



Hybrid Fertiliser Drill



Operator's Manual

Original Instructions

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Contents

Introduction	3
Identification of the Machine	6
Directive Provisions	7
Airborne Noise Emissions.....	7
Warnings and Cautions	7
Equipment Overview	8
Preparation	8
General	8
Connecting the Drill to the Tractor	9
Marker Arms.....	12
Radar Recalibration Process	13
Charging/releasing the Stone Release Pressure	14
Navigating the Control Unit (brief guide)	16
Main Screen	16
Rate Screen	17
Info Screen	18
Setup Menu	19
Tramlining	20
Alarms Setup	21
Setting Up the Seeding System	22
Calibrating the Seed Rate.....	23
Overview of the Metering Unit.....	23
Method	25
Calibration Check	28
Field Use of the Drill	29
Set Machine Level	29
Set the Seeding Depth	30
Set Up the Level Board	31
Care and Maintenance	33
Lubricating Points.....	33
Tyre Pressures	34
Changing Wearing Parts.....	34
Changing Front Tines	34
Changing Shares	35
Changing Seed Boots	35
Appendix A – Artemis Fault Codes	36
Appendix B – Declaration of Conformity	43
Appendix C – Hopper to Hopper Transfer Kit.....	44
Calibration	44
Appendix D – Metering Unit Slider Positions.....	45
Small Seeds	47
Appendix E – Calibration Factors.....	48
Small Seeds	50



Hybrid Seed Drill

Hybrid Drill Warranty Registration

In order to activate your Claydon Warranty this page must be completed and returned to:

Claydon Yield-O-Meter Ltd
Gaines Hall,
Wickhambrook,
Newmarket,
Suffolk,
CB8 8YA
Tel: +44 (0) 1440 820 327
Fax: +44 (0) 1440 820 642

**IF THE REGISTRATION DOCUMENT IS NOT RETURNED THEN THE DRILLS WARRANTY
WILL BE VOID**



Hybrid Drill Warranty Registration

NAME:

ADDRESS:

CONTACT NUMBER:

DELIVERY DATE:

SERIAL NUMBER:

PLEASE ENSURE:

- The Machine is washed off upon delivery to remove any road salt,
- The drills hydraulic free flow service is plugged in prior to the drill being operated.

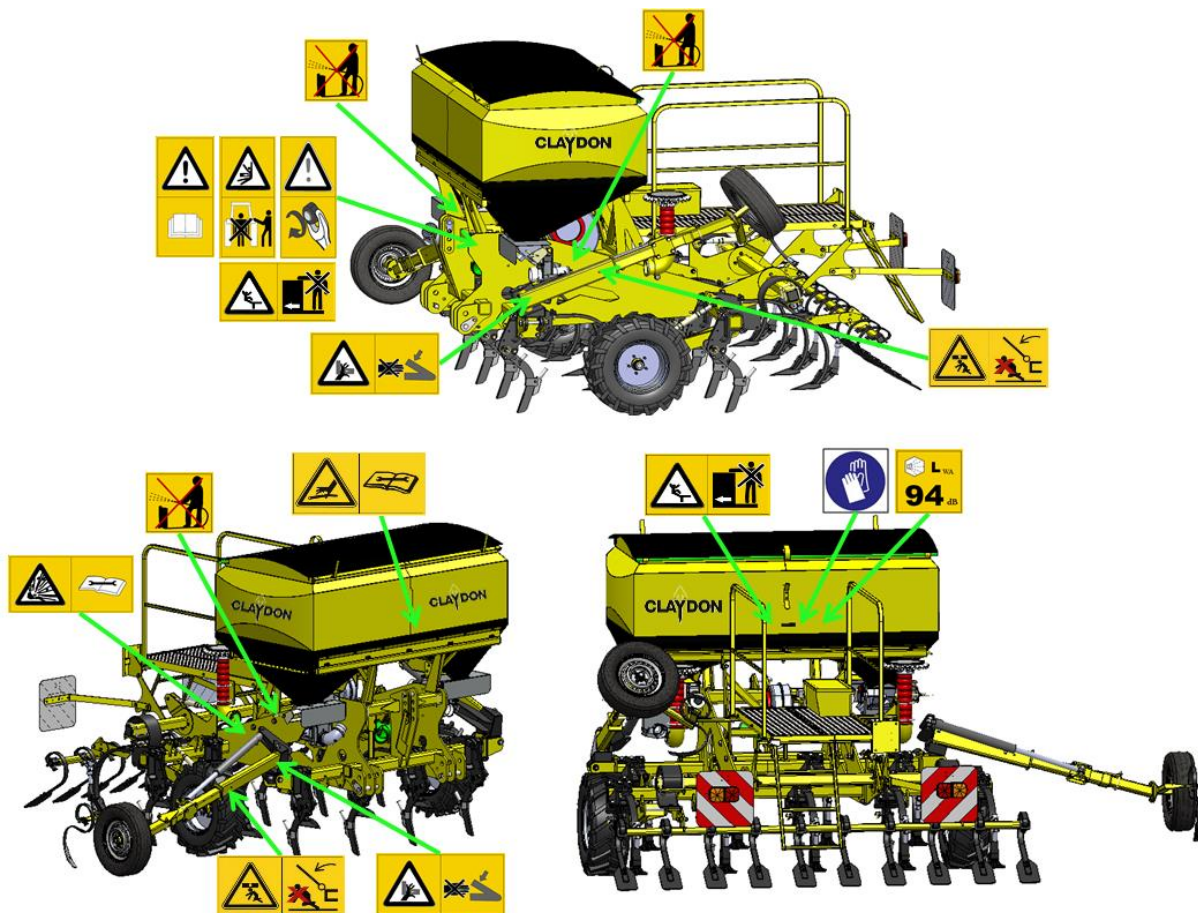
SIGNATURE:

Safety

Safety stickers can be found located on your Claydon Fertiliser drill at numerous locations, these stickers must be observed to ensure your safety and that the machine is operated in a safe manner.

Warning Symbols

If any of the stickers become illegible or peel off, new stickers can be ordered and attached in the appropriate position. The stickers must not be removed.



Meaning of warning symbols:



Read the operating manual carefully.

Prior to operating the machine the manual must be read fully and understood. Special attention should be applied to the Warnings and Cautions section.

Do not stand between the tractor and the machine.

Standing between tractor and the drill is especially prohibited during coupling and uncoupling.



Riding on the machine is prohibited.

Serious or fatal injury can occur as a result of riding on the machine.



Proceed with care in the event of leaking hydraulic fluid.

Defective hydraulic hoses or incorrectly seated hydraulic couplings can trigger unpredictable machine movements and cause injury.



Keep clear of slewing range.

There is an extreme risk of injury from slewing or folding machine parts.



Do not pressure wash locality.

Electronic components will be seriously damaged if event occurs.



Machine noise levels.

Noise level of fan during operation (decibels).



Wear gloves.

Gloves must be worn when handling product or performing maintenance tasks.



Risk of crushing.

Gaps between components may become smaller or disappear completely.



Caution, danger of explosion.

Disassembly and re-pair work must be completed by a qualified person only. Accumulators contain pressurised gas and oil.



Retighten all nuts.

All nuts should be checked and retightened after a few operating hours. Nuts may come loose due to machine vibration.



Hybrid Seed Drill

Introduction

Thank you for your purchase of a new Claydon Hybrid Fertiliser Drill. The Claydon Hybrid Fertiliser Drill is a high performance drill designed to sow fertiliser alongside seed of a wide variety type and size. Due to its electronically controlled metering system this is achieved accurately and economically.

The purpose of this Operator's Manual is to comprehensively explain to the operator how to set up, use and maintain the machine.

It is important that the operator reads this manual carefully to correctly set up, use and maintain the machine safely. In particular, it is essential that the Warnings and Cautions section has been read carefully.

For any further assistance or explanation please contact Claydon Yield-O-Meter using the contact details given on the front cover and quoting the serial number stamped on the left hand plate near where the top link attaches.

The Claydon Hybrid Fertiliser Drill will give many years of excellent service with little maintenance due to its robust construction and its small number of moving parts. However, for optimum machine life some maintenance will be necessary.

We reserve the right to make future modifications to the machine that could make some diagrams and descriptions in this manual 'out of date'. While the clarity of the manual should not be affected by this, please bring any concerns to the attention of Claydon Yield-O-Meter Ltd for us to resolve the problem.

Identification of the Machine

The Hybrid Fertiliser Drill possesses the following specifications:

Machine	Working Width	Transport Width	Weight Approx. Unladen	Max Hopper Capacity (Seed and Fertiliser)	Number of Working Rows
3m	3m	3m*	1700 kg	2400 L	9

*With level boards removed.

In addition to the machine identification plate, the serial number of the machine is stamped into the left hand main mounting beam.



Location of serial number



Detail of serial number (enhanced)

Record your serial number here:

You may need to quote the serial number of your machine when you order spare parts in the future.

Directive Provisions

The Claydon Hybrid Fertiliser Drill conforms to Machinery Directive 2006/42/EC (see Appendix B – Declaration of Conformity).

Airborne Noise Emissions

The A-weighted emission sound pressure level of measurements taken directly at the fan is 94dBA.

Warnings and Cautions

These warnings and cautions must be observed when operating the Hybrid Fertiliser Drill.

- Ensure total weight of tractor/drill combination does not exceed permitted limits and weight of tractor is sufficient for safe field and road use.
- Do not allow anyone to stand between tractor and drill during coupling/uncoupling procedures.
- For maintenance/adjustment of the drill ensure that it is lowered to the ground on the 3 point linkage.
- Seed dressing is highly poisonous so protective measures-gloves, goggles, facemask must be used while loading the hopper and cleaning the machine after use with compressed air.
- The hydraulic system on the machine operates under high pressure and pressurised hydraulic oil is dangerous. Connecting/disconnecting the drill must only be undertaken with the tractor engine turned off and the pressure in the hoses released.
- Before operating the machine ensure no-one is standing within range of its turning circle-including the marker arms.

IMPORTANT INFORMATION for Drills with Hydraulic Stone Protection System:

- BEFORE pressurising the stone protection circuit, ensure that the drills hydraulic free flow service is plugged in as the overflow pressure is directed into this circuit and dissipated back into the tractor through the free flow return, this will avoid damage to the stone protection circuit or fan motor **(which are not covered by warranty)**.
- Always release the pressure from the stone protection system before working on the hydraulic system.
- Release the pressure from the stone protection system for over winter storage and allow the rams to go to closed centres allowing the rods some protection against corrosion.
- The Tungsten points on the leading tines should be protected by parking the drill on wooden boards.

Equipment Overview



The terms 'front' 'rear' 'left' and 'right' in this manual refer to the machine as follows:

1. 'Front' indicated the three point linkage end of the machine.
2. 'Rear' indicates the machine end on which the steps are mounted.
3. 'Left' indicated the left of the machine as you look at the machine from the rear.
4. 'Right' indicates the right of the machine as you look at the machine from the rear.

Figure 1 - Overall view

Preparation

General

On taking delivery check for any possible damage that could have occurred during transit. Remove all loose parts (harrow tines, level boards etc.) that may have been stored in the seed or fertiliser hopper for transit and fit to the machine.

A tool box is supplied and contains the following items:

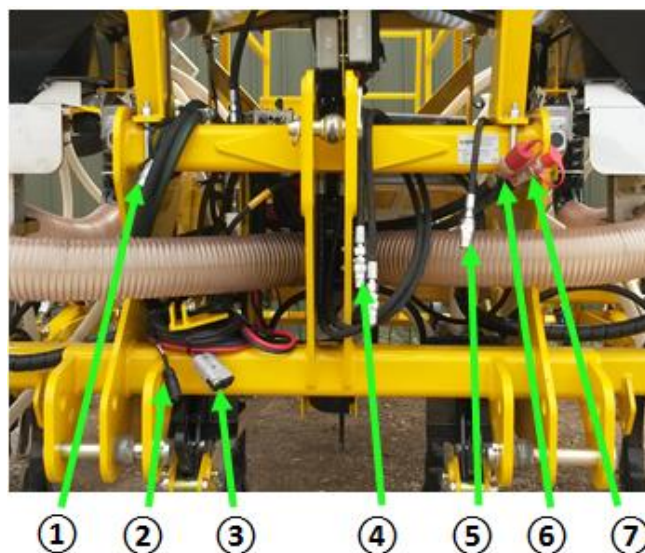
- 1 x Quick Release Tool
- 1 x Spare Front Tine (Part No SBA152)
- 1 x Pack of Shear Bolts (Shear Bolt version machines only)
- 2 x M16 U-Bolts for Tine
- 1x Control Unit and Cable
- 1 x Control Unit Mounting Bracket and Bolts
- 1 x Tractor Power Cable
- 1 x Claydon Instruction Manual
- 1 x Claydon Instruction DVD
- 1 x Parts Catalogue
- 1 x RDS Operation manual
- 1 x Calibration Scales
- 1 x Fan 1" ISO with 18L male thread

Please contact Claydon if any are missing.

Connecting the Drill to the Tractor

The Claydon Drill can be mounted onto any CATIIN or CATIVN compatible three point linkage with the linkage pins supplied and CATIIL balls (not supplied).

Connect the main power cable supplied with the RDS Artemis Control Unit directly to the battery terminals. Run the cable to the tractor cab by a safe route so that it can't be caught or snagged.



Connections

Color

- | | |
|--|-------|
| 1. Light cable | - |
| 2. Data cable for RDS box | - |
| 3. Electrical cable | - |
| 4. Marker arms | Green |
| 5. Stone protection* | White |
| 6. Hydraulic fan (Free flow service 18L connector) | Blue |
| 7. Hydraulic fan (Pressure) | Red |

*Optional extra

Figure 2 – Tractor connections

The following labels (Figure 3) can be found located on the front of the drills seed hopper, these labels specify the corresponding hydraulic connections and there color coded indicators. The amount of hydraulic services on your Hybrid drill will alter depending on the specifications and the drills width.

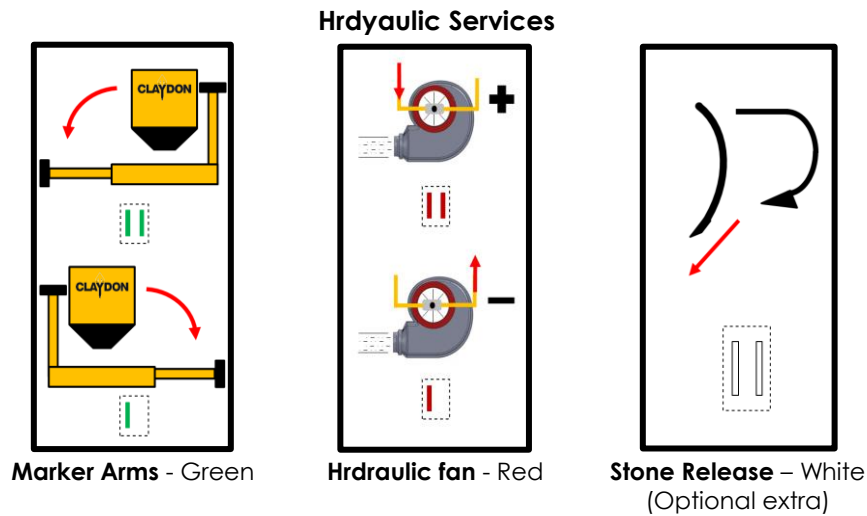


Figure 3 – Labels for hydraulic services

Mount the RDS Artemis Control Unit in a position in the cab easily visible and reachable from the driving position.

Mount the drill onto the three point linkage. Run the electric cables into the tractor cab and connect them to the relevant sockets within the cab (they will only fit their correct partners – see Figure 4). To avoid exposure to moisture, keep the connections inside the cab wherever possible.

