select the appropriate factor after changing wheels.

The Speed Sensor Factor ("SSF") is the distance travelled forward in the time between two pulses from the forward speed sensor. This could be calculated based on the nominal tyre diameter or rolling distance and then entered manually (ref. section 1.1.3), however this does not take into account wheel slip, compaction, or tyre deformation under practical operating conditions.

The best method is to do an "Auto Cal".

Mark a set distance of 100 metres (or 100 yards depending on the units set on the instrument) by suitable means. The surface should be representative of the average field conditions (i.e. not a paved surface). Position the vehicle with the first marker level with a suitable reference point on the vehicle.

With the appropriate sensor option highlighted on the "SPEED FACTOR" page, press ENTER, then select "Auto Cal". Press  and then follow the screen instructions.

Stop the vehicle when the second marker lines up with the pre-determined reference point on the vehicle and press  to end the "Auto Cal" procedure. The Speed Sensor Factor is automatically re-calculated and stored in memory.

**NOTE:** If you overrun the marker, do not simply reverse - repeat the "Auto Cal" procedure from the beginning.

### 3.5.3 Wheel sensor calibration - manually calculating the Forward Speed Factor

The smaller the speed sensor factor the better the speed update will be. Aim for a factor less than 2.000 m (78.78").

**NOTE:** Perform the following calculations in inches or metres depending on whether the instrument is set for Imperial or Metric units. If you calculate the factor using any other unit of measurement e.g. feet or centimetres, the forward speed display will be incorrect.

- (i) **To Calculate**, Manual Speed Sensor Factor =  $\frac{\text{Circumference Of Wheel}}{\text{Number of Magnets}}$

#### **Example Calculation**

A vehicle is fitted with a 5 magnets on the wheel hub, the diameter of the tyre is 1.36 metres and therefore the circumference of the tyre is 4.272m

1. Convert the diameter to circumference :-  $1.36 \times 3.142 = 4.272$
2. Divide by 5 (magnet pulses) to give the calibration factor:-  $4.272 / 5 = \underline{0.854}$
3. Programme the factor '0.854' as the speed sensor factor.

### 3.5.4 Radar Sensor

If an RDS Radar sensor is installed at the correct angle of  $37 \pm 1^\circ$ , the Speed Sensor Factor is **0.0078** m (or **0.312** inches). It is still recommended to do an 'Autocal' since the sensor may not be mounted exactly at  $37^\circ$ .

### 3.5.5 RDS ‘Satspeed’ Interface / NMEA VTG Input

No calibration is necessary.

## 4. Dynamic & Static Calibration

### 4.1 Dynamic Calibrations

The Apollo can display actual hopper contents as measured by a series of load cells fitted to the spreader. This weight reading will be a live display on the MAIN page. Weight applied, as displayed on the INFO page, will remain as a theoretical weight calculated from the floor belt speed and the material CAL factor.

The change in actual weight can be used to retrospectively correct the calibration factor using either a static or dynamic calibration routine.

The Apollo receives weight information via a Loadcell Interface located on the spreader. The Loadcell Interface sends an electrical signal to the instrument via a CAN Bus which is then converted into a weight reading. The Loadcell Interface also includes a dual axis inclinometer, which is used to record the angle of the spreader relative to the ground.

When the spreader is traveling in the field the instrument applies a software filter to remove fluctuations in the weight reading. The filter is inactive when the machine is stationary.

### 4.2 Operation

The instrument MAIN screen will display a weight reading as below.



Press the weight button to display the weighing options page.



The weighing option screen displays the current forward speed and current weight in the spreader.

**TARE -** With the hopper completely empty and the machine stationary on level ground, use the TARE button to set the displayed weight to zero.

**DYN/STAT -** The Pro-Series will use the loadcells to adjust the calibration of the system. This can be done in STATIC or DYNAMIC mode but the system should normally be left in DYN.

The static calibration can be carried in two ways. The first method involves spreading the product out over a required distance, the vehicle spreader must be stationary at the start and end of the test. The second method involves setting a simulated forward speed and then unloading the product back onto the fertiliser pile.

Using the dynamic procedure the instrument will take weight reading over a given time period whilst the machine is moving in the paddock.

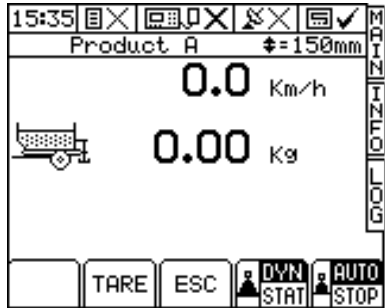
Static Calibration is more accurate, however it requires operator intervention. The initial calibration of a new product or different door opening must be carried out in Static mode.

