



## **VS-2 CONTROL SYSTEM - OVERVIEW.**

Rev1/9/15

The VS-2 control system is designed to provide a simple and low cost method of metering seeds and granules in proportion to forward speed, with an audio / visual alarm system monitoring basic functions.

It is possible to use the VS-2 without any forward speed input, in which case it will work perfectly well provided a consistent forward speed is maintained, but it is envisaged that most users will prefer a speed proportionate metering of product for accuracy and economy when used as a seeder or granular applicator.

Forward speed is monitored typically using a supplied GPS receiver - this is our recommendation because it is the easiest and most accurate method - the GPS receiver is really simple to fit (magnetic attachment) and is not affected by the angle of fitting or require any in-field calibration over a measured distance run (unlike radar) - if a GPS will not work in your area (highly unlikely) we offer a simple land wheel with a pulse generator that will provide a speed input ( but this will require some mechanical fitting) or radar can be supplied - or it may be possible to use a speed input from the tractor if it is fitted with GPS, radar or mechanical signal - if the tractor has a 8 pin ISO socket it may be possible to access and use this signal - please contact us for details and advice.

The feed motor that drives the feed rolls is controlled and continually monitored by the VS-2 system. It sends a signal to the motor to run at a certain speed, and receives a signal back from the motor to tell it that the motor has responded correctly - this is a continual process.

Once the application rate has been decided and calibrated for, the VS-2 will monitor the forward speed of the vehicle via the speed sensor, and balance the speed of the feed motor to the forward speed, ensuring that the metering is proportionate to any forward speed changes in the field - if you slow down and stop, so will the feed motor - start moving and speed up, and so will the feed motor - provided all the alarms stay green and silent, the application rate will be remain in proportion to the forward speed.

In practice, a simple static "catch and weigh" calibration test is done prior to any field work, to set the application rate for the typical target field speed you will be working at - so at this point you decide what your optimum target field speed will be, and this speed is used as part of the static application rate calibration. You will select the appropriate feed rolls and feed roll RPM to achieve

the desired application rate, for the seed or granule, for the bout width, and for the selected target forward speed - and the VS-2 remembers the feed motor speed for this setting.

Once this static catch and weigh test is done, the next step is to take the tractor and machine into the field and calibrate the VS-2 for that target speed selected during the static catch and weigh test - this is really easy - you don't even need product in the hopper to do this. Simply lower and engage the implement in its working position, attitude and depth - and then drive forwards until the tractor speedometer indicates that you are travelling at the same forward speed as the selected target speed used during the static product calibration - and with the VS-2 powered up and switched ON, you simply hold the spring loaded LEFT toggle switch in the raised position for a few seconds, until you hear an audible tone, and see 2 green and 1 red LED display illuminate on the console – and then release the switch.

This indicates the VS-2 has registered the forward speed input from the speed sensor (and it knows that this is the target forward speed you selected and used during the static product calibration) and from this point forwards, the VS-2 will constantly compare and balance the pulsed signal it sends to, and receives back from, the feed motor - to the pulsed signal coming in from the speed sensor - and the application rate will remain proportionate to the forward speed

This balance is continually monitored and alarms will remind you when the motor is switched off at headland, for example, or if you drive too fast or too slow and the feed motor speed cannot be maintained in proportion to forward speed, or if the fans are not working, or the hopper contents are low.

Application rates can be manually nudged up or down on the go, using the dial - this is proportionate because each of the 36 motor speeds is different by the same amount, and this increase or decrease in rate can be worked out. If you do change the application rate, an alarm will remind you that you are no longer working at the calibrated setting, until the original setting is resumed.

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## **VS-2 CALIBRATION GUIDE**

### **SETTING THE APPLICATION RATE – STATIC CATCH AND WEIGH TEST**

- ***NOTE - Ensure the Fan switch is turned off before calibrating***

Partially fill the hopper with the seed you intend to apply.

Drop the trap door at the bottom of the hopper unit and slide the calibration tray into position.

Only turn on the Agitator switch if applying grass seed (otherwise leave in the off position)

### **HOW TO SET THE APPLICATION RATE**

A simple catch and weigh test will set the rate required. To establish how much seed to collect to give the required rate (Kgs/Ha) at your width and forward speed – use the formula as follows:

## FORMULA

You can use the following formula which works for all seeds and granules, all widths and all speeds.