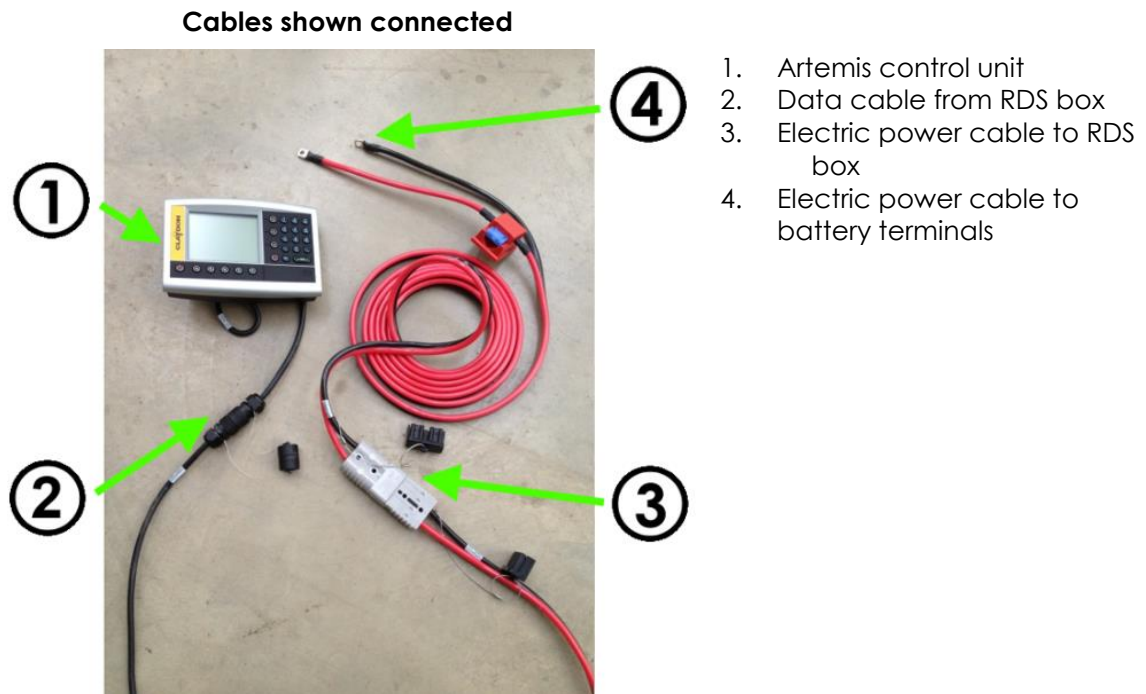


Figure 4 – Electric cable connections

CAUTION: MAKE SURE THE FAN RETURN IS PLUGGED INTO A 'FREE FLOW RETURN' ON THE TRACTOR.

Connect the hydraulic hoses to the tractor spools in their relevant pairs. The 1" ISO female coupling with 18L male thread supplied with your drill will have to be connected to the tractor rear axle. If necessary, your tractor dealer will advise. The return pipe cannot just be inserted into the filler cap as the oil cannot return to the pump sufficiently quickly in many tractors. **DO NOT CHANGE THE 1" ISO TO A DIFFERENT SIZE AS THIS COULD CAUSE DAMAGE TO THE MOTOR, WHICH ARE NOT COVERED BY WARRANTY.** The fan return cannot be connected to the tractor ISO.

Once the drill is attached and at the correct working depth, the top link should be set at an angle in which the convergence point between the upper and lower link arms should fall at the front axle (Figure 5). This can be achieved by altering the top link pin attachment points on the tractor and drill. This ensures stability and the mass of the implement is used correctly.

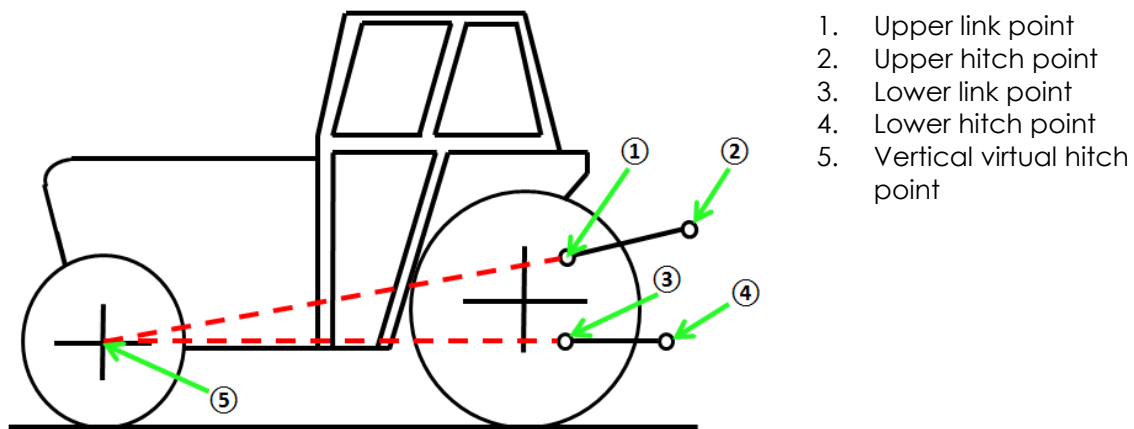


Figure 5 – Top link convergence position

Marker Arms

On delivery of the drill the marker arms may be in their shortest position for transport. Both marker arms will have to be set up for the working width of the machine. Additionally, should the driving position not be central (either through driver's choice or position of the seat) it may be necessary to adjust the two markers to avoid gaps or overdrilling.

Figure 6 shows where to measure from in order to set the marker arm distance followed by a brief explanation on how to achieve this. It is advised to carry out this process when the drill is in the ground and at the correct working depth.



1. Marker arm extended
2. Marker arm folded in
3. Working width of the machine, from the centre of the middle tine to the centre of the marker point
4. Locations of bolts to adjust aggressiveness of marker tines

Figure 6 – Marker arms

Measure horizontally from the centre of the middle (leading) tine on the machine to the centre of the marker point (the spring tine at the marker arm, that runs behind the wheel), with the marker arm swung out completely. This measurement needs to be equal to the width of the machine, e.g. for a 3m wide machine the measurement between the two points must be 3m. To lengthen the marker arm, slacken the U-Bolt, slide the arm out to the correct length and retighten.

If the marker arm tine is not aggressive enough during operation, then a more prominent mark can be made by adjusting the tine angle. This is achieved by slackening the bolts at the stub axle shaft and allowing the whole unit to pivot round on the slotted holes (Figure 7).

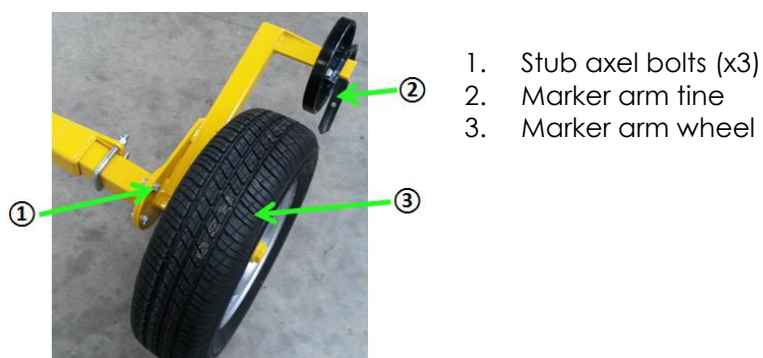
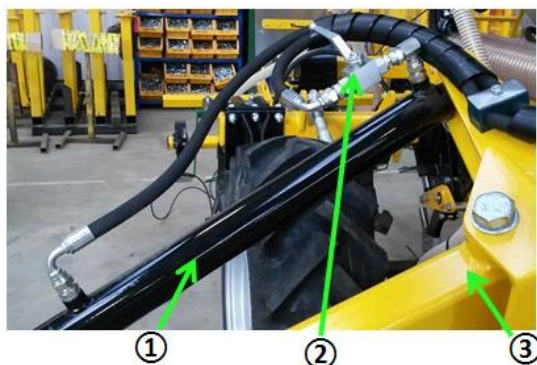


Figure 7 – Stub axle marker arm arrangement

When the drill is in transport, the Hydraulic valve taps (located on the hydraulic cylinders, Figure 8) should be locked off to prevent the marker arms being unfolded.



1. Marker arm cylinder
2. Hydraulic valve tap (currently in the closed position)
3. Marker arm

Figure 8 – Location of marker arm isolation valve taps

Radar Recalibration Process

Once your Hybrid Fertiliser Drill is fully connected to the tractor it is recommended that the drills radar should be recalibrate. Firstly a 100m stretch should be measured out and marked using two indicators. The drill should be in the ground and the tractor should be stationary at the beginning of the 100m run. It is recommended that the marker arm should be extended out so it can be used as a guide when crossing the second indicator.

Figure 9 displays how to navigate the Artemis control box in order to select the radar recalibration process once the tractor and drill are in position.

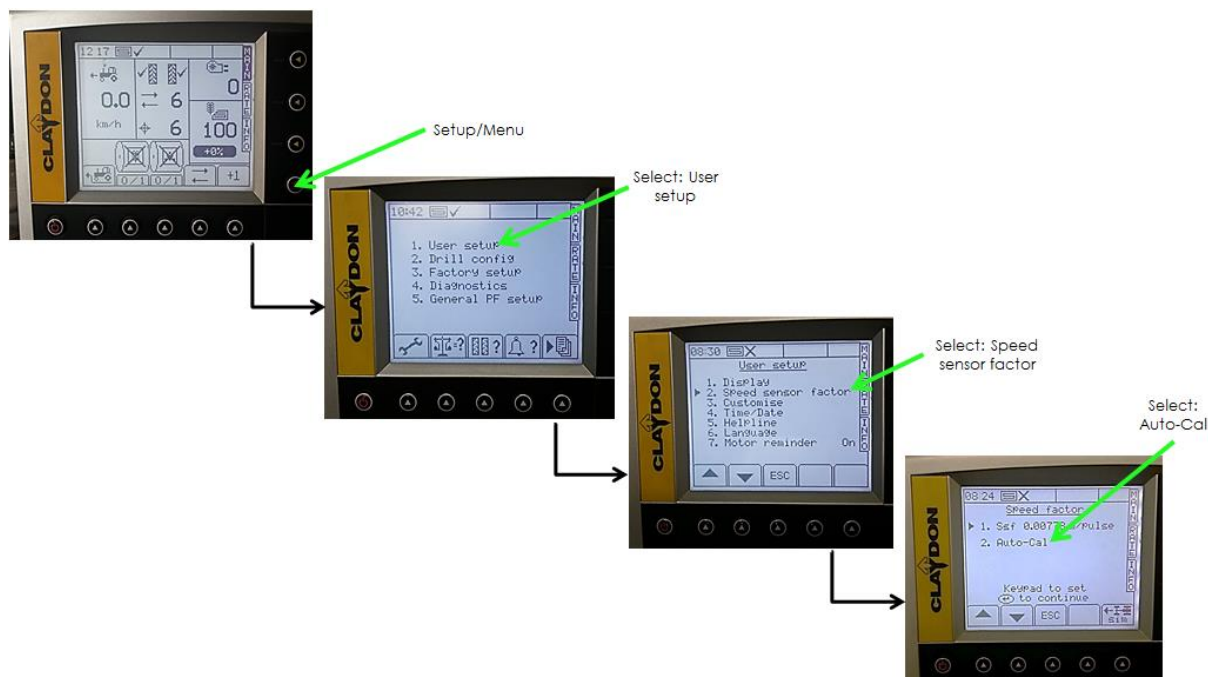


Figure 9 – Radar recalibration sub menu

By selecting the "Auto-Cal" option the radar calibration procedure can now begin, this procedure should start from a standstill and come to a stop at the 100m indicator. The screens displayed on the Artemis box during this procedure can be seen in Figure 10.

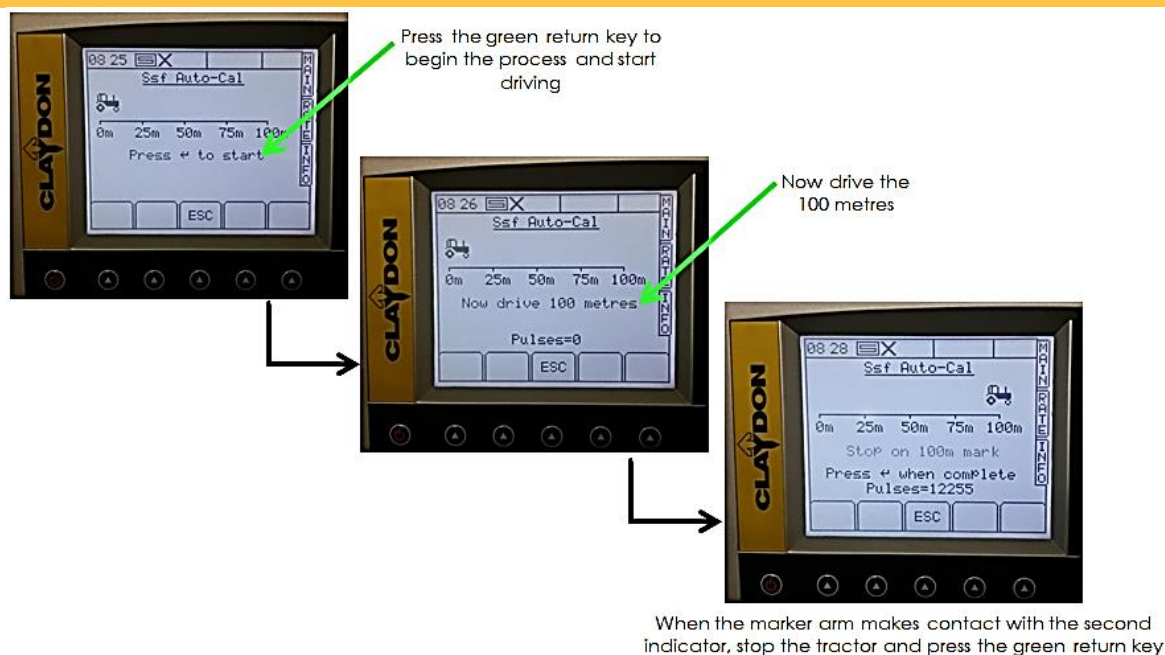


Figure 10 – Radar Auto calibration process

On completion of the 100m run a new factor will be displayed, the green return key must be pressed once more to accept and store the new factor. Once the new factor has been stored the control box will return to the Setup menu.

Charging/releasing the Stone Release Pressure

(Hydraulic Stone Protection Machines only)

The optional Stone Protection System is designed to safeguard the drill from damage when operating in stony conditions.

The hydraulic free flow return on the drill **MUST** be plugged into the tractor otherwise the pressure released from the stone protection circuit can damage the hydraulic motor. **The hydraulic fan motors are not covered by warranty.**

Plug the hydraulic pipe leading from the valve assembly (mounted under the seed hopper) into the tractor. Turn the tap to the 'open' position (parallel to the direction of the pipe Figure 11); this may release the pressure from the circuit back into the tractor depending on the spool valve position.



Figure 11 – Tap in open position

Before carrying out work on the hydraulic stone protection system, the pressure gauge (highlighted in Figure 12) **MUST** read 0 with the spool valve in float or open position. It is dangerous to work on the hydraulic circuit while it is under pressure.



Figure 12 – Stone Protection pressure gauge

Using the tractor's hydraulics, the circuit needs to be pressurised to the required pressure (maximum pressure is set to 110 bar {1600 psi} from the factory). In the event that it is higher or lower, please call Claydon for guidance on how to adjust it (see Contact Details on the front cover).

