

SPREADER CONTROL SYSTEM V 3.905

INSTALLATION AND OPERATION MANUAL

Covering Versions 3.90 to 3.905

Revision 9
05 October 2007



System Overview

The controller measures the speed of the vehicle, using a sensor on the speedometer cable, and adjusts the conveyor speed to maintain the correct spread rate.

This control system uses a motorised hydraulic Control Valve to regulate the speed of the Spreader Conveyor.

If the vehicle has Spinner Control then the same type of valve is used to regulate the Spinner Speed.

If the vehicle is equipped with a Blower then the same type of valve may be used to perform blower ramp up (soft start).

The system also records information on the Off road distance driven, Spread distance driven, Area Spread, and Amount of fertiliser spread. This information can be displayed or printed when the job is completed.

The Control Panel.

A small hand-held control box located in the vehicle cab.



Button Functions

All the front panel buttons serve more than one purpose. This will be explained later.

The lights above buttons 3 to 6 indicate the current state of the Spinner , blower etc.. as labelled.

<u>Main Function</u>	<u>Additional Function.</u>
1) Spinner Increase.	- Menu Page Selection.
2) Spinner Decrease.	- Menu Page Selection.
3) Spinner On/Off.	- Options Menu Select. (Long Press)
4) Blower On/Off.	- Settings Menu Select. (Long Press)
5) Auto/Manual.	- Data Menu Select. (Long Press)
6) Conveyor On/Off.	- Status Menu Select. (Long Press)
7) Spread Decrease.	- Value Change Decrease.
8) Spread Increase.	- Value Change Increase.

Power On Messages

When power is switched on the control panel will give one short beep, then the following message will be displayed.

**PLEASE WAIT FOR
COMPUTER STARTUP**

The control computer will now begin operation and the following messages will be displayed.

**SPREADER CONTROL
SYSTEM V3.905**

The main control screen will now be displayed.

**SPINNER
1000**

**SPREAD
250**

The Control System is now ready for **normal use**.

The value shown below SPINNER is the spinner SPEED in Revs Per Minute.

The value shown below SPREAD is the spread RATE in Kilograms Per Hectare.

Note : The actual values shown below **Spinner** and **Spread** will be the **last settings** used before the system was **switched off**.

Basic Operation

Use the **SPINNER** and **SPREAD increase** and **Decrease** buttons to select the appropriate **Speed** and **Spread Rate** as desired.

SPINNER 1500	SPREAD 750
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Automatic Operation

When operating in Automatic, the conveyor speed will automatically adjust to suit the vehicle speed to maintain the correct spread rate.

Manual Operation

If you need to run the conveyor with the vehicle stationary, you must select **MANUAL** operation. (*The AUTO Light OFF*).

When you do, the controller assumes that the vehicle is moving at a **SIMULATED VEHICLE SPEED**, this being the **MANUAL SPEED** setting. This setting will determine the rate at which the conveyor will move.

Clutch Switch

On systems that use a PTO driven pump, a hydraulic clutch switch is fitted. The hydraulic system is **switched off** when the **Clutch Pedal** is depressed.

If the clutch pedal remains held down then the Spinners, Conveyor and Blower (**if fitted**) will stop until it is released.

Remote Start/Stop Switch

This switch can be either a non-latching push button or a spring return toggle switch.

The switch will turn the **conveyor** on and off but will not allow access into the **status menu**.

Display Symbols

There are 4 symbols that can appear beside the Spinner and Spread values.

These provide information about the decisions being made by the control system.

- + The Spread Rate is low by greater than 4 times the acceptable error limit.
- - The Spread Rate is high by greater than 4 times the acceptable error limit.
- < The **Spread Rate is TOO HIGH**. The conveyor can not move fast enough to **Accurately** deliver the requested spread rate at the current vehicle speed. When this occurs, the beeper will sound once per second while the conveyor is switched on. To fix this problem either **open the Gate more** or **travel at a slower speed**. The control computer has determined that the selected spread rate cannot be reliably achieved with the current settings.
- > The **Spread Rate is TOO LOW**. The conveyor can not move slow enough to **Accurately** deliver the requested spread rate at the current vehicle speed. When this occurs, the beeper will sound once per second while the conveyor is switched on. To fix this problem either **close the Gate more** or **travel at a faster speed**. The control computer has determined that the selected spread rate cannot be reliably achieved with the current settings.
- ? **End of valve adjustment**. The control valve has moved to the full open position and the correct conveyor speed has not been reached. There is possibly a system fault. When this occurs, the beeper will sound once per second until the problem is resolved.