Dynamic Calibration is continuous and requires no operator input. If the spreader is working over very rough terrain, then dynamic calibration should not be used. In normal field conditions, the software filter will reduce the effects of bouncing in the field.

### 4.3 Dynamic Weighing

When dynamic calibration is selected on the weighing option page, the instrument will automatically re-calibrate the CAL factor with operator intervention.

Choose DYN and AUTO on the weighing options page. The following screen is displayed.



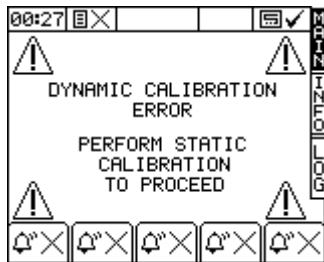
Now start work. To stop the Dynamic Calibration at anytime press STOP.

The dynamic test will be aborted when the spreader is switched off at the headlands and to avoid weighing errors when turning. It will be restarted some seconds after the spreader has been switched again.

A dynamic test will not correct the calibration factor if the test has run for too small a quantity of material, too short a time period, if excessive weight fluctuation is recorded or if the suggested correction is greater than a certain difference. For more information see LOADCELL CORRECTION.

Dynamic calibration is not effected by re-loading. When the instrument is switched off, the dynamic calibration is also turned off and must be re-enabled next time the instrument is turned on.

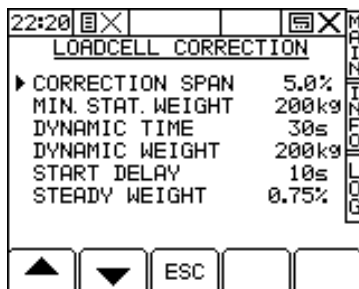
If there is an error between the newly calculated CAL factor and the old CAL factor that is greater than a set limit, the instrument will display the following alarm.



It is recommended to run a static test if the Dynamic Calibration error appears.

### 4.4 Loadcell Correction

The loadcell correction page is accessed from the Technical Config screen.



On this screen the technician can configure the operation of the load cells for calibration purposes.

**CORRECTION SPAN** – dynamic calibration will not change the calibration factor if the error is greater than this percentage set.

**MINIMUM STATIC WEIGHT** – the distance required for the static calibration is calculated based on this minimum weight change required (both actual and theoretical).

**DYNAMIC TIME** – this is the period for each dynamic test. The calibration factor is updated every 30 seconds.

**DYNAMIC WEIGHT** – the dynamic test will not end until at least this weight has been spread (actual and theoretical) or until the time period has elapsed.

**START DELAY** – this is the time delay between starting a new bout and the dynamic test starting. This allows for the spreader to reach a normal, smooth operating speed.

**STEADY WEIGHT** – if a weight fluctuation is seen above this level, the weight reading is considered 'unstable' and a dynamic test will be aborted.

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Original issue

## **Gate height Settings for Agrispread Apollo Computer**

### **Gate heights for EFC09230 Valve set up**

**Gate heights given are a guideline for initial set up.** Use this as a guideline for initial start-up. As shown below, with the amount of variables involved it is necessary to test your settings to insure the product is being spread to the correct rate and to the correct width. Oil temperatures should be monitored to insure the tractor pump is operating to normal working conditions.

**See Page 9 of operators manual to see Forward speed indicator. This shows min and max forward speed indicator in relation to your valve set up, door height set and oil flow. Good indicator of weather the door height needs resetting in relation to other factors.**

By reducing any items from C through G, the oil flow required is reduced

### **General Notes:**

1. Based on tractor oil flow of 100 litres per minute
2. Door heights are a combination of
  - A. Oil flow on tractor available
  - B. Oil pressure on pump
  - C. Spinner speed required
  - D. Density of material being spread
  - E. Forward speed
  - F. Spread width
  - G. Rate being spread
3. Based on Dual Brand Valve hydraulic set up. (EFC09230)
4. Spinner Motor: 80cc 2K (104-1503-006)
5. Floor Motor: 130cc 2k (104-3265-006)
6. If oil flow on tractor is less than 100 litres per minute increase door height until rate is obtainable with spinner speed and forward speed
7. If there is more than 100 litres of oil available then the door heights can be reduced if required. This needs to be checked on product being spread. Oil flow as shown above is only one factor.