When the required pressure is met, turn the tap to the 'off' position (at a right angle to the direction of the hose Figure 13).

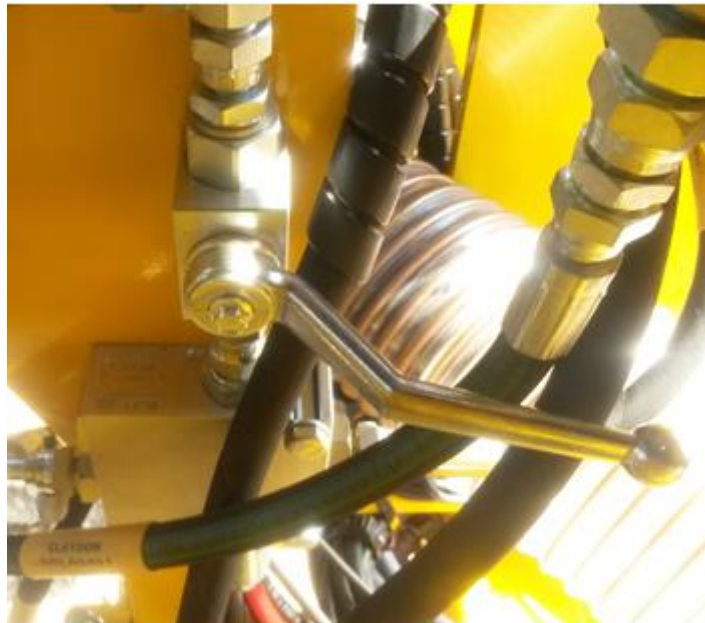
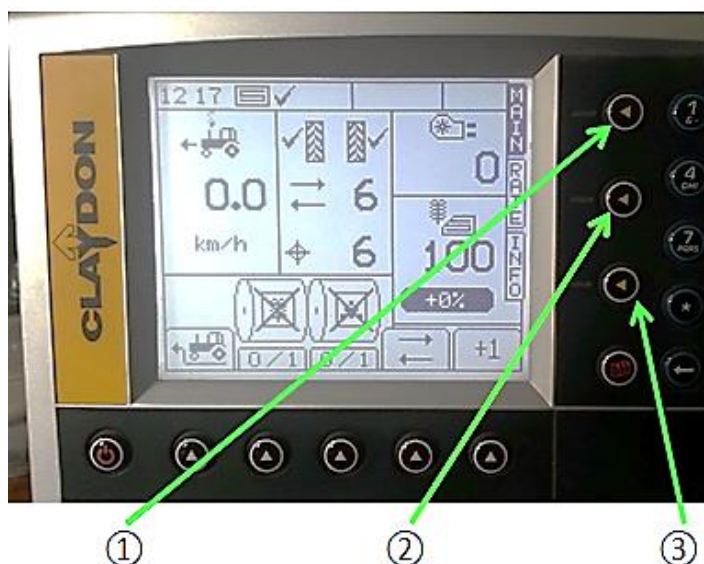


Figure 13 - Tap in closed position

Navigating the Control Unit (brief guide)

This is a brief guide to using the RDS Artemis Control Unit while in work. The RDS manual supplied with the machine should be read for full instructions.

The Artemis display has three main screens which can be selected using the arrow buttons on the right hand side of the display. The screens are Main, Rate and Info.

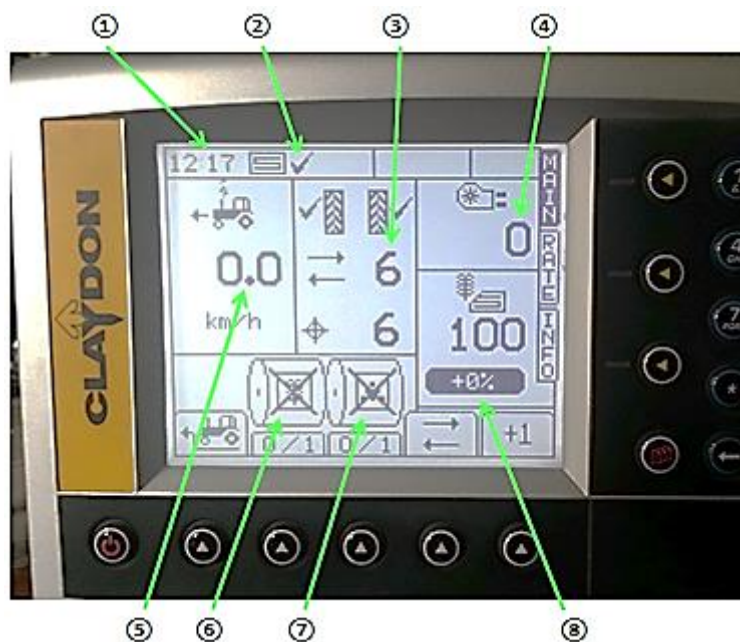


1. Press to select Main screen
2. Press to select Rate setting screen
3. Press to select Info page

Figure 14 - Screen selection

Main Screen

An overview of the Artemis Main screen can be seen in Figure 15; this screen will be displayed when the control box is first turned on and whilst in work. Figure 16 displays the navigation buttons located on the Artemis box.



1. Time
2. Area cut out status
(✓ = In work, X = Out of work)
3. Tramline number
4. Fan speed (rpm)
5. Forward speed
6. Manual Override Seed Metering (On/Off)
7. Manual Override Fertiliser Metering (On/Off)
8. Seed rate

Figure 15 - Main screen indications

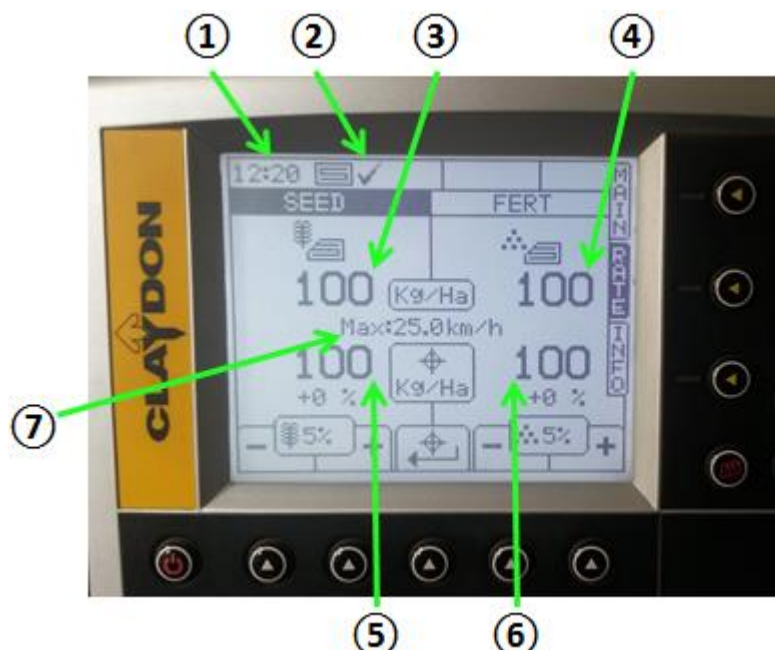


1. Setup Menu
2. Go to INFO Screen
3. Go to RATE Screen
4. Go to MAIN Screen (currently displayed)
5. Number Key Pad
6. Power On/Off Button
7. Pre-Start, starts metering unit prior to moving forward
8. Manual Override Seed Metering (On/Off)
9. Manual Override Fertiliser Metering (On/Off)
10. Auto Tramline advance (On/Off)
11. Tramline number nudge (tramlines come on when on highest number, 6 of 6 in this case)
12. Backspace key
13. Enter Key

Figure 16 - Main screen controls

Rate Screen

Figure 17 displayed the Rate screen sub menu for seed and fertiliser, the corresponding buttons and their functions can be seen in Figure 18.



1. Time
2. Area cut out status (✓ = In work, X = Out of work)
3. Seed rate set
4. Fertiliser rate set
5. Seed rate applied (current)
6. Fertiliser rate applied (current)
7. Max drilling speed

Figure 17 - Rate screen Indications

Press the Enter key to toggle between seed and fertiliser to adjust the target rate using the number pad.

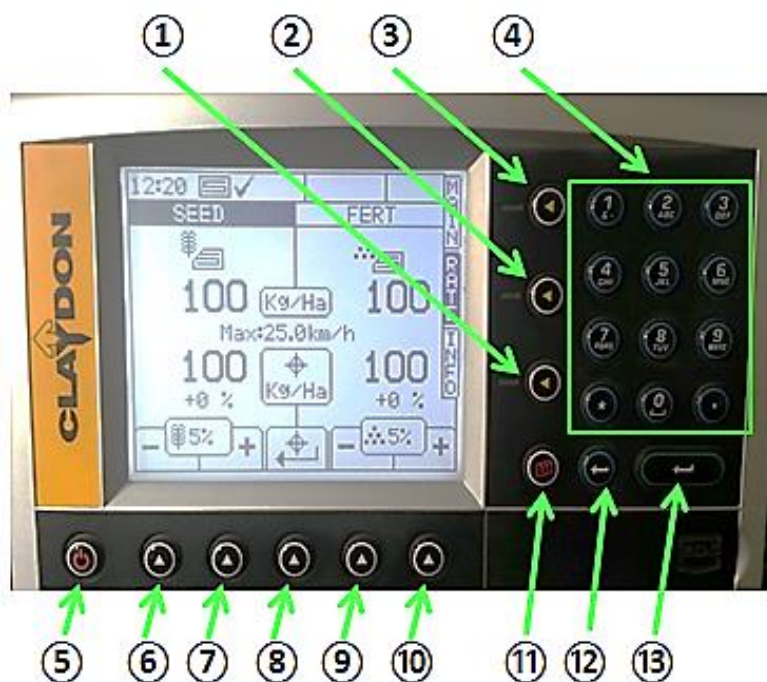


Figure 18 - Rate screen controls

1. Navigate to INFO Screen
2. Navigate to RATE Screen (already there)
3. Navigate to MAIN Screen
4. Number Key Pad
5. Power On/Off
6. Decrease Seed Rate by 5%
7. Increase Seed Rate by 5%
8. Return Seed Rate and Fertiliser Rate to Original Desired Rates (100Kg/Ha here)
9. Decrease Fertiliser Rate by 5%
10. Increase Fertiliser Rate by 5%
11. Setup Menu
12. Backspace Key
13. Enter Key

Info Screen

Figure 19 displayed the Info screen sub menu where the amount of hectares (Ha) and quantities of seed/fertiliser (Kg) can be viewed. The corresponding buttons and their functions can also be seen in Figure 20.

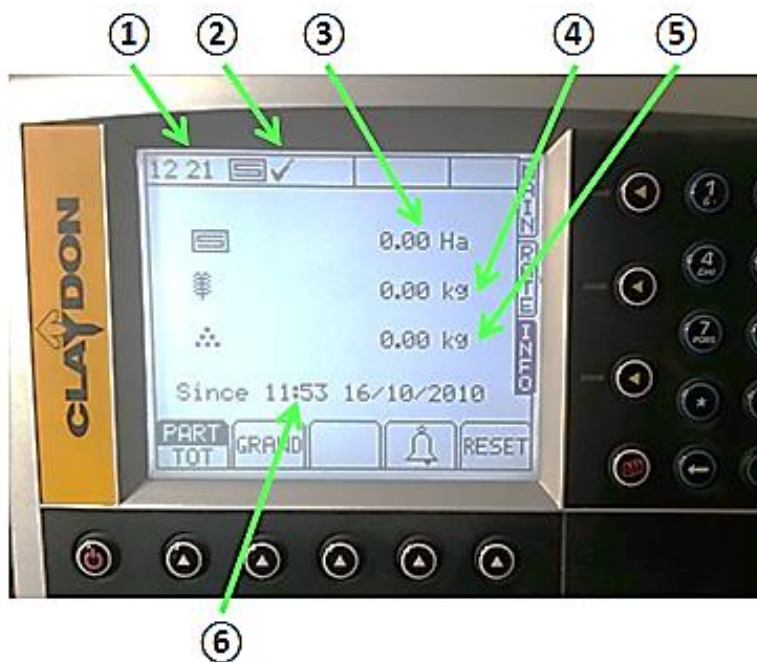


Figure 19 - Info screen indications

1. Time
2. Area cut out status (✓ = In work, X = Out of work)
3. Area covered (Ha)
4. Seed dispensed (Kg)
5. Fertiliser dispensed (Kg)
6. Time in operation since date

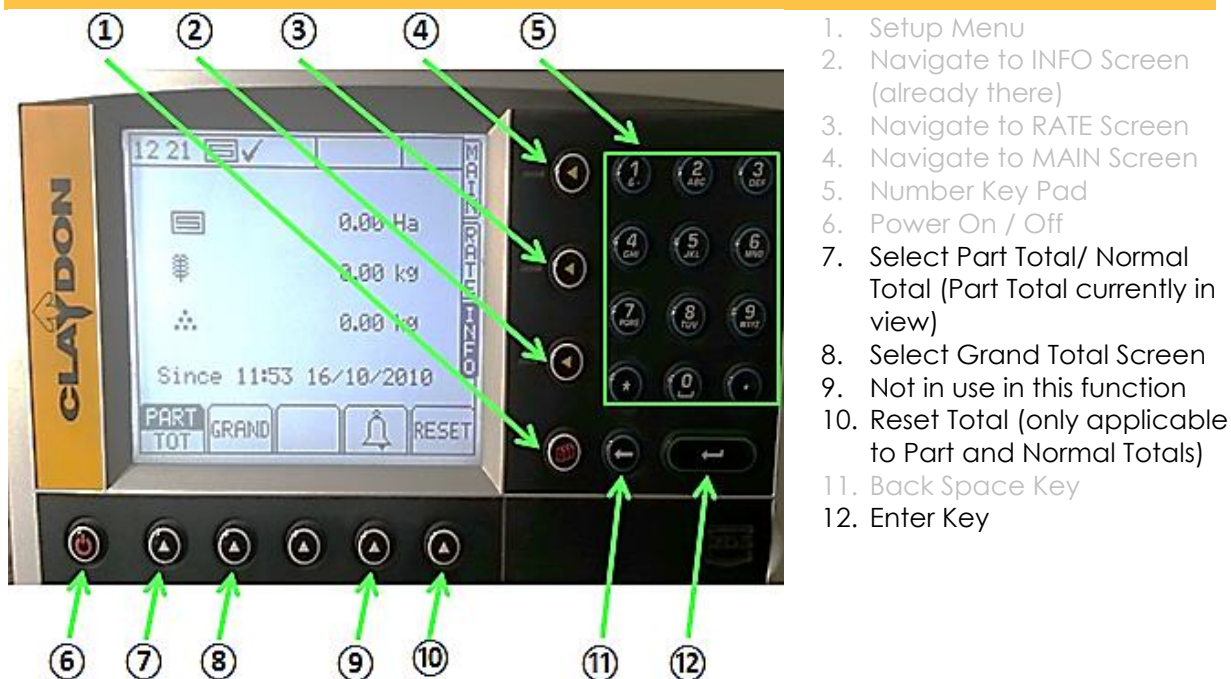


Figure 20 - Info screen controls

Setup Menu

On pressing the Setup Menu key the screen displayed in Figure 21 will be shown, shortcut keys are now present along the bottom of the screen; the corresponding buttons are positioned directly under each option.