Important Considerations

The GATE height setting should be changed to suit the job.

If you leave the GATE HEIGHT set TOO SMALL you will NOT BE ABLE to spread HIGH RATES.

If you leave the GATE HEIGHT set TOO LARGE you will NOT BE ABLE to spread LOW RATES.

IDEALLY the operator should **TRY** to set the **GATE HEIGHT** to allow the **CONVEYOR** to operate at **ABOUT HALF SPEED** when travelling at the intended **VEHICLE SPEED**, but **this may not always be possible**. This will allow the conveyor speed to be controlled with good **accuracy** while leaving plenty of scope for speed **increases** and **decreases**.

SPREAD RATE TOO LOW occurs when the **SPREAD RATE** is not going to be controlled within acceptable error limits. It is not reasonable to expect the control system to deliver an acceptable accuracy when operation below 5% of its available range, it would be like trying to drive a sports car at 10 kilometres per hour. This is due to the mechanical limitations of the hydraulic system.

Options/ Setup/ Data/ Status Menus

There are **FOUR** menus available that give access to various **groups of settings and information**.

- **OPTIONS** - **Manual & Start speed settings.**
- **SETUP** - **Calibration and Installation setting.**
- **DATA** - **Distance & area spread data.**
- **STATUS** - **Density Factor setting.**

Each Menu is Selected by **PRESSING** and **HOLDING** the appropriate button for 1 second **until a beep is heard**.

A message identifying the menu will be briefly shown. **For example..**

DATA MENU

To exit the menu and return to the normal display page **PRESS** and **HOLD** one of the **MENU** buttons once again for 1 second **until a beep is heard**.

The normal display page will then be restored.

SPINNER 1000	SPREAD 750
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Each menu has a varying number of pages to select from. These are listed below.

To select the Next & Previous page Press the select up and down buttons.

To change the item displayed on the current page use the Change Up & Down buttons.

MENU PAGE LAYOUT

The following is a chart of the menu choices available and their purpose.

These will be explained individually later.

OPTIONS MENU

Rate Adjust Off/ On	-	Enables a preset rate adjustment at the push of a button.
Bout Adjust Off/ On	-	Enables a preset bout adjustment at the push of a button.
Spin Reduce Off/ On	-	Enables a preset spinner speed adjustment at the push of a button.
Manual speed	-	Speed value for manual operation.
Start Speed	-	Start speed for spreading.
Wheel Size	-	Selection between two wheel sizes.

DATA MENU

Area/Amount	-	Current area and amount spread.
Spread Distance	-	Distance travelled while spreading in Kilometres.
Total Distance	-	Total Distance travelled in Kilometres.
Total Area	-	Total Area spread in Hectares.
Total Amount	-	Total amount spread in Tonnes per Hectare.
Reset Values	-	Reset all Totals values.

STATUS MENU

Set Density	-	Set fertiliser density compensation factor in kg/ltr.
Set Bout Width	-	Set current Bout width.
Gate Setting	-	Set selected gate height.

SETTINGS MENU

The settings menu is not normally used by a vehicle operator.

Enter Password Locked	-	No changes without being unlocked.
Spinner Off Time	-	Delay between chain stop and spinner stop.
Speed Value	-	Set speed calibration with vehicle stopped.
Start Speed	-	Start speed for spreading in Kmh.
Speed 1 Cal	-	Set Ratio 1 speed Calibration Value.
Speed 2 Cal	-	Set Ratio 2 speed Calibration Value.
Spinner Value (view)	-	Displays spinner speed in rpm and hertz.
Spinner Calib	-	Set number of pulses per rev of the spinner.
Conveyor Pulses Per Rev	-	Set conveyor pulses per output drum shaft rev.
Convey Shaft Diameter	-	Set conveyor output shaft drum diameter.
Conveyor Gear Ratio	-	Set conveyor gear ratio for motor rpm display.
Motor Speed (view)	-	Conveyor motor speed in rpm.