**NOTE REGARDING FORWARD SPEED** – Before you use the formula, consider what the typical forward speed is going to be used in the field for this operation – use this speed in this formula – and then use this same speed again when you set the VS-2 to match the actual forward speed in the field.

This is a **ONE** minute catch test

**Rate (kgs/ha) x Speed (kph) x Width (metres) = Flow rate of product in kgs/minute.**

**600**

**Example 1.** The required application rate is 25 kilograms per hectare. The target forward speed is 10 kilometres per hour. The bout width is 6 metres wide.

25 kgs/ha x 10 kph x 6 metres = 1500

1500 divided by 600 = 2.5 kgs per minute flow rate. So in this example, 2.5 kilograms of seed must be collected in a 1 minute catch test

**Example 2.** The required application rate is 5.5 kilograms per hectare. The target forward speed is 12 kilometres per hour. The bout width is 4.25 metres wide.

5.5 kgs/ha x 12 kph x 4.25 metres = 280.5

280.5 divided by 600 = 0.467 kgs per minute flow rate. So in this example, 467 grams of seed must be collected in a 1 minute catch test

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## SETTING THE FEED MOTOR SPEED

### Overview

The feed motor has three speed settings along with a dial to increase or decrease the feed motor speed to adjust the feed rate as required so that the correct amount of seed has been collected in the calibration tray as indicated by the above formula over a 1 minute catch test.

**The centre switch and dial** are used in combination to select the feed motor speed, and thus the application rate. The 3 position switch selects the speed range, the uppermost position is High Range, middle position is Mid Range, and the lowermost position is Low Range, and 12 speeds in each range allows a total of 36 different motor speeds.

The control console instructs the motor to turn at the speed selected, and the motor is fitted with an integral encoder which sends a signal back to the console to confirm the speed. This is known as a “closed loop” system, and ensures the motor is always running at the selected speed – if the console detects that the motor speed is not as selected, it will trigger the motor alarm (red LED) to alert the operator.

Use the dial to increase or decrease seeding rate as required. Each of the 36 motor speeds represents approximately a 1.54 RPM change in speed.

**HINT** - When performing the first calibration with a new seed, set the range to MID, and the Dial to 6 to set the feed motor to half speed – this is now the mid range speed (18 of 36) and from this result you will see if the motor needs to be faster or slower for the next catch and weigh test.

**NOTE.** The minimum motor speed is approximately 6 RPM, and the maximum is approximately 60 RPM

Each of the 36 speed settings changes are approximately 1.54 RPM

The output should be approximately proportionate to feed roll speed – if you find you need to collect twice the amount of seed in the catch test, consult the chart below and select a speed setting to give approximately twice the feed roll speed RPM and repeat the catch test until the correct amount is collected to give the required application rate for your width and forward speed.

**Catch and weigh test.**

**Feed Motor Settings and Speeds (RPM)**

When you are ready to begin, switch the console main ON/OFF switch ON, and then use the FEED switch on the junction box switch to turn the feed motor ON and OFF during the catch test, and the FAN switch to OFF, and AGITATOR switch ON or OFF as required depending on the product to be metered – ON for grass seeds, etc, OFF for granular products normally and OSR, mustard, kale, etc.

- Run the feed motor for the required time.
- Weigh the collected amount in kilograms
- Use the High, Mid or Low speed range, and the speed dial to increase or decrease the rate accordingly and repeat the procedure until the correct output for your machine width and forward speed is reached.
- Note the setting for future reference.
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LOW RANGE		MID RANGE		HIGH RANGE	
Settings 1 - 12		Settings 13 -24		Settings 25-36	
Dial setting	Speed RPM	Dial setting	Speed RPM	Dial setting	Speed RPM
1	6	1 (13)	24.48	1 (25)	42.96
2	7.54	2 (14)	26.02	2 (26)	44.5
3	9.08	3 (15)	27.56	3 (27)	46.04
4	10.62	4 (16)	29.1	4 (28)	47.58
5	12.16	5 (17)	30.64	5 (29)	49.12
6	13.7	6 (18)	32.18	6 (30)	50.66
7	15.24	7 (19)	33.72	7 (31)	52.2
8	16.78	8 (20)	35.26	8 (32)	53.74
9	18.32	9 (21)	36.8	9 (33)	55.28
10	19.86	10 (22)	38.34	10 (34)	56.82
11	21.4	11 (23)	39.88	11 (35)	58.36
12	22.94	12 (24)	41.42	12 (36)	59.9