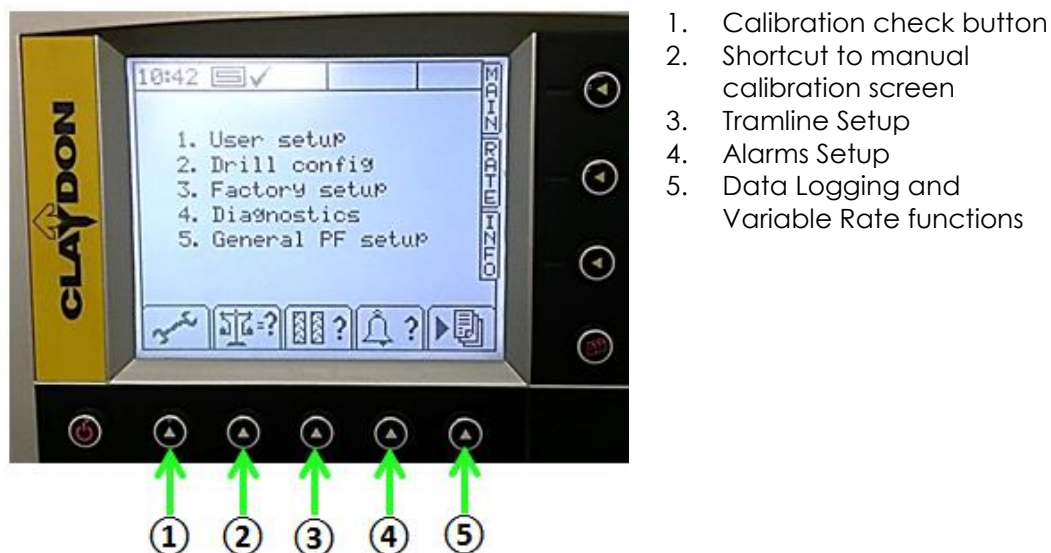


Figure 21 – Shortcut keys within setup menu

The Calibration check option will be discussed in greater detail after the calibration procedure has been described. The Tramline and Alarms Setup menus will be explained in the following sections, for further information on the remaining Setup screens please consult the RDS manual.

Tramlining

In order to adjust the required tramline width or to turn the system off completely access the menu by pressing the Setup Menu key. The tramline shortcut key is now present along the bottom of the screen (Figure 22).

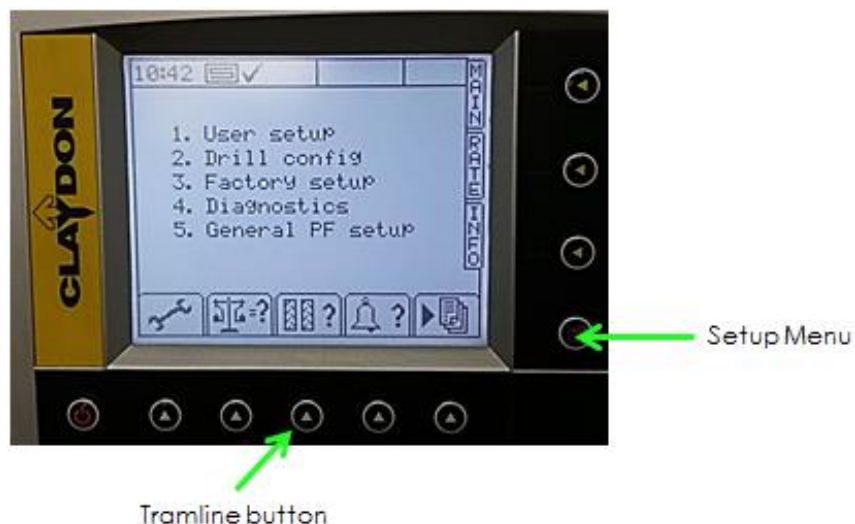


Figure 22 – Tramline sub menu screen

Once the tramline option key has been selected, the tramline setup menu displayed in Figure 23 will be displayed. Within this sub menu the spray width can be adjusted or turned off by altering the target number of bouts. Furthermore the tramline rhythm can also be altered between Symmetrical, Asymmetrical left and Asymmetrical right using the navigation keys (Figure 23).

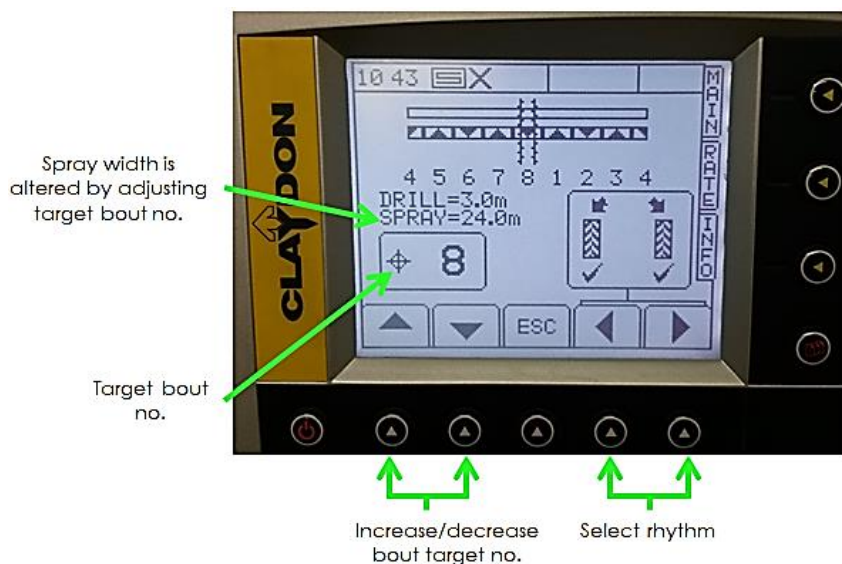


Figure 23 – Tramline sub menu screen

Alarms Setup

In order to view the fan speed alarm limits and the status of the hopper level sensors, the alarms setup menu can be accessed by pressing the alarms shortcut key (Figure 24).

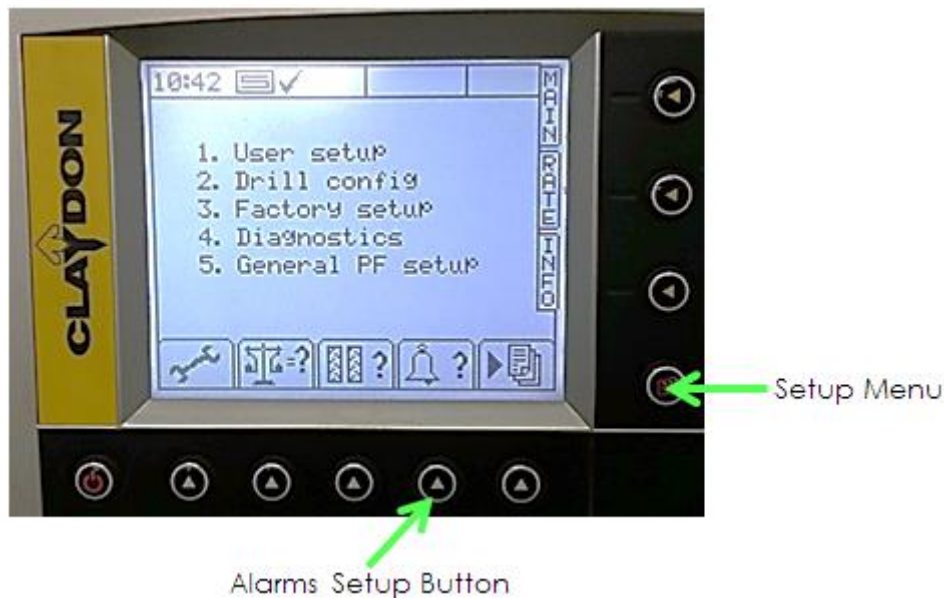


Figure 24 – Setup menu screen

Figure 25 displays the recommended fan speed threshold settings and whether the seed low level sensor is activated. If the fan speed drops or exceeds the pre-set alarm thresholds then the system will alarm and the metering units will not run.

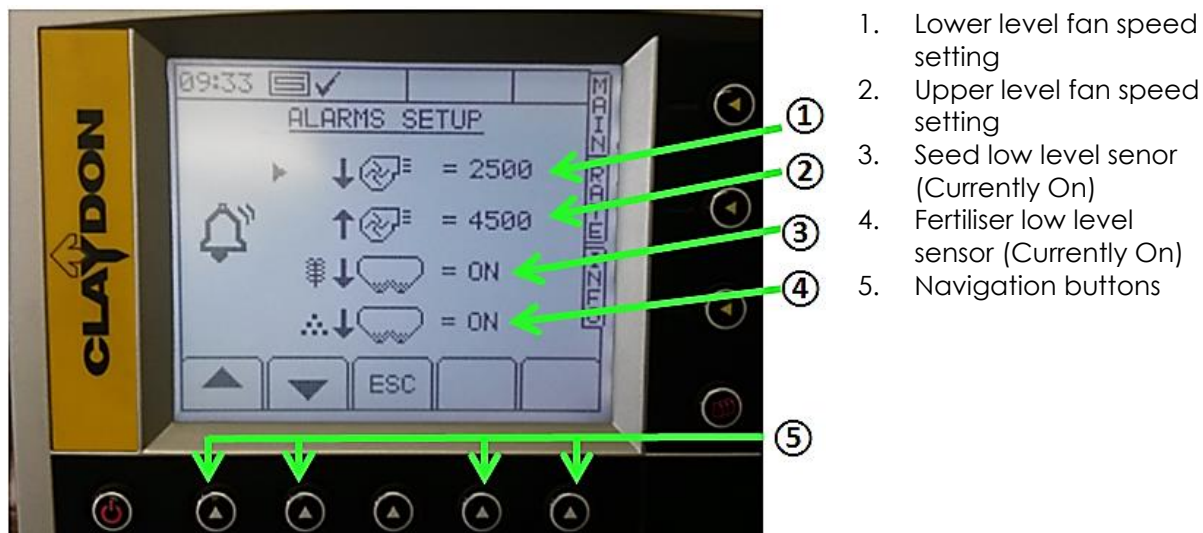


Figure 25 - Alarms setup screen

The Seed and Fertilizer low level alarms can be turned off by firstly using the navigation buttons located on the left of the Artemis unit to select the level sensor option. Once selected, use the navigation buttons on the right of the Artemis unit to turn the level sensor either on or off.

Setting Up the Seeding System

As previously described, make sure the Artemis Control Unit and all electrical connections are correctly installed. Connect the two black round connectors to power up the Control Unit.

If the Control Unit is beeping with a forward speed alarm this can be turned off by pressing the Metering On/Off button. To enable seeding, press the Metering On/Off button again.

The toggle switch comes attached to its mounting plate. Position the mounting plate to straddle the upright plate of the headstock. The drill should be placed on a solid surface while attached to the tractor. The toggle switch bracket should now be slid up or down the headstock plate until the switch is in the neutral position (in the middle) and just touching the bottom of the top link. Now tighten the pinch bolts up to lock the bracket into place. The purpose of the switch is to turn the seeding system on and off. With the drill in the working position and at drilling depth there should be approximately 5mm clearance between the switch and the underside of the top link.

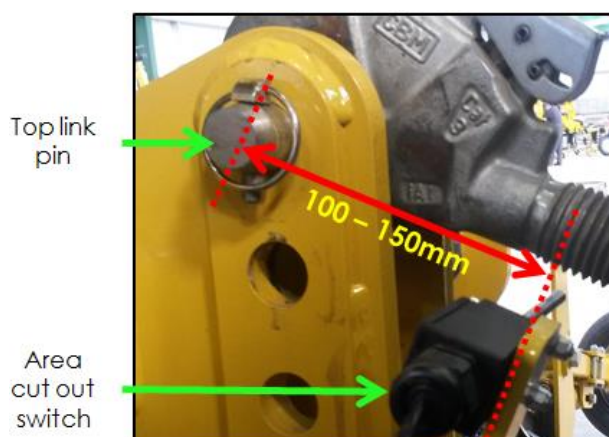


Figure 26 - Spring toggle switch shown in work position

The seed and fertiliser level sensors can each be set in three different positions for various seed and fertiliser rates. In the seed hopper, the upper setting may be used for high seed rates, the middle setting for medium seed rates and the lower setting for low seed rates i.e. Oilseed rape.



1. Setting for low seed rates (Current position)
2. Setting for medium seed rates
3. Setting for high seed rates

To adjust the hopper level sensor setting:
From inside the hopper pull the end of the bracket nearest the sensor away from the hopper and over the locating bolt head. Move the sensor to the required position and locate on the appropriate bolt head.

Figure 27 - Level sensor in lower position

Calibrating the Seed Rate

Prior to explaining the calibration process an overview of the metering units highlighting the various components can be seen in Figures 28 – 32.

Overview of the Metering Unit

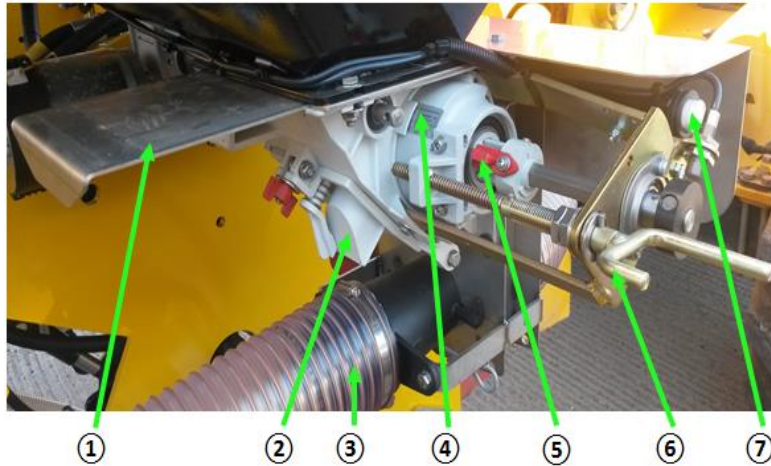


Figure 28 – Metering Unit

1. Separation slider plate (open)
2. Lid for empty seeds
3. Air pipe
4. Slider position scale
5. Red lever
6. Handle
7. Calibration button

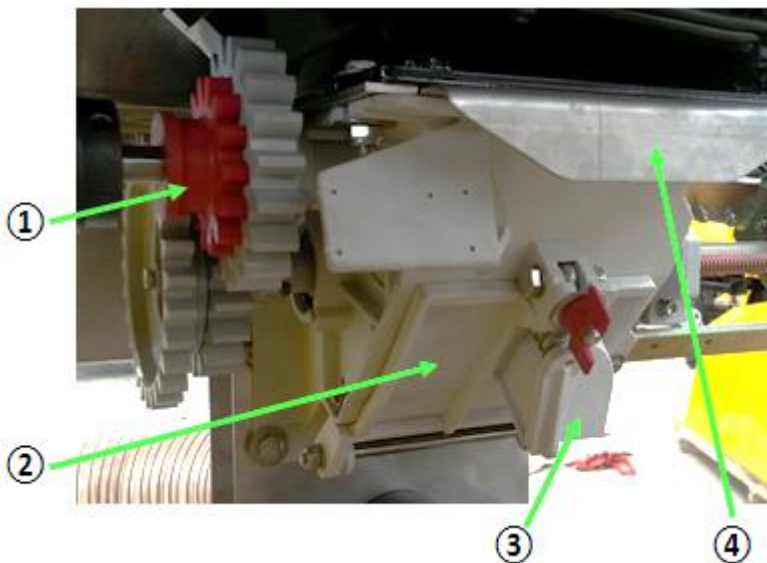


Figure 29 – Gearing

1. Red cog should always remain in the closed position (high gear)
2. Lid for emptying large seed amounts and cleaning seed wheel
3. Outlet for emptying smaller seed amounts (e.g. OSR)
4. Separation slider plate (closed)