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Convey (view)	-	Display conveyor speed in M/Min and hertz.
Spin Minimum	-	Set minimum Spinner speed.
Spin Maximum	-	Set maximum Spinner speed.
Spread Minimum	-	Set minimum Spread rate.
Spread Maximum	-	Set maximum Spread rate.
Spin Gain	-	Set spinner control gain.
Conveyor Gain	-	Set conveyor control gain.
Spin Dead Band	-	Set spinner control dead band.
Convey Dead Band	-	Set conveyor control dead band.
Spin Step Size	-	Set spinner adjust MFC minimum step size in milliseconds.
Convey Step Size	-	Set conveyor adjust MFC minimum step size in milliseconds.
Spin Range	-	Set spinner MFC control range in milliseconds.
Convey Range	-	Set conveyor MFC control range in milliseconds.
Blower Range	-	Set blower MFC control range in milliseconds.
Blower Step Size	-	Set blower MFC minimum step size in milliseconds.
Blower Ramp Time	-	Set blower ramp up/down time in seconds.
Blower Off Time	-	Set blower ramp down delay time in seconds.
BlowerFlap Time	-	Set delay of flap opening on initial start up in seconds.
Spin Dead Time	-	Set delay between spinner speed adjustments in milliseconds.
Convey Dead Time	-	Set delay between conveyor speed adjustments in milliseconds.
Convey Maximum	-	Set conveyor maximum speed in metres per minute.
Spinner Output	-	Set control valve operation state.
Convey Output	-	Set control valve operation state.
Blower Output	-	Set control valve operation state.
Flap Output	-	Set control valve operation state.
Flap Interlock	-	Set interlock between blower and blower flap.
Clutch Input	-	Set clutch input switch operation state.
Clutch Test (view)	-	State of clutch switch.
Spinner Control	-	Set spinner control option.
Spinner Display	-	Set spinner display option.
Sidling Spinner	-	Set sidling spinner option.
GPS Data Output	-	Set GPS interface option.
Tyre Selection	-	Set tyre selection option.
Oil Temp Alarm	-	Set Oil Temp Alarm operation state.
Temp Alarm Time	-	Set Oil Temp Alarm delay time in seconds.
Oil Level Alarm	-	Set Oil Level Alarm operation state.
Level Alarm Time	-	Set Oil Level Alarm delay time in seconds.
Alarm Lockout	-	Set Alarm Lockout selection option.
Conv Fail Time	-	Set Conveyor Failure Alarm activation time in seconds.
Conv Fail Limit	-	Set Conveyor Failure range limit.
Conveyor Loss Factor	-	Set offset for mechanical losses within machine.
Conveyor Test	-	Conveyor test function in metres per minute.
Spinner Test	-	Spinner test function in RPM.

Auger Enabled	-	Set Auger control option.
Auger Preload	-	Set the pre-load time for Auger on initial startup in millimetres.
Kickstart Time	-	in milliseconds.
Kickstart Limit	-	
Rate Adjust	-	
Bout Adjust	-	
Bout Reduce Spin	-	
Adjust Buzzer	-	
Gate Width	-	Gate width setting in millimetres.
Gate Settings	-	Set Number Of Gate Positions.
Gate Height Values	-	The Height Of Gate Positions.
Save Default Settings	-	Saves the default settings.
Read Default Settings	-	Read all settings from disk file.

External Alarms

Two alarms are available (where fitted).

- **Low Oil Level.**
- **High Oil Temperature.**

Once an alarm has been triggered it will not operate for 10 minutes.

This should prevent the alarms from being a nuisance.

When an alarm activates, one of the following messages are displayed.

<p>OIL TEMPERATURE ALARM</p>

<p>OIL LEVEL ALARM</p>

An alarm beep will sound. The alarm can be cancelled by pressing any button on the control panel.

The following message will be displayed.

<p>ALARM CANCELLED</p>

If **ALARM LOCKOUT** is **ON** then the following message will appear.

<p>ALARM LOCKOUT SYSTEM HALTED</p>

To **CANCEL** this and return to normal use **PRESS** and hold the **STATUS BUTTON** until a beep is heard. If the **FAULT** has been **CORRECTED** the system will return to **NORMAL** operation.

Internal Alarms

There is an in-built alarm that operates if the conveyor fails to operate or if the conveyor speed sensor fails.