# Density 700 kg m<sup>3</sup>

Rate					Rate					Rate				
25kg per hectare					25kg per hectare					25kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	30	25	20	15	door height (mm)	12	10	8	6	door height (mm)	4	4	4	4
Rate					Rate					Rate				
50kg per hectare					50kg per hectare					50kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	60	50	40	30	door height (mm)	24	20	16	12	door height (mm)	8	8	7	6
Rate					Rate					Rate				
100kg per hectare					100kg per hectare					100kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	114	95	76	57	door height (mm)	45.6	38	30.4	22.8	door height (mm)	15.2	15.2	13.3	11.4
Rate					Rate					Rate				
150kg per hectare					150kg per hectare					150kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	171	142.5	114	85.5	door height (mm)	68.4	57	45.6	34.2	door height (mm)	22.8	22.8	19.95	17.1
Rate					Rate					Rate				
200kg per hectare					200kg per hectare					200kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	\	190	152	114	door height (mm)	91.2	76	60.8	45.6	door height (mm)	30.4	30.4	26.6	22.8
Rate					Rate					Rate				
250kg per hectare					250kg per hectare					250kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	\	\	190	143	door height (mm)	114	95	76	57	door height (mm)	38	38	33.25	28.5
Rate					Rate					Rate				
300kg per hectare					300kg per hectare					300kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	\	\	228	171	door height (mm)	171	142.5	114	85.5	door height (mm)	57	57	49.875	42.75
Rate					Rate					Rate				
350kg per hectare					350kg per hectare					350kg per hectare				
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	850	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700	density of material kg m3	700	700	700	700
door height (mm)	\	\	\	\	door height (mm)	\	190	152	114	door height (mm)	76	76	66.5	57



AgriSpread Gate Height settings for EFC09230

Density 1000 kg m3

Rate	25kg per hectare				Rate	25kg per hectare				Rate	25kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	20	17	14	10	door height (mm)	8	6	5	4	door height (mm)	4	4	4	4
Rate	50kg per hectare				Rate	50kg per hectare				Rate	50kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	40	34	28	20	door height (mm)	16	12	10	8	door height (mm)	8	8	8	8
Rate	100kg per hectare				Rate	100kg per hectare				Rate	100kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	48	40	32	24	door height (mm)	28	23	19	14	door height (mm)	14	12	10	7
Rate	150kg per hectare				Rate	150kg per hectare				Rate	150kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	72	60	48	36	door height (mm)	42	34.5	28.5	21	door height (mm)	21	18	15	10.5
Rate	200kg per hectare				Rate	200kg per hectare				Rate	200kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	\	160	64	48	door height (mm)	\	46	38	28	door height (mm)	\	24	20	14
Rate	250kg per hectare				Rate	250kg per hectare				Rate	250kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	\	200	80	60	door height (mm)	\	57.5	47.5	35	door height (mm)	\	30	25	17.5
Rate	300kg per hectare				Rate	300kg per hectare				Rate	300kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	24	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	\	\	96	72	door height (mm)	\	86.25	71.25	52.5	door height (mm)	\	45	37.5	26.25
Rate	350kg per hectare				Rate	350kg per hectare				Rate	350kg per hectare			
forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15	forward speed (kph)	30	25	20	15
spread width (meters)	36	36	36	36	spread width (meters)	24	24	24	850	spread width (meters)	12	12	12	12
spinner revs	970	970	970	970	spinner revs	850	850	850	850	spinner revs	700	700	700	700
density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000	density of material kg m3	1000	1000	1000	1000
door height (mm)	\	\	112	126	door height (mm)	\	115	95	70	door height (mm)	\	60	50	35



AgriSpread Gate Height settings for EFC09230

Density 1400 kg m<sup>3</sup>

Rate	1000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	70	70	70	60

Rate	1000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	12
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	70	70	60	50

Rate	1000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	60	50	50	50

Rate	1500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	100	90	70	70

Rate	1500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	12
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	80	70	70	70

Rate	1500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	70	70	70	60

Rate	2000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	140	120	90	70

Rate	2000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	12
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	110	90	70	70

Rate	2000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	80	70	70	70

Rate	2500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	170	150	120	90

Rate	2500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	12
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	130	110	90	70

Rate	2500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	80	70	70	70

Rate	3000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	180	160	130	100

Rate	3000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	12
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	150	130	100	80

Rate	3000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	100	80	70	70

Rate	3500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	200	160	120

Rate	3500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	650
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	180	150	120	90

Rate	3500kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	130	110	90	70

Rate	4000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	\	180	120

Rate	4000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	650
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	180	140	110

Rate	4000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	130	100	80

Rate	5000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	14	14	14	14
spinner revs	700	700	700	700
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	\	220	160

Rate	5000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	12	12	12	650
spinner revs	650	650	650	650
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	\	170	130

Rate	5000kg per hectare			
forward speed (kph)	30	25	20	15
spread width (meters)	9	9	9	9
spinner revs	500	500	500	500
density of material kg m3	1400	1400	1400	1400
door height (mm)	\	160	130	90