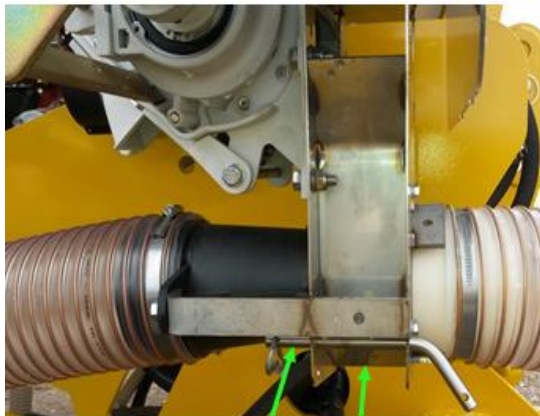


Figure 30.1 - Hinged flap closed

1. Pin
2. Hinged flap closed
3. Hinged flap open



Figure 30.2 - Hinged flap open for metering out product

Figure 30 – Venturi casing

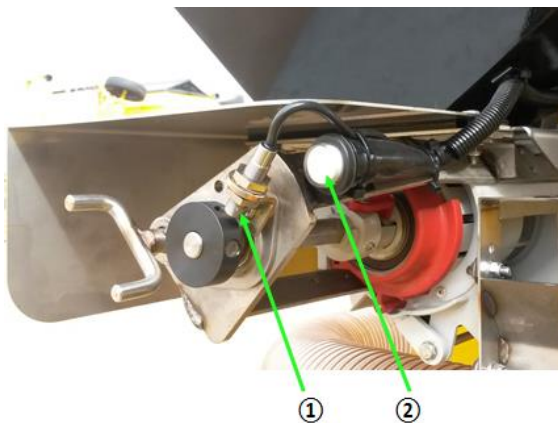


Figure 31 – Speed sensor and calibration button

1. Speed sensor for metering system
2. Calibration button

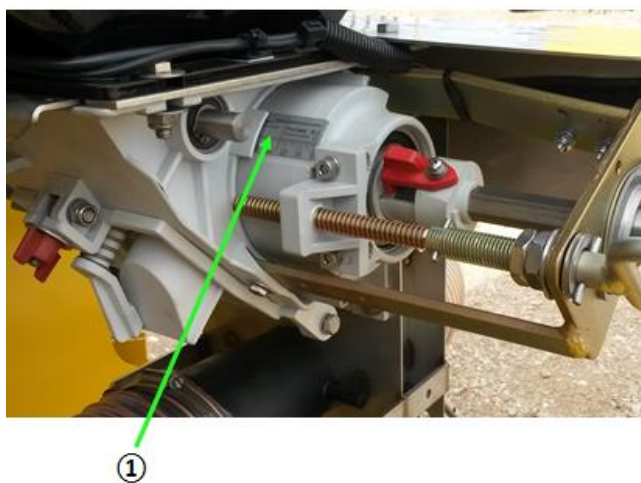


Figure 32 – Slider position

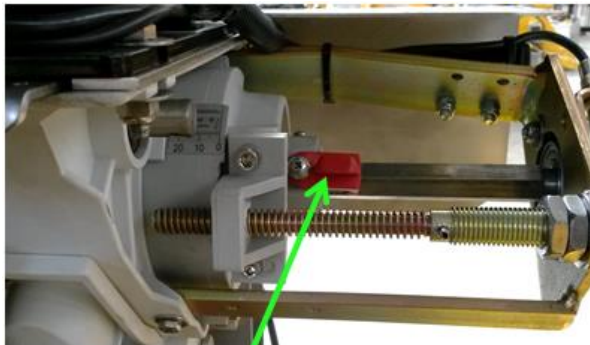
1. Slider position

Method

To make sure seed and fertiliser is being metered and sown at the required rate it is necessary to take and weigh a sample from both metering units. These weights are then entered at the Artemis Control Unit which will calculate and adjust for any error - i.e. the error being the difference in product weights between what the Control Unit calculated would pass through the metering unit per revolution and what was actually weighed. As the seed and fertiliser metering units are identical, the same calibration procedure applies to both **(N.B. If fertiliser is not required to be sown and a hopper transfer kit is present, please calibrate the fertiliser metering unit as described in Appendix C at the rear of the manual)**. With the seed hopper empty follow the method below to calibrate your drill:

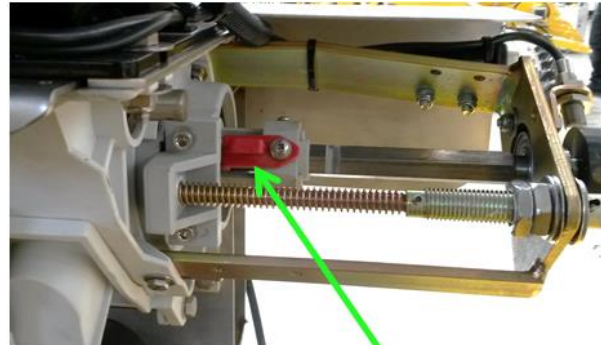
Small Seeds (OSR etc.)	Larger Seeds (Cereals etc.)
1) At the metering unit wind in the handle until it is fully closed (the O position) and make sure the separation slider plate is fully open.	
2) Turn red lever to intersect drive shaft key way (Figure 33.1).	Turn red lever so that it is not in the drive shaft key way (Figure 33.2).
3) The fan deflector Must be set parallel to pipe for all seeds (Figure 34)	
4) If necessary, ensure that the white and red gears are aligned by pushing the white button so that the red cog will insert into the grey/white cog and push into place. This setting should always be used and gives high speed gearing at all times.	
5) Wind out handle to about 15 on slider (20 max) see Figure 32. For more comprehensive details on slider positions consult Appendix D at the rear of the manual.	Wind out handle to about 80 on slider. The handle may be wound out to 100 to achieve higher speeds (see Figure 32). For more comprehensive details on slider positions consult Appendix D.
6) Remove pin from Venturi casing to allow the hinged flap to open. Place a bucket under the metering unit, prime the metering unit by pressing the white button and hold for three seconds to start the metering motor, this ensures the unit is full of seed prior to an automatic calibration. Press the white button again and hold for another three seconds to stop seed flow. Empty the bucket.	
7) To commence the automatic calibration procedure, position a bucket which you have accurately weighed in its place under the metering unit. Press the white button and hold for three seconds, to start the metering motor. When you have obtained a good sized sample, press the white button again and hold for another three seconds to stop seed flow, (the motor may not stop immediately).	
8) Weigh the bucket with the sample in accurately (Grams for small seeds kilograms for large seeds).	
9) Subtract bucket weight.	
10) At the Artemis Control Unit select grams for small seeds or kilograms for large seeds (Figure 35).	
11) Enter the weight measured (Figure 35).	
12) Press the Enter Key three times to correct the error (Figure 35).	
13) Select the rate screen (middle arrow button to the right of the screen).	
14) Type in the seeding/fertiliser rate you require on the number pad and press Enter.	
15) The Control Unit will automatically set the seeding/fertiliser rate and display the maximum drilling speed. If you consider this speed too slow you can wind the handle on the metering unit out further to allow more product through and repeat this calibration process.	

Small Seeds (OSR etc.)	Larger Seeds (Cereals etc.)
16) To check that the calibration is now correct, repeat the process, the error displayed should now be between 0% and 4%. Sometimes it is necessary to repeat the calibration process when changing between different size seeds to decrease the percentage error.	
15) Once finished, MAKE SURE both flaps on the Venturi casing are closed and the pins are replaced.	
16) Fan speed should be set between 4300 – 4500 RPM.	



Red lever intersects drive shaft key

Figure 33.1 - Red lever (on shaft) out, small seed setting



Red lever not intersecting drive shaft key

Figure 33.2 - Red lever (on shaft) in, large seed setting

Figure 33 – Red lever positions

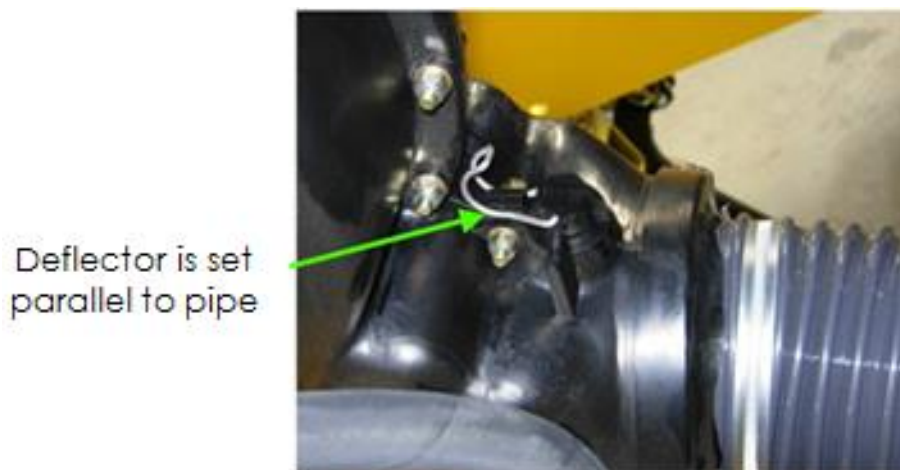


Figure 34 – Deflector settings

1) Screen displayed on Artemis control box after calibration button has been pressed.



Kg's or Gram's selected by pressing these button's

2) Enter actual weight dispensed making sure the correct units are highlighted, press Enter.



Kg's highlighted

3) Once the weight is entered and the cursor has stopped flashing press Enter again.



5) Once the stored values are accepted and saved the Setup menu will be displayed.



4) This screen will be displayed once the weight has been entered. Press the Enter key once more to accept and store the new values.

Figure 35 – Calibration process on Artemis Control Box

Calibration Check

To ensure the metering unit has been calibrated correctly, it is possible to perform a calibration check by observing the "Cal. Factor". This is checked by firstly pressing the Setup Menu button, from the Setup menu the calibration check button should then be pressed (Figure 36).



Figure 36 – Calibration check option

Once the calibration check button has been pressed the screen in Figure 37 will be displayed and the "Cal. Fact" can now be seen. This value is the kg of seed or fertilizer dispensed for each revolution of the metering unit (highlighted below).

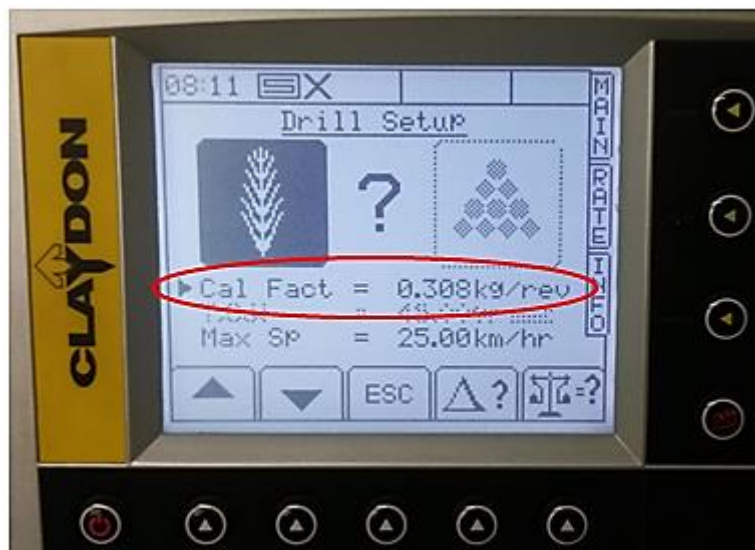


Figure 37 – Calibration Factor highlighted

This value is generated after every calibration and can now be compared against the calculated "Cal. Factors" in Appendix E (at the rear of the manual). If large discrepancies are present between the "Cal. Factors" in appendix E and what is displayed on the control box, a recalibration may be required.

Field Use of the Drill

Set Machine Level

It is important that the machine is set level from front to rear to gain accurate and consistent seed depth between the front and rear seeding tines, this is achieved by adjusting the tractor's top link. To confirm the seed drill is set up evenly, the depth wheels positioned across the width of the machine should be firstly set so the drills A-Shares scalp the field's surface when in work (Figure 38).

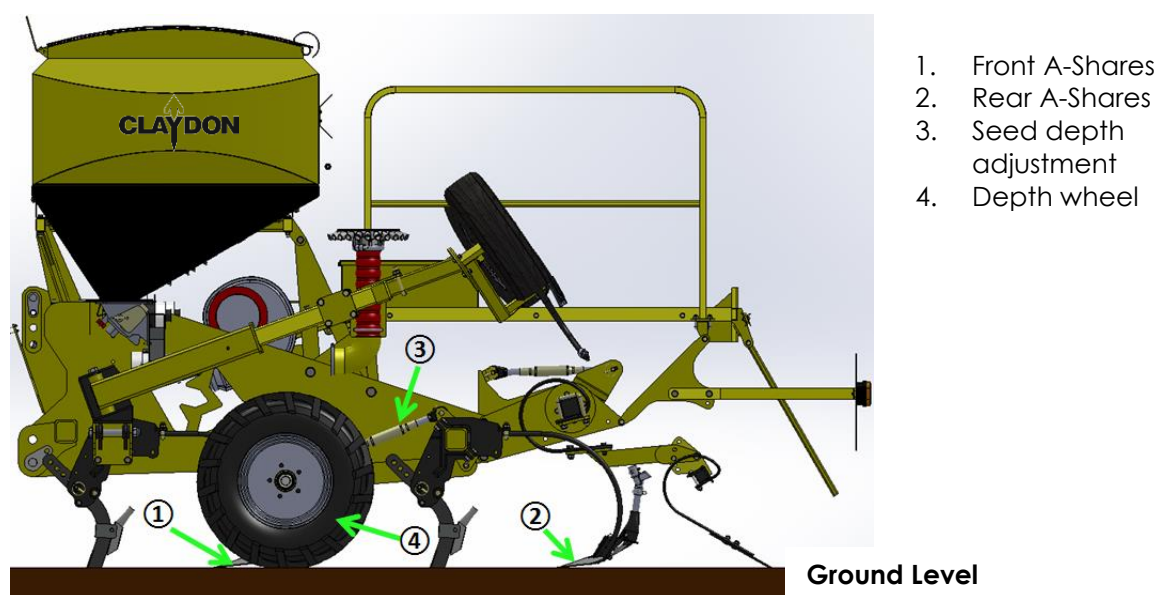


Figure 38 – Front and rear tines scalping field's surface

This can be achieved by setting the depth wheels to the measurement displayed in Figure 39. The depth can be accurately set by measuring between the lugs on the depth wheel assembly (Figure 39). By altering the depth wheels to this depth the front and rear A-Shares should scalp the field's surface evenly, if the tractor's top link has been set correctly

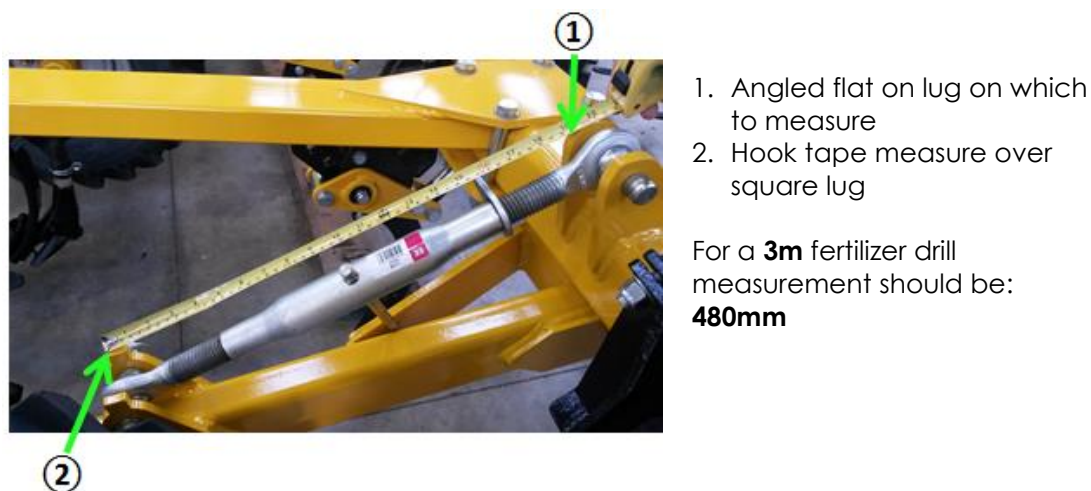
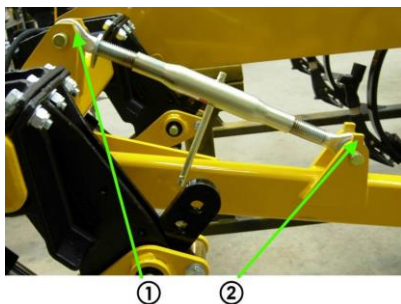


Figure 39 – Measurement lugs located on depth wheels

Set the Seeding Depth

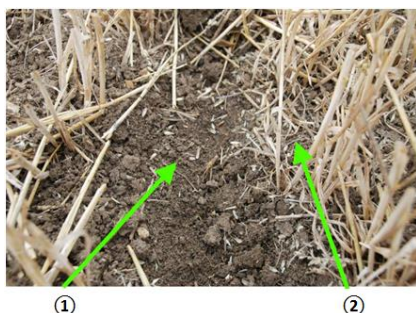
Once the machine has been set level front to rear, the seeding depth can be set by re-adjusting the top links on the depth wheels (Figure 40) positioned across the width of the machine. Check that the adjusters are all the same length with a tape measure using the position lugs as previously described (you can measure between the pins if you prefer).