When the alarm activates the following message is displayed.

CONVEYOR FAULT ALARM

The conveyor will automatically switch itself OFF.

An alarm beep will sound. The alarm can be cancelled by pressing any button on the control panel.

The following message will be displayed.

ALARM CANCELLED

Options Menu Items

Rate Adjust Off

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20%	RATE ADJUST OFF	40KG/H
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Bout Adjust Off

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50%	BOUT ADJUST OFF	10.0M
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Spin Reduce Off

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80%	SPIN REDUCE OFF	800 RPM
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Manual Speed

If you need to run the conveyor with the vehicle stationary, you must select **MANUAL** operation. (*The AUTO Light OFF*). When you do the controller pretends that the vehicle is moving.

This setting allows you to set the **SIMULATED VEHICLE SPEED** as it will determine the rate at which the conveyor will move. **If this value is low** then the **maximum spread rate** on **MANUAL** will be **low**. **If this value is high** then the **maximum spread rate** on **MANUAL** will be **high**.

I suggest that this value be set to match a typical spreading speed.

MANUAL SPEED 15 Kmh

Start Speed

This setting is the **MINIMUM** vehicle speed at which the spread conveyor will operate. Correctly setting this should allow you to do **low speed manoeuvring** **without the spreader starting**.

START SPEED 2 Kmh

Wheel Size

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WHEEL SIZE SMALL

Status Menu Options

Set Density

This setting allows you to **compensate** for the **DENSITY** of the fertiliser.

This value should be set to match the **WEIGHT** per **LITRE** of the fertiliser.

This can be done by measuring the weight of one litre of fertiliser.

SET DENSITY 1.000 KG/LITRE

Bout Width

This shows you the current **BOUT WIDTH** setting.

This value is used to calculate the total area spread value. (see above)

To change this value Press the **CHANGE** buttons.

SET BOUT WIDTH 20.0 METRES

Gate Height Setting

This shows you the current **GATE SETTING** number.

This value is used to calculate the spread rate.

To change this value Press the **CHANGE** buttons.

GATE SETTING 1 NUMBER

Data Menu Options

Area / Amount

These values recorded are intended to give information per bin load or paddock. This shows you the **AREA SPREAD** in **HECTARES** and the **AMOUNT SPREAD** in **TONNES** since the counter was **RESET**. These values are **RESET** to zero when the other data values are reset using the **RESET ALL VALUES** menu option. These values can also be reset to zero **WITHOUT** resetting all the other values to zero by pressing and holding one of the **CHANGE** buttons for one second.

AREA	0.000 H
AMOUNT	0.000 T

Spread Distance

This shows you the **DISTANCE TRAVELLED** in **KILOMETRES** while spreading on **AUTOMATIC** since the counter was **RESET**.

<p style="text-align: center;">SPREAD DISTANCE 0.000 KM</p>

Total Distance

This shows you the **TOTAL DISTANCE TRAVELLED** in **KILOMETRES** since the counter was **RESET**.

<p style="text-align: center;">TOTAL DISTANCE 0.000 KM</p>
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Total Area

This shows you the **TOTAL AREA SPREAD** in **HECTARES** while spreading on **AUTOMATIC** since the counter was **RESET**.

<p style="text-align: center;">TOTAL AREA 0.000 HECT</p>
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Total Amount

This shows you the **TOTAL AMOUNT SPREAD** in **TONNES** since the counter was **RESET**.

**TOTAL AMOUNT
0.000 TONNES**

Print Report

This option is not available yet. When this is available you will be able to print reports for customers.

**PRINT REPORT
NOT AVAILABLE**

Reset Values

This allows you to **RESET** all of the accumulated data values to **ZERO**.

To **RESET** Press either of the **CHANGE** buttons.

**RESET ALL DATA
VALUES ?**

Settings Menu Options

Password

All the settings on the **SETTINGS MENU** can **NOT be changed** without the correct **password** being entered to **UNLOCK** the security.

You will be able to **VIEW** the settings while **LOCKED**.

**ENTER PASSWORD
LOCKED**

Spinner Off Time

This value is the **TIME INTERVAL** between the **VEHICLE** stopping and the **SPINNERS** stopping. If this value is set to zero, the spinners will stop as soon as the vehicle stops. To change this value Press the **CHANGE** buttons.