**NOTE REGARDING FEED ROLLS.** Ideally you will be able to select a feed roll speed that is not at either extreme of the available range – ideally somewhere mid range - this will allow the feed motor to speed up and slow down in line with your actual forward speed changes – sometimes you may have to change the configuration or type of feed rolls to allow this to happen – we have several different types for different products and rates – if you need any advice please contact us.

## **CALIBRATING THE VS-2 TO FORWARD SPEED**

### **IN THE FIELD WITH THE IMPLEMENT FITTED:**

On the machine junction box, turn the Fan Switch and Feed Motor to the ON position (the Agitator only being switched on if calibrated for Grass Seed)

Turn on the main power switch on the cab box to the on position and then lower the machine and engage in the working position and depth and attitude.

Drive forward with the machine now in its typical working position and accelerate until the “calibrated speed” is reached - this is the speed used during the catch and weigh test.

Using the tractor speedometer (or radar or GPS), maintain this speed and press and hold upwards the spring loaded toggle switch on the left hand side of the cab box until two green lights and one red appear, you will hear an audible tone to indicate that it has calibrated successfully. Release the switch.

The VS-2 has registered the signal from its own GPS receiver at this speed and now knows that it has to balance the signal from the feed motor (established during the catch and weigh test using this same speed as the target) to the signal from the GPS running at this actual field speed – from now on it will maintain the proportion between the two – if for any reason it cannot an alarm will sound and a red LED will light – for example, this could happen if the feed motor needs to run faster as forward speed increases, but the motor is at the limit of its performance and cannot increase RPM further (this could be when a change of feed rolls could be considered)

**Once this Speed Calibration is done, your machine is ready for work and will operate at varying forward speeds maintaining your calibrated application rate. If the feed motor cannot achieve the required speed to apply the rate an alarm will sound and a red LED will light.**

**This rate can be changed whilst on the move by increasing or decreasing the feed motor speed using the dial - If it is adjusted the alarm will sound to remind you that you have changed the feed rate and will remain so until the motor speed has been returned to the original setting.**

**Turn the feed ON and OFF as required using the left hand toggle switch from mid to low position.**

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**NO SPEED SIGNAL.** If for any reason the system has not calibrated correctly (whilst holding this switch up) the alarm will sound and all the LED lights will flash indicating an error.

Note the system can still operate at the calibrated rate but will not be speed related – if the forward speed is maintained at the speed used for the catch and weigh test – the rate will be correct

*In the unlikely event that your machine has not calibrated correctly switch off the electrics and conduct a check of all wiring and ensure all connections are good - and then re-calibrate.*

If unable to calibrate correctly or you have any other questions about the machine please contact us on TEL: **01945 464909** or email: **sales@stocks-ag.co.uk** STOCKS AG LIMITED, CROMWELL ROAD, WISBECH, CAMBRIDGESHIRE, PE14 OSD, UK.

## VS-2 CONSOLE.

The left hand toggle switch is used to:

1. Calibrate to actual forward speed in its spring loaded uppermost position
2. Used to switch the feed motor ON and OFF in its mid and lower position.

The middle toggle switch is main power ON and OFF. Power remains connected (in Standby mode with slow pulsed led) until the main power cables are disconnected – note the forward speed calibration memory will be lost if this happens, and will have to be reset. The system can be left connected for long periods with no significant current draw.

The right hand toggle switch is 3 position used as low, medium and high range for the feed motor speed (in conjunction with the dial)



## MACHINE JUNCTION BOX

The 3 toggle switches are used to turn on and off the feed motor – the fan – the agitator - as indicated. Use these when calibrating the machine to isolate the fan, and control the feed motor during the catch and weigh test. Select the agitator for use with grass seeds or other product that requires agitation. Remember to switch back on after calibrating.

The LED lights indicate switched off status or problems with the fan / hopper level contents / feed motor / agitator as indicated – they will light when the various items are switched off or have a problem – for example if the hopper contents are too low.