1. Angled flat on lug on which to measure
2. Hook tape measure over square lug

Figure 40 - Setting seeding depth

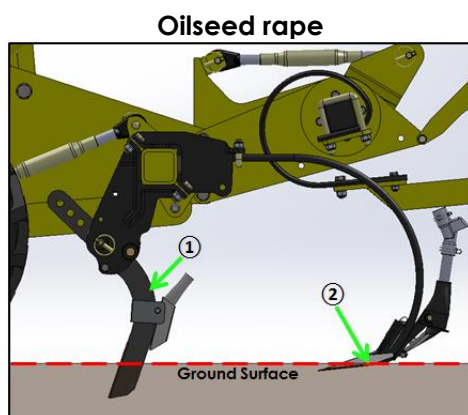
Lower the machine into the ground and drive a short distance, brush away the tilth where the straw is still attached and find the original surface level of the field. Now brush back and find the depth of the seed compared to the original level of the field. Ignore how much soil is directly on top of the seed as this will level out and settle down to the original field level.



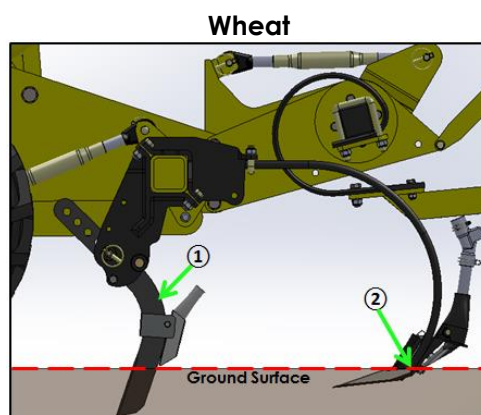
1. Seed depth
2. Original soil level

Figure 41 – Seed depth

To ensure the correct drilling depth has been achieved the depth of the drills A-Shares relative to the ground's surface should be examined. Figure 42 displays the recommended A-Share depth for Oilseed rape (shoulder of A-Share should coincide with ground surface) and Wheat (top of A-Share should coincide with ground surface).



1. Leading tine
2. A-Share depth - OSR



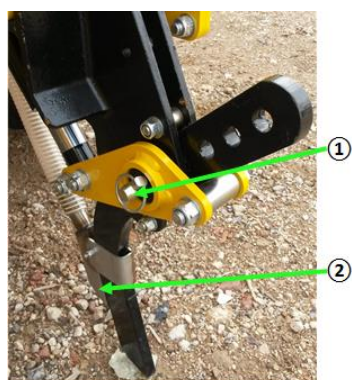
1. Leading tine
2. A-Share depth - Wheat

Figure 42 – Recommended A-Share depth for OSR and Wheat

Once the seed depth is set you can set the depth of the front tine. As a guide, the front tine should be set to approximately:

- 120 - 150mm deep for Oilseed Rape,
- 100mm for Cereals,
- 125mm for autumn Beans and Maize,
- 75 -100mm for Spring Beans.

The front tines are adjusted by simply removing the pin, sliding the tine to the required depth position hole (Figure 43) and reinserting the pin. Ensure the fertiliser boots are positioned directly behind the front tines and not submerged within the soil.



1. Remove pin and slide tine up or down to required position
2. Fertiliser boot

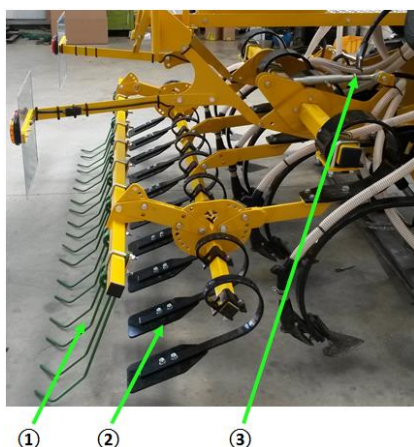
Figure 43 - Setting front tine depth

The top hole should not be used on brand new tines; it is only to be used once the tine has begun to wear. Do not operate the front tine deeper than 150mm.

Set Up the Level Board

The Level Board (also known as Batter Board or Ski Board) should be set up to drag along the top of the ridges with little down pressure. The down pressure can either be increased or decreased by altering the adjuster at the rear of the drill (Figure 44). The levelling boards are designed to level the ridges out created from the leading tine and not to perform any kind of pressing operation. The Boards should not be set at too steep an angle and should have the appearance of skiing along the surface.

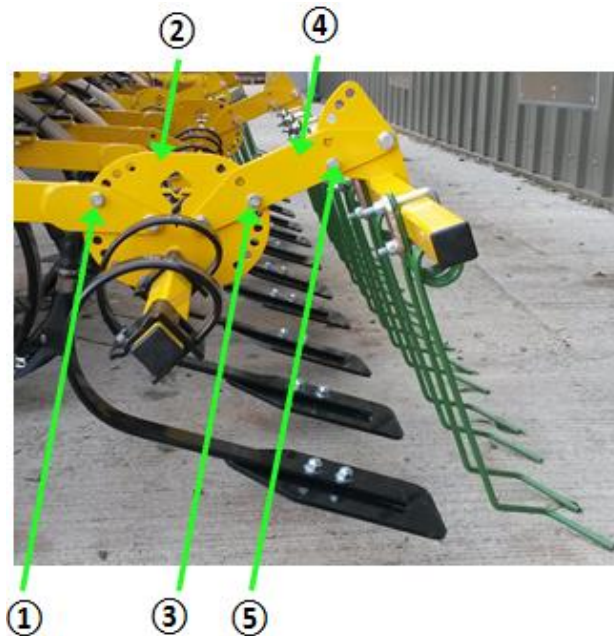
The green harrow tines may also be fitted to follow behind the levelling boards (Figure 44) or used as an alternative depending on the machine specification.



1. Green harrow tines
2. Level board
3. Level board/tine adjustment

Figure 44 - Level board

The level board angle is adjusted on the pin holes where the tool bar connects to the arms (Figure 45). The green harrow tines should be situated at an acute angle with the tail of the tine positioned firmly and parallel to the ground. This angle can be adjusted by altering the pin holes on the connecting arm (Figure 45). Figure 45 displays our suggested setting.

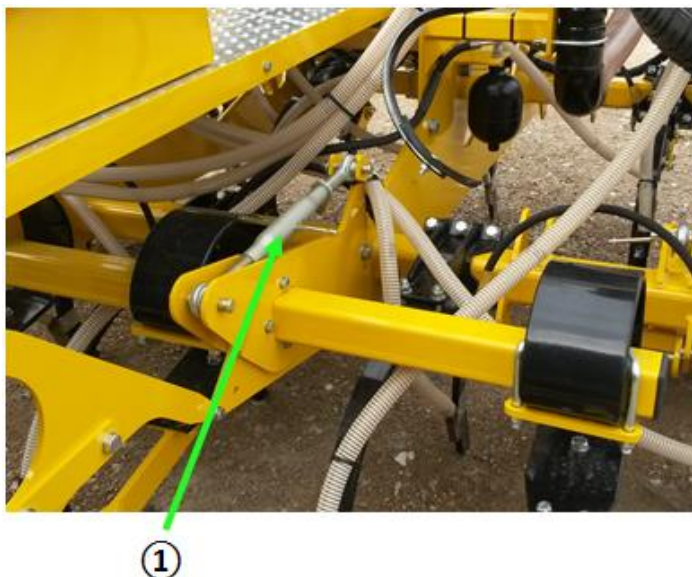


1. Remove pin to alter angle of ski boards
2. Rear tool bar
3. Remove pin to adjust height of green tines
4. Connecting arm for double tool bar
5. Remove pin to alter angle of green tines

Figure 45 - Ski boards and green tines adjustment settings

The level board height is altered on the adjuster located on the swivel beams (Figure 46). The levelling boards can be lifted completely out of work with this adjuster or have some downward pressure applied to them. Depending on the field conditions the following Ski board settings are recommended and should be achieved using the top link:

- **Wet conditions** - Remove pressure from ski boards
- **Dry conditions** - Apply pressure to ski boards
- **Ideal conditions** - Zero pressure (top link becomes loose during adjustment)



1. Level board adjuster

Figure 46 - Setting level board

Care and Maintenance

Lubricating Points

Lubrication is performed using multi-purpose grease. An overview of the greasing points for the 3m Hybrid Fertiliser Drill is shown in Figure **Error! Reference source not found.**47, with identification numbers corresponding to the detail of lubricating points in Figure 48.

Grease should also be placed on the top link pin to prevent excessive from the upper link ball.

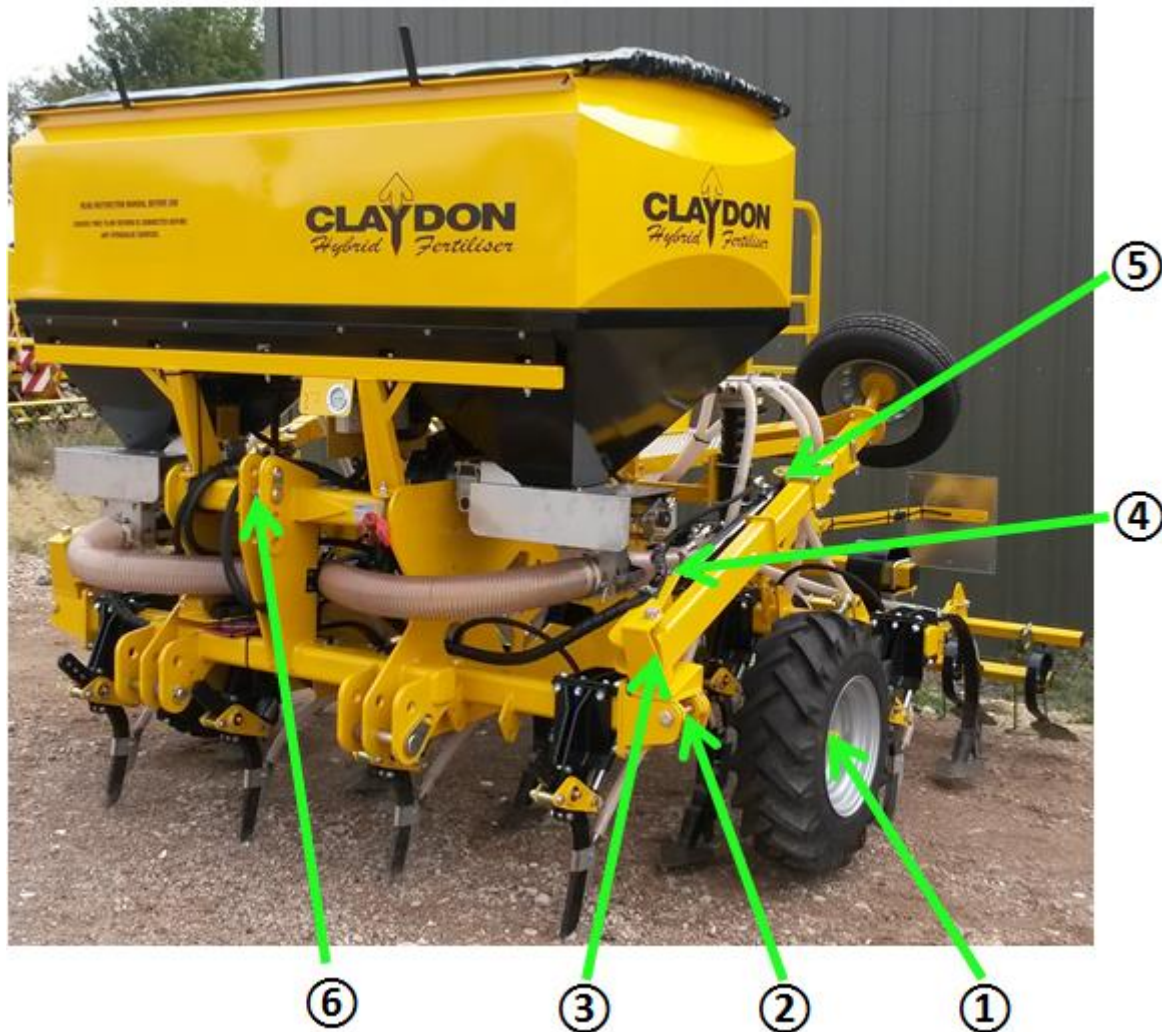


Figure 47 - Lubricating points, 3m Hybrid Fertiliser Drill

Lubrication Points to be Greased Daily		
		
1. Wheel hub	2. Marker arm pivot pin	3. Marker arm pivot pin
		
4. Marker arm ram (rod end)	5. Marker arm ram (base end)	6. Top link pin (grease at regular intervals)

Figure 48 – Details of lubrication points

Tyre Pressures

It is recommended that the wheels on the Hybrid Fertiliser Drill should be inflated to a pressure of 30 psi (2 bar).

Changing Wearing Parts

Changing Front Tines

To change the front tines, detach the fertiliser boot through unfastening the 13mm bolt, remove the lynch pin and the 19mm pin, slide the entire tine out and replace with a new one. Refit pin and lynch pin.



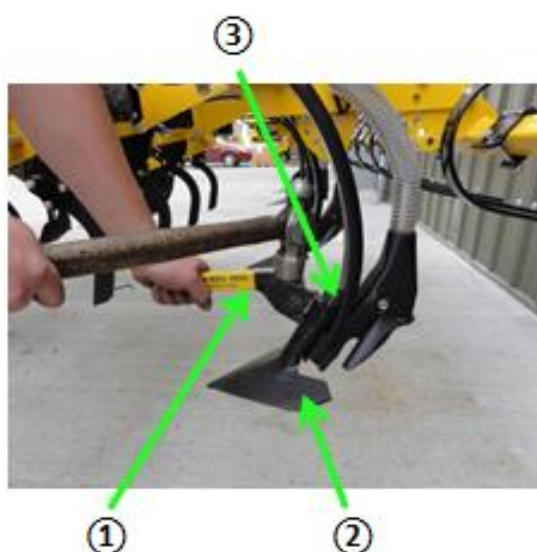
If work is required to be carried out whilst the drill is raised, ensure a substantial prop is positioned safely under the drill preventing it falling under its own weight.