SPINNER OFF TIME

30 SECONDS

Speed Value

This option is used to **CALIBRATE** the **VEHICLE SPEED** input.

This should be adjusted with the vehicle moving.

Note: The speed measurement system has the ability to work with two different differential ratios, To do this TWO different calibration values are required, one for each ratio. The number next to the word “SPEED” shows you which speed calibration value is in use.

To change this value Press the **CHANGE** buttons.

**SPEED 1 12.0Hz
VALUE 22.0Kmh**

Start Speed

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**START SPEED
2 Kmh**

Speed 1 Calibration View

This option is used to **CALIBRATE** the **VEHICLE SPEED** input.

If you have already calibrated the speed, you can record the value shown here.

To change this value Press the **CHANGE** buttons.

**SPEED 1 CAL =
200**

Speed 2 Calibration View

This option is used to **CALIBRATE** the **VEHICLE SPEED** input.

If you have already calibrated the speed, you can record the value shown here.

To change this value Press the **CHANGE** buttons.

**SPEED 2 CAL =
200**

Spinner Speed/Frequency

This option is used to **VIEW** the **SPINNER SPEED** and **FEEDBACK**. This is for test purposes.

SPINNER 20.0Hz VALUE 1200 RPM
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Spinner Calibration View

This option is used to **CALIBRATE** the **SPINNER SPEED INDICATION**.

If you have already calibrated the spinners, you can record the value shown here.

To change this value Press the **CHANGE** buttons.

SPINNER CALIB = 1

Conveyor Pulses Per Revolution

This option is used to **SET** the **PULSES PER REVOLUTION**.

To change this value Press the **CHANGE** buttons.

CONVEYOR PULSES PER REV 250.00

Conveyor Shaft Diameter

This option is used to **SET** the **CONVEYOR SHAFT DIAMETER**.

If you have already calibrated the conveyor, you can record the value shown here.

To change this value Press the **CHANGE** buttons.

CONVEYOR SHAFT DIAMETER 305
--

Conveyor Gear Ratio

This option is used to **SET** the **CONVEYOR GEARBOX RATIO**.

This is to allow the motor speed to be shown in rpm.

CONVEYOR GEAR

RATIO 15.0:1

Motor Speed

This option is used to **DISPLAY** the **CONVEYOR MOTOR SPEED** in **RPM**.

This is for fault location purposes.

**MOTOR SPEED
0.00 RPM**

Conveyor Speed/Frequency

This option is used to **DISPLAY** the **CONVEYOR PULSE RATE** and **SPEED** in **METRES Per MINUTE**. This is for test purposes.

**CONVEYOR 20.0Hz
= 13.07 M/Min**

Spin Minimum

This option sets the **MINIMUM** Rpm setting for the spinners.

To change this value Press the **CHANGE** buttons.

**SPIN MINIMUM
250**

Spin Maximum

This option sets the **MAXIMUM** Rpm setting for the spinners.

To change this value Press the **CHANGE** buttons.

**SPIN MAXIMUM
2000**

Spread Minimum

This option sets the **MINIMUM** spread rate setting value.

To change this value Press the **CHANGE** buttons.

**SPREAD MINIMUM
50**

Spread Maximum

This option sets the **MAXIMUM** spread rate setting value.

To change this value Press the **CHANGE** buttons.

SPREAD MAXIMUM 7500

Spin Gain

This option sets the **GAIN** of the spinner control loop.

Reducing this value will slow system response.

To change this value Press the **CHANGE** buttons.

SPIN GAIN 66%

Conveyor Gain

This option sets the **GAIN** of the conveyor control loop.

Reducing this value will slow system response.

To change this value Press the **CHANGE** buttons.

CONVEYOR GAIN 66%

Spin Dead Band

This option sets the **DEAD BAND** of the spinner control loop.

This is the acceptable position error percentage. Setting this value too low will cause the system to become unstable, too high and the accuracy will diminish.

To change this value Press the **CHANGE** buttons.

SPIN DEAD BAND 2.0%

Conveyor Dead Band

This option sets the **DEAD BAND** of the conveyor control loop.

This is the acceptable position error percentage. Setting this value too low will cause the system to become unstable, too high and the accuracy will diminish.

To change this value Press the **CHANGE** buttons.

**CONVEY DEAD BAND
1.0%**

Spin Step Size

This option sets the **MINIMUM MOTOR STEP SIZE** of the spinner control loop.

This value is in **MILLISECONDS**.

To change this value Press the **CHANGE** buttons.

**SPIN STEP SIZE
50 MILLISECS**

Conveyor Step Size

This option sets the **MINIMUM MOTOR STEP SIZE** of the conveyor control loop.

This value is in **MILLISECONDS**.

To change this value Press the **CHANGE** buttons.

**CONVEY STEP SIZE
30 MILLISECS**

Spin Range

This option sets the **MOTOR CONTROL RANGE** of the spinner control loop.

This value is the time from valve fully closed to valve fully open in **MILLISECONDS**.

To change this value Press the **CHANGE** buttons.

**SPIN RANGE
2850 MILLISECS**

Conveyor Range

This option sets the **MOTOR CONTROL RANGE** of the spreader control loop.

This value is the time from valve fully closed to valve fully open in

MILLISECONDS.

To change this value Press the **CHANGE** buttons.

**CONVEY RANGE
2850 MILLISECS**

Blower Range

This option sets the **MOTOR CONTROL RANGE** of the Blower valve.

This value is the time from valve fully closed to valve fully open in **MILLISECONDS.**

To change this value Press the **CHANGE** buttons.

**BLOWER RANGE
2850 MILLISECS**

Blower Step Size

This option sets the **MINIMUM MOTOR STEP SIZE** of the blower control loop.

This value is in **MILLISECONDS.**

To change this value Press the **CHANGE** buttons.

**BLOWER STEP SIZE
50 MILLISECS**

Blower Ramp Time

This option sets the Blower **RAMP UP AND DOWN TIME** in seconds.

To change this value Press the **CHANGE** buttons.

**BLOWER RAMP TIME
10 SECONDS**

Blower Off Time

This option sets the Blower **OFF DELAY TIME** in seconds.

To change this value Press the **CHANGE** buttons.

BLOWER OFF TIME

10 SECONDS

Blower Flap Time

This option sets the Blower **FLAP DELAY TIME** in seconds.

To change this value Press the **CHANGE** buttons.

**BLOWER FLAP TIME
10 SECONDS**

Spin Dead Time

This option sets the **DEAD TIME BETWEEN MOTOR ADJUSTMENTS** of the spinner control loop.

This value is in **MILLISECONDS**.

To change this value Press the **CHANGE** buttons.

**SPIN DEAD TIME
300 MILLISECS**

Conveyor Dead Time

This option sets the **DEAD TIME BETWEEN MOTOR ADJUSTMENTS** of the spreader control loop.

This value is in **MILLISECONDS**.

To change this value Press the **CHANGE** buttons.

**CONVEY DEAD TIME
300 MILLISECS**

Conveyor Maximum

This setting is the **MAXIMUM CONVEYOR SPEED** in metres per minute.

This can be determined by fully opening the control valve manually and observing the value on the Conveyor Calibration page.

To change this value Press the **CHANGE** buttons.

**CONVEY MAXIMUM
40.0 METRES/MIN**

Spinner Output

This option allows you to set the **ACTIVE STATE** of the spinner **CONTROL VALVE**. Normal = energised ON. Inverted = energised OFF.

To change this Press either of the **CHANGE** buttons.

**SPINNER OUTPUT
NORMAL**

Conveyor Output

This option allows you to set the **ACTIVE STATE** of the conveyor **CONTROL VALVE**. Normal = energised ON. Inverted = energised OFF.

To change this Press either of the **CHANGE** buttons.

**CONVEY OUTPUT
NORMAL**

Blower Output

This option allows you to set the **ACTIVE STATE** of the Blower **CONTROL VALVE**. Normal = energised ON. Inverted = energised OFF.

To change this Press either of the **CHANGE** buttons.

**BLOWER OUTPUT
NORMAL**

Flap Output

This option allows you to set the **ACTIVE STATE** of the Flap **CONTROL VALVE**. Normal = energised ON. Inverted = energised OFF.

To change this Press either of the **CHANGE** buttons.