Figure 49 - Changing front tines

Changing Shares

On the seeding leg, hook the removal tool (supplied) over the top of the share and push the pin down, hit the top with a hammer to remove the share (Figure 50). Now simply slide the new share up the Speed-Loc adaptor and hit the bottom with a hammer until the locking pin pushes back out.

IF WORK IS REQUIRED TO BE CARRIED OUT WHILST THE DRILL IS RAISED, ENSURE A SUBSTANTIAL PROP IS POSITIONED SAFELY UNDER THE DRILL PREVENTING IT FALLING UNDER ITS OWN WEIGHT.



1. Speed-Loc tool
2. A-Share
3. Speed-Loc adaptor



EYE PROTECTION MUST BE WORN

Figure 50 – Changing shares

NEVER HIT THE TUNGSTEN CARBIDE TILES WITH A HAMMER, WEAR GLOVES AND SAFETY GLASSES WHEN WORKING WITH THE TUNGSTEN CARBIDE PARTS. NEVER HIT THE LOCKING PIN WITH A HAMMER AND PUNCH OR ANYTHING SIMILAR AS THIS WILL DAMAGE THE SPRING.

Changing Seed Boots

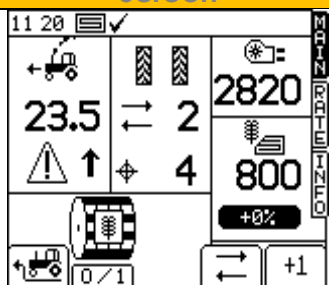
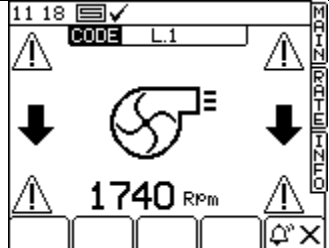
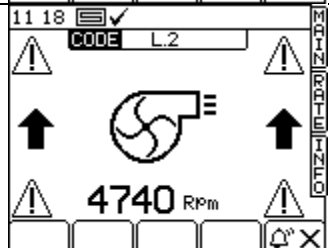
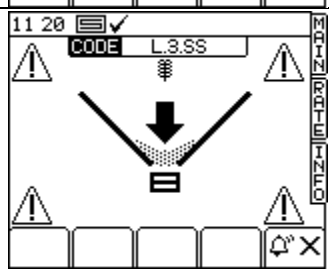
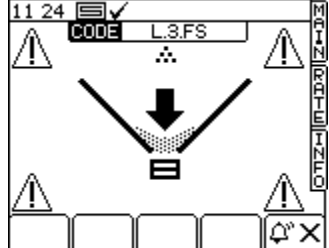
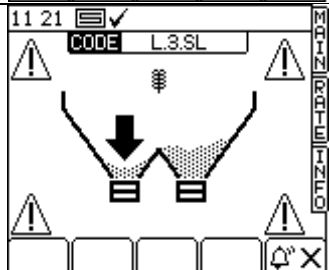
To remove and refit the seed boot undo the nut, remove the bolt and let the boot drop out of the boot holder, place new boot in holder and push bolt back into place, retighten the nut.

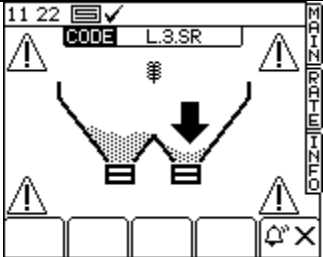
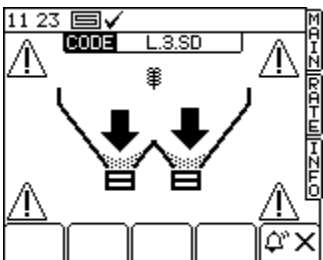
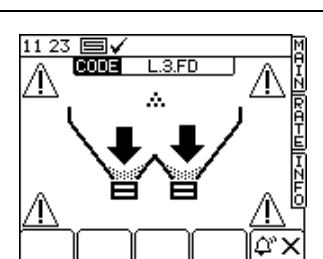
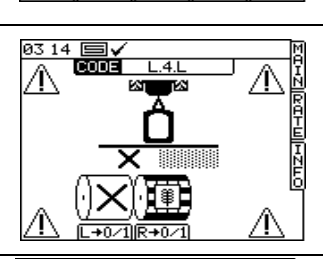
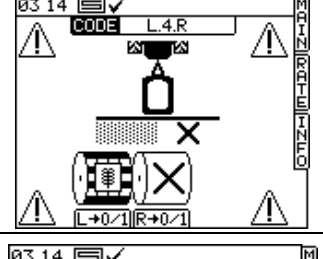
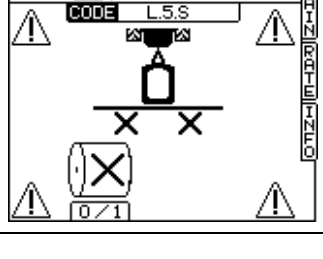


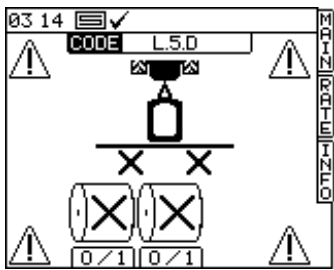
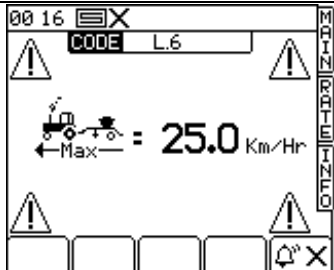
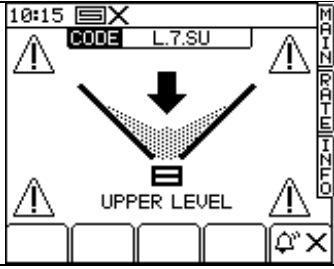
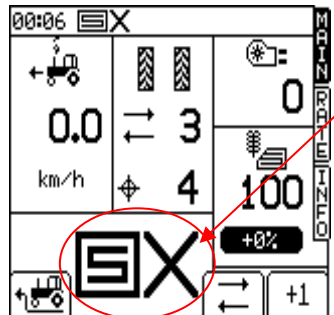
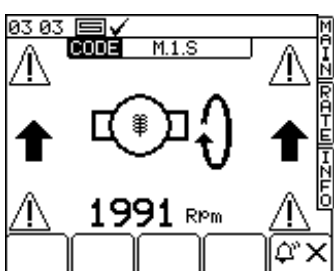
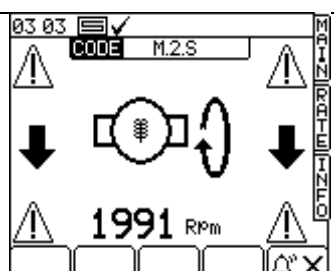
NB. Use 9/16" spanners.

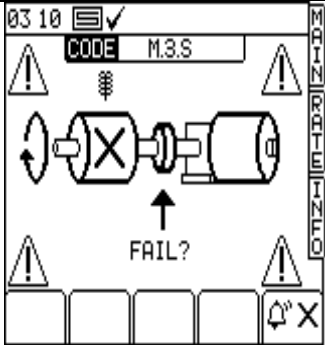
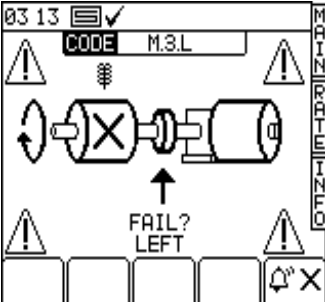
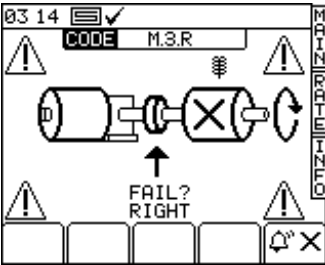
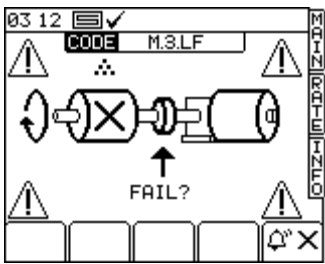
Figure 51 – Changing seeding boots

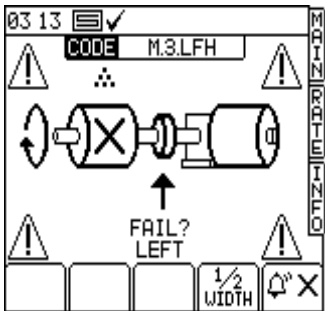
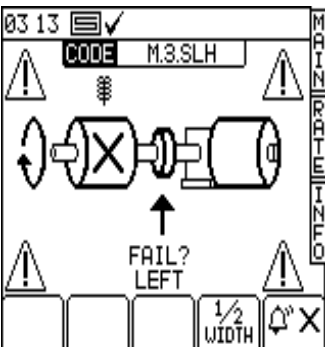
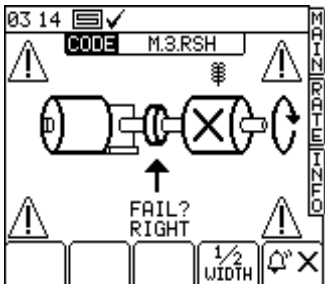
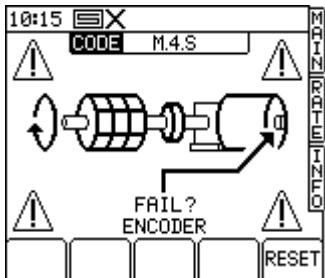
Appendix A – Artemis Fault Codes

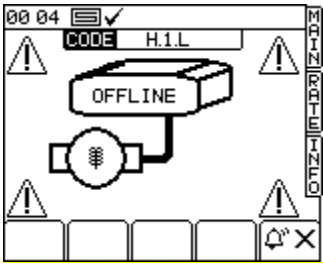
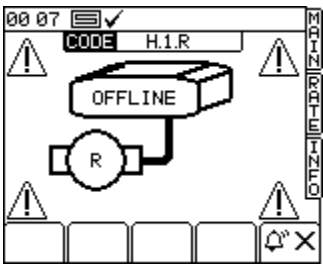
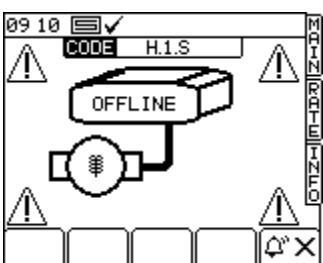
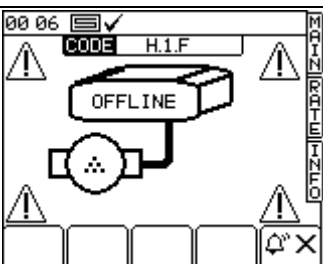
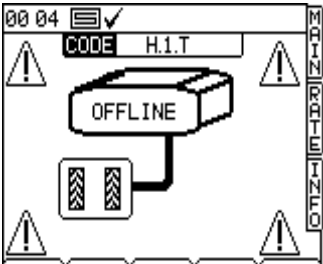
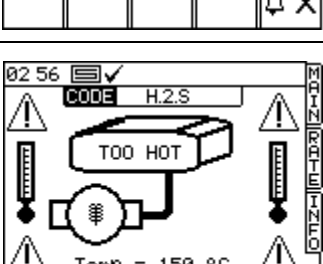
Code	Screen	Reason	Check?
N/A		High forward speed Forward speed exceeds the maximum calculated and displayed on the RATE screen	- Target application rate is as required - Calibration factor is realistic - Adjust metering unit and recalibrate which will increase kg/rev factor and therefore increase maximum achievable forward speed
L.1		Low fan speed Fan speed is below the low alarm value programmed	- Fan's actually operating - Hydraulic flow from tractor - Sensor & target functioning and correct - PPR value programmed correctly
L.2		High fan speed Fan speed is above the upper alarm value programmed	- Fan is actually operating - Sensor & target functioning and correct - PPR value programmed correctly - Hydraulic flow from tractor
L.3.SS		Seed level is low (Seed only or Seed & Fert drill, 1 metering unit per product)	- Seed level is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
L.3.FS		Fert level is low (Seed & Fert drill only, 1 metering unit per product)	- Fert level is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
L.3.SL		Seed level left is low (Seed only drill with 2 metering units, independent left & right level sensors)	- Seed level left is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct

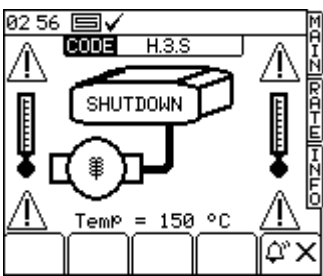
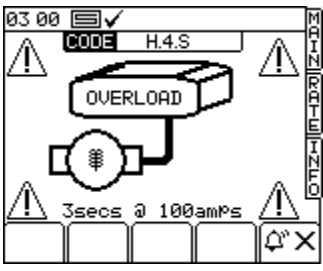
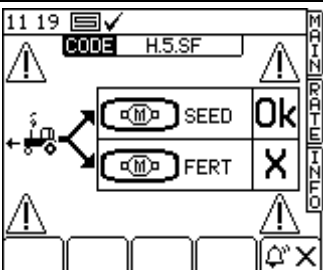
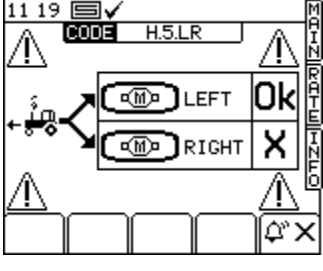
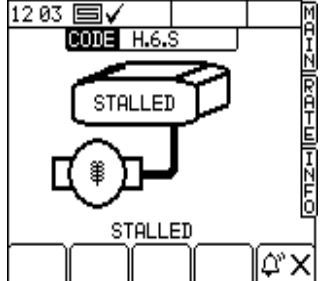
L.3.SR		Seed level right is low (Seed only drill with 2 metering units, independent left & right level sensors)	- Seed level right is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
L.3.SD		Both seed levels are low (Seed only drill with 2 metering units, independent left & right level sensors)	- Seed levels are actually low - Sensors are functioning correctly - Wiring between sensors and connection box is correct - Wiring between connection box and CAN module is correct
L.3.FD		Fert level is low (only Seed & Fert drill, 2 metering units per product)	- Fert level is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
L.4.L		Half Width Enabled – Left Side (only Seed drill, 2 metering units per product)	- Left side motor is disabled due to pressing the on-screen motor inhibit button. - Re-press to re-enable the motor or ignore to continue with half width drilling.
L.4.R		Half Width Enabled – Right Side (only Seed drill, 2 metering units per product)	- Right side motor is disabled due to pressing the on-screen motor inhibit button. - Re-press to re-enable the motor or ignore to continue with half width drilling.
L.5.S		Single Motor Metering Off	- Motor is disabled due to pressing the on-screen motor inhibit button. - Re-press to re-enable the motor or ignore to continue with the motor inhibited.