**FLAP OUTPUT
NORMAL**

Flap Interlock

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**FLAP INTERLOCK
OFF**

Clutch Input

This option allows you to set the **ACTIVE STATE** of the clutch **CONTROL INPUT**.
Normal = energised ON. Inverted = energised OFF.

To change this Press either of the **CHANGE** buttons.

**CLUTCH INPUT
NORMAL**

Clutch Test

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**CLUTCH TEST
OUT**

Spinner Control

This option allows you to **ENABLE** and **DISABLE** spinner control.

With spinner control disabled, the display will act as a **RPM** indicator only.

To change this Press either of the **CHANGE** buttons.

**SPINNER CONTROL
OFF**

Spinner Display

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**SPINNER DISPLAY
TARGET**

Sidling Spinner

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**SIDLING SPINNER
OFF**

GPS Data Output

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**GPS DATA OUTPUT
ON/OFF ONLY**

Tyre Selection

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**TYRE SELECTION
OFF**

Oil Temp Alarm

This option allows you to set the **ACTIVE STATE** of the oil temperature alarm.

To change this Press either of the **CHANGE** buttons.

**OIL TEMP ALARM
CLOSED**

Temp Alarm Time

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**TEMP ALARM TIME
30 SECONDS**

Oil Level Alarm

This option allows you to set the **ACTIVE STATE** of the oil level alarm.

To change this Press either of the **CHANGE** buttons.

**OIL LEVEL ALARM
CLOSED**

Level Alarm Time

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**LEVEL ALARM TIME
30 SECONDS**

Alarm Lockout

This option allows you to **ENABLE** and **DISABLE** Alarm **LOCKOUT**.

With lockout **ENABLED**, any **ALARM** will cause the control system to **DISABLE THE HYDRAULIC SYSTEM** until the **FAULT IS NO LONGER PRESENT** and the **STATUS button** has been **pressed**.

To change this Press either of the **CHANGE** buttons.

**ALARM LOCKOUT
OFF**

Conveyor Fail Time

This option sets the **TIME OUT** value of the conveyor failure alarm.

Setting this value too low will cause the alarm to operate falsely, too high and the alarm will not operate quickly enough.

To change this value Press the **CHANGE** buttons.

**CONV FAIL TIME
10 SEC**

Conveyor Fail Limit

This option sets the **VALVE** position limit value of the conveyor failure alarm.

Setting this value too low will cause the alarm to operate falsely, too high and the alarm will not operate quickly enough.

To change this value Press the **CHANGE** buttons.

**CONV FAIL LIMIT
10 %**

Conveyor Loss Factor

This option sets the **CONVEYOR LOSS FACTOR**. This value is the conveyor efficiency value. This can be adjusted to correct any spread rate errors.

This value is used to calculate the spread rate.

To change this value Press the **CHANGE** buttons.

**CONVEYOR LOSS
FACTOR 0.87**

Conveyor Test

This option allows you to set the **TEST CONVEYOR OPERATION** and **MEASURE THE MAXIMUM CONVEYOR SPEED**. Pressing the upper **CHANGE** button will open the conveyor control valve in steps of 10%. Pressing the lower **CHANGE** button will close the conveyor control valve in steps of 10%.

NOTE: The conveyor **ON/OFF** button will need to be used to switch the conveyor on.

**CONVEYOR TEST
0% 15.02 M/Min**

Spinner Test

This option allows you to set the **TEST SPINNER OPERATION** and **MEASURE THE MAXIMUM SPINNER SPEED**. Pressing the upper **CHANGE** button will open the spinner control valve in steps of 10%. Pressing the lower **CHANGE** button will close the spinner control valve in steps of 10%. **NOTE:** the spinner **ON/OFF** button will need to be used to switch the spinner on.

**SPINNER TEST
0% 0 RPM**

Auger Enabled

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**AUGER ENABLED
NO**

Auger Preload

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**AUGER PRELOAD
1000 MM**

Kickstart Time

.***

**KICKSTART TIME
0 MILLISECS**

Kickstart Limit

.***

**KICKSTART LIMIT
0 PERCENT**

Rate Adjust

.***

**RATE ADJUST
OFF**

Bout Adjust

.***

**BOUT ADJUST
OFF**

Bout Reduce Spin

.***

**BOUT REDUCE SPIN
OFF**

Adjust Buzzer

.***

**ADJUST BUZZER
OFF**

Gate Width

This shows you the current **GATE WIDTH** setting.

This value is used to calculate the spread rate.

To change this value Press the **CHANGE** buttons.

**GATE WIDTH
750 MM**

Gate Settings

This option allows you set the **NUMBER OF GATE POSITIONS**.

To do this Press either of the **CHANGE** buttons.

**GATE SETTINGS
10**

Gate Height

This option allows you to SET the **HEIGHT of each GATE SETTING position**.

To do this Press either of the **CHANGE** buttons.

NOTE: There will be a value displayed for each gate position number.

**GATE HEIGHT 1
15 MM**

Save Settings

This option allows you set the **CURRENT SETTINGS**. This should be done when **ANY** values have been changed. To do this Press either of the **CHANGE** buttons.

**SAVE DEFAULT
SETTINGS**

Read Settings

This option allows you to **READ** the **SAVED SETTINGS** from Flash-Disk .

To do this Press either of the **CHANGE** buttons.

**READ DEFAULT
SETTINGS**

Print Settings

This option is not available yet.

When this is available this will allow you to **PRINT** the **CURRENT SETTINGS** To printer.

To do this Press either of the **CHANGE** buttons.

**PRINT SETTINGS
NOT AVAILABLE**

Shutdown System

This option allows a **TECHNICIAN** to **END THE PROGRAM** and return to **DOS** for program maintenance.

To do this Press either of the **CHANGE** buttons.

SHUTDOWN SYSTEM



Control Computer

A sealed box normally located inside the cab containing the electrical control equipment.

Wiring Layout.

CAUTION

**DO NOT unplug ANY CONNECTORS while
POWER is ON.**

OR DAMAGE WILL occur!!

Spread Rate

The **RATE** at which fertiliser is delivered to be spread is controlled by the following factors.

- The **WIDTH** of **THE REAR GATE OPENING**. This is usually **FIXED**.
- The **HEIGHT** of the **REAR GATE OPENING**. This is usually **ADJUSTABLE**.
- The **CONVEYOR SPEED**. This is **VARIED AUTOMATICALLY** by the control computer.
- The **BOUT WIDTH** over which the fertiliser is being spread. This is determined by the **SPINNER SPEED**.
- The **DENSITY FACTOR**. This is the weight of 1 litre of the product being spread.
- The **VEHICLE SPEED**.

The computer uses all these values to determine the correct spread rate.

The **VOLUME** of fertiliser to be delivered is calculated using the formula below.

LITRES per minute = (Gate Width / 1000) * (Gate Height / 1000) * Conveyor Speed * 1000

WHERE - **Gate Width and Gate Height are in Millimetres.**
 - **Conveyor speed is in metres per minute.**

To determine the **WEIGHT** that is being delivered multiply the volume by the weight of fertiliser (density) in **KILOGRAMS PER LITRE**.

You will now know the amount of fertiliser in **KILOGRAMS** that is being delivered **PER MINUTE**.

To calculate the AREA being covered use the following formula

$$\text{AREA in Hectares Per Minute} = \text{SPEED} * \text{BOUT WIDTH} / 600$$

Where - Speed is in Kilometres Per Hour.
 - Bout Width is in Metres.

We can now combine both the values to form the actual spread rate.

$$\text{RATE} = \text{KILOGRAMS} / \text{HECTARES.}$$

System Calibration.

- Calibrate the **VEHICLE** speed.
- Calibrate the **SPINNER** speed.
- Calibrate the **CONVEYOR** speed.
- Set the **GATE HEIGHT**.
- Set the **GATE WIDTH**.
- Set the fertiliser **DENSITY**. This will have to be measured.
- Set the **BOUT WIDTH**. This will have to be measured.

**The method has not yet been defined.
This will be updated when available.**

Technical Notes.

**FOR AUTHORISED AND QUALIFIED
PERSONNEL ONLY!**

Password.

Without issuing the correct password, controller settings can only be viewed.
To unlock the Controller For adjustments use the following password sequence.

SPREAD UP	- 1 up
SPREAD DOWN	
SPREAD DOWN	- 2 down
SPREAD UP	
SPREAD UP	- 3 up
SPREAD UP	

The **LOCKED** message will now change to **UNLOCKED**.
If this does not occur then move to a new page then return and try again.

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