L.5.D		Dual Motor Metering Off	- Both motors are disabled due to pressing the on-screen motor inhibit buttons. - Re-press to re-enable the motors or ignore to continue with the motors inhibited.
L.6		Max Forward Speed	- Based upon the calibration factor, this is the maximum speed that can be achieved. - If this is too low then open the metering unit slide further and re-calibrate.
L.7.SU		Seed Level Upper is Low (Pre-Level)	- Seed level upper is actually low - Sensor is functioning correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
N/A		Area cut-out Flashes up for 1 second every 3 seconds when system is 'out of work'	- Is drill still lifted - Sensor & target/switch functioning and correct - Spring toggle switch correctly set + operating - Operating logic not set correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct
M.1.S		Seed motor speed high Error between actual motor speed and target motor speed is greater than 10%	- Target motor speed too low - Erratic forward speed signal - Erratic loading on motor via metering unit - Check radar Reduce Metering Unit Opening/Slide Re-calibrate
M.2.S		Seed motor speed low Error between actual motor speed and target motor speed is greater than 10%	- Target motor speed too high - Erratic forward speed signal - Erratic loading on motor via metering unit - Check radar Increase Metering Unit Opening/Slide Re-calibrate

M.3.S		Seed metering unit is not going around	- Is seed metering unit rotating when motor rotates - Sensor & target functioning and correct - PPR value programmed correctly wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.3.L		Left seed metering unit is not going around (Seed only drill with 2 motors each driving 1 metering unit)	- Is seed left metering unit rotating when motor rotates - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.3.R		Right seed metering unit is not going around (Seed only drill with 2 motors each driving 1 metering unit)	- Is right metering unit rotating when motor rotates - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.3.LF		Fert metering unit is not going around (Seed & fert drill with 2 motors each driving 1 metering unit)	- Is fert metering unit rotating when motor rotates - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is right - Check sensor on metering unit

M.3.LFH		Left fert metering unit is not going around (Seed & fert drill with 2 motors each driving 2 metering unit)	- Is fert left metering unit rotating when motor rotates - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.3.SLH		Left seed metering unit is not going around (Drill with 1 motor driving 2 metering units)	- Is seed left metering unit rotating when motor rotates - Is drill being operated at 1/2 width? - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.3.RSH		Right seed metering unit is not going around (Drill with 1 motor driving 2 metering units)	- Is seed right metering unit rotating when motor rotates - Is drill being operated at 1/2 width? - Sensor & target functioning and correct - PPR value programmed correctly - Wiring between sensor and connection box is correct - Wiring between connection box and CAN module is correct - Check sensor on metering unit
M.4.S		Motor speed signal from seed motor not being received Motor being operated and pulses received from shaft confirmation sensors but no motor speed signal	- Signs of mechanical damage to encoder or cabling on motor 3way connector between motor and harness is correct - Wiring between 3way connector and module connector is correct

H.1.L		Left motor control module is 'offline'	- Check wiring between 6way connector and module connector on MCM harness - If alarm M.3.L & H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.R		Right motor control module is 'offline'	- Check wiring between 6way connector and module connector on MCM harness - If alarm L.7.SU & H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.S		Seed Motor Control Module is 'offline'	- Check wiring between 6way connector and module connector on MCM harness - If alarm H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.F		Fert motor control module is 'offline'	- Check wiring between 6way connector and module connector on MCM harness - If alarm L.4.R & H.1.L also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.1.T		Tramline module is 'offline'	- Check module has got power from main battery power cable - Check wiring between 4way connector and module connector on HBM harness - If alarm L.4.R also shown then check between 50way D connector on back of PSi and both 6way & 4way of instrument harness
H.2.S		Seed motor module temperature too hot Module temperature has exceeded the value programmed	- Motor speed very low - Excessive load applied to motor which for a prolonged time has caused the high module temperature

H.3.S		Seed motor module temperature shutdown Module temperature has exceeded the value programmed	- Motor speed very low - Excessive load applied to motor which for a prolonged time has caused the high module temperature
H.4.S		Seed motor module overload shutdown Motor current requirement exceeded so module shutdown and motor operation inhibited	- Motor stalled - Excessive drag on the metering unit requiring high motor current
H.5.SF		Forward Speed Failure (Seed & Fert)	- Check wiring of forward speed in alarmed connection box. - Check for continuity between pin 2A on MCM 1 (white wire) and pin 2A on MCM 2
H.5.LR		Forward Speed Failure (Left & Right)	- Check wiring of forward speed in alarmed connection box. - Check for continuity between pin 2A on MCM 1 (white wire) and pin 2A on MCM 2
H.6.S		Motor has Stalled	- Check for blockages in the metering unit - Disconnect motor from metering unit and ensure both units rotate separately. - Check motor and gearbox. Open and Close Finger Switch/Area Cut Out to Reset Alarm Criteria

EC Declaration of Conformity

In accordance with EN ISO 17050-1:2004

in accordance with the following Directive(s):

hereby declare that:

Model number	Hybrid Fertiliser Drill
--------------	-------------------------

Serial Number

is in conformity with the applicable requirements of the following documents

Ref. No.	Title	Edition/date
EN ISO 12100-1:2003	Safety of Machinery – Basic Concepts	2003
EN ISO 12100-2:2003	Safety of Machinery – Basic Concepts	2003

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications and is in accordance with the requirements of the Directive(s)

Di Hayden

Signed by:

Name: Oliver Claydon

Position: Director of Design and Production

Done at
Gaines Hall
Wickhambrook

On
21/08/2012

The technical documentation for the machinery is available from:

Name: Claydon Yeldometer Ltd

Address: Gaines Hall
Wickhambrook
Newmarket
Suffolk
CB8 8YA

Appendix C – Hopper to Hopper Transfer Kit

If fertiliser is not required to be sown alongside seed the Hopper to Hopper Transfer Kit (Figure 52) can be attached. This optional extra allows seed to be transferred from the fertiliser hopper to the seed hopper.



Figure 52 – Hopper to Hopper Transfer kit Installed

In order to attach the transfer pipe firstly remove the vented plate from the fertiliser distribution head, this is achieved by unscrewing the six wing nuts (Figure 53). The transfer pipe can then be located over the distribution head and secured using the wing nuts. The vented distribution plate can then be stored on the transfer pipe holder when not in use.

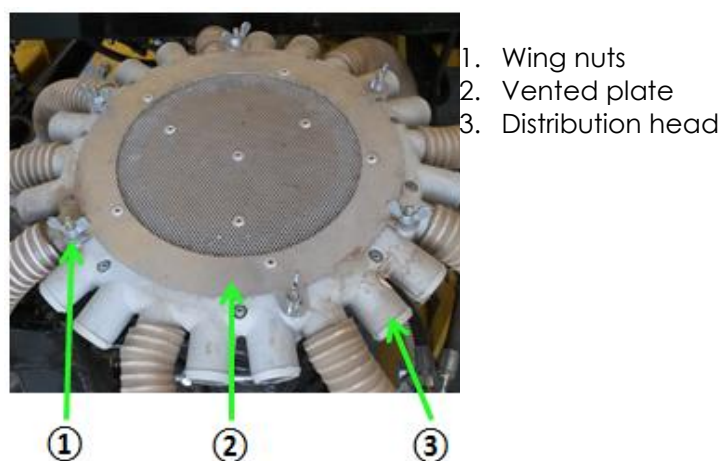


Figure 53 – Removal of vented head

Calibration

The **seed** metering unit should be calibrated using the process stated in the calibration method section and therefore does not change. The **fertiliser** metering unit should also be calibrated in the same manner as the seed metering unit; however on the drills control box the **fertiliser** rate required (Kg/Ha), should be entered as half the required **seeding** rate. For example, if the seeding rate was entered as 200 Kg/Ha on the control box, the fertiliser rate should be entered as 100 Kg/Ha. This will ensure both hoppers empty at the same rate.



Hybrid Seed Drill

Appendix D – Metering Unit Slider Positions

Tables 1 and 2 display where the slider on the metering unit should be positioned when sowing **large** seeds and fertilizer. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed. E.g. If wheat was required to be sown at 246 Kg/Ha, the slider on the metering unit would be set at 50 on a 3m drill, highlighted below.

Table 1 – Slider settings on metering unit (large seed)

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT						
English	Wheat	Rye	Barley	Oats	Beans	Fertiliser
Italian	Grano	Sègale	Ørzo	Avèna	Fagioli	Fertilizzante
Dutch	Tarwe	Rogge	Gerst	Haver	Veldbonen	Meststof
Spanish	Trigo	Centeno	Cebada	Avena	Frijoles	Fertilizante
Swedish	Vete	Råg	Korn	Havre	Böner	Gödningsmedel
Danish	Hvede	Rug	Byg	Havre	Bønner	Gødning
German	Weizen	Roggen	Gerste	Hafer	Bohnen	Dünger
French	Blé	Seigle	Orge	Avoine	Haricots	Engrais
Polish	Pszenica	Żyto	Jęczmień	Owies	Fasola	Zapylaczka
Czech	Pšenice	Žito	Ječmen	Oves	Fazole	hnojivo
Relative density Kg/l	0.77	0.74	0.68	0.5	0.85	1
Drill width (m)	3	3	3	3	3	3
Slider Setting	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha
10	48	47	45	34	32	64
15	72	69	68	49	59	95
20	97	93	90	66	86	127
25	121	117	112	83	112	159
30	147	141	134	100	138	191
35	172	165	157	116	164	223
40	198	189	179	133	191	254
45	222	213	202	150	217	286
50	246	237	224	167	243	318
55	271	260	246	184	270	350
60	296	282	268	199	295	382
65	322	306	291	216	322	413
70	347	332	313	233	347	445
75	373	356	336	250	374	477
80	397	380	357	267	400	509
85	421	404	378	282	426	541
90	446	426	401	299	452	572
95	473	450	424	316	477	604
100	497	476	446	333	503	636
105	522	500	469	350	528	668
110	546	524	491	367	555	700

Table 2 – Slider settings on metering unit (large seed)

NORMAL SEED SETTING - RED LOCKING TAP POINTS TOWARDS THE METERING UNIT					
English	Peas	Lupins	Vetches	Maize	Grass
Italian	Piselli	Lupini	Vècce	Mais	Èrba
Dutch	Erwtten	Lupinen	Wikke	Maïs	Gras
Spanish	Chicharos	Lupino	Vezas	Maíz	Hierba
Swedish	Ärtor	Lupine	Vicker	Majs	Gräsfrö
Danish	Ærter	Lupiner	Vikker	Majs	Græsfrø
German	Erbsen	Lupinen	Wicken	Mais	Grassamen
French	Poi	Lupine	Vesce	Maïs	Gazon
Polish	Groszek	Łubin	Wyki	Kukurydza	Trawy
Czech	Hrášek	Lupina	Vikve	Kukuřice	Travní
Relative density Kg/l	0.81	0.76	0.83	0.79	0.36
Drill width (m)	3	3	3	3	3
Slider Setting	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha
10	30	40	45	11	0
15	56	64	72	34	25
20	83	88	99	66	37
25	110	112	126	99	48
30	137	136	152	130	59
35	165	160	179	162	71
40	192	184	206	193	
45	219	208	233	220	
50	246	232	260	247	
55	274	256	287	274	
60	301	280	313	299	
65	328	305	340	326	
70	354	330	367	352	
75	381	354	394	377	
80	408	378	421	402	
85	436	402	448	429	
90	463	426	474	456	
95	490	452	501	483	
100	517	476	528	510	
105	544	500	555	536	
110	570	524	582	562	

Small Seeds

Table 3 displays where the slider on the metering unit should be positioned when sowing small seeds. Firstly, select the desired product and then select the closest required application rate (Kg/Ha), the metering unit should then be opened to the slider setting displayed. E.g. If Oilseed Rape was required to be sown at 4.9 Kg/Ha, the slider on the metering unit would be set at 5 on a 3m drill, highlighted below.

Table 3 – Slider settings on metering unit (small seed)

SMALL SEEDS SETTING - RED LOCKING TAP IN HEXAGON SHAFT GROOVE				
English	Oilseed Rape	Red Clover	Grass	Turnip
Italian	Còlza	Trifoglio Rosso	Èrba	Ràpa
Dutch	Koolzaad	Rode Klaver	Gras	Knolraap
Spanish	Colza	Trébol Rojo	Hierba	Nabo
Swedish	Raps	Rödklöver	Gräsfrö	Kålrot
Danish	Raps	Rødkløver	Græsfrø	Majroe
German	Raps	Rotklee	Grassamen	Rübe
French	Colza	Trèfle Rouge	Gazon	Navet
Polish	Rzepak	Koniczyna Czerwona	Trawy	Rzepa
Czech	Řepka	Červený Jetel	Travní	Tuřín
Relative density Kg/l	0.77	0.74	0.68	0.5
Drill width (m)	3	3	3	3
Slider Setting	Kg/Ha	Kg/Ha	Kg/Ha	Kg/Ha
2.5	2.3	2.4	0.0	2.6
5	4.9	5.6	0.0	5.3
7.5	7.2	9.1	3.0	7.9
10	9.6	12.7	5.5	10.6
12.5	12.1	16.2	7.6	13.2
15	14.5	19.1	9.7	15.9
17.5	16.8	22.6	11.9	18.5
20	19.3	25.4	14.0	21.2
22.5	21.7	28.2	15.9	22.8
25	24.1	29.1	17.2	24.4



Hybrid Seed Drill

Appendix E – Calibration Factors

Once the “Cal. Factor” value has been obtained from the calibration check procedure, the figure can then be compared with the results below; all the values on this page apply to **large seeds** only.

Firstly select the correct product, then locate the nearest application rate (Kg/Ha) and compare the resulting “Cal. Factor” (Kg/rev) to the value displayed on the Artemis control box. Although the values may not be an exact match, the figures should be within the same region, if not a recalibration may be required. E.g. If Wheat was required to be sown at 174 Kg/Ha, the Artemis unit would display a Cal Factor of approximately 0.205 Kg/rev, highlighted below.

English	Wheat	English	Barley	English	Beans	English	Oats	English	Peas	English	Lupins
Italian	Grano	Italian	Grano	Italian	Grano	Italian	Grano	Italian	Grano	Italian	Grano
Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe
Spanish	Trigo	Spanish	Trigo	Spanish	Trigo	Spanish	Trigo	Spanish	Trigo	Spanish	Trigo
Swedish	Vete	Swedish	Vete	Swedish	Vete	Swedish	Vete	Swedish	Vete	Swedish	Vete
Danish	Hvede	Danish	Hvede	Danish	Hvede	Danish	Hvede	Danish	Hvede	Danish	Hvede
German	Weizen	German	Weizen	German	Weizen	German	Weizen	German	Weizen	German	Weizen
French	Blé	French	Blé	French	Blé	French	Blé	French	Blé	French	Blé
Polish	Pszenica	Polish	Pszenica	Polish	Pszenica	Polish	Pszenica	Polish	Pszenica	Polish	Pszenica
Czech	Pšenice	Czech	Pšenice	Czech	Pšenice	Czech	Pšenice	Czech	Pšenice	Czech	Pšenice

Kg/Ha	Cal. Factor (Kg/rev)
34	0.040
51	0.060
69	0.081
86	0.101
104	0.122
122	0.144
140	0.165
157	0.185
174	0.205
192	0.226
210	0.247
228	0.268
246	0.289
264	0.311
281	0.331
298	0.351
316	0.372
335	0.394
352	0.414
370	0.435
387	0.455

Kg/Ha	Cal. Factor (Kg/rev)
32	0.038
48	0.056
64	0.075
79	0.093
95	0.112
111	0.131
127	0.149
143	0.168
159	0.187
174	0.205
190	0.224
206	0.242
222	0.261
238	0.280
253	0.298
268	0.315
284	0.334
300	0.353
316	0.372
332	0.391
348	0.409

Kg/Ha	Cal. Factor (Kg/rev)
23	0.027
42	0.049
61	0.072
79	0.093
98	0.115
116	0.136
135	0.159
154	0.181
172	0.202
191	0.225
209	0.246
228	0.268
246	0.289
265	0.312
283	0.333
302	0.355
320	0.376
338	0.398
356	0.419
374	0.440
393	0.462

Kg/Ha	Cal. Factor (Kg/rev)
24	0.028
35	0.041
47	0.055
59	0.069
71	0.084
82	0.096
94	0.111
106	0.125
118	0.139
130	0.153
141	0.166
153	0.180
165	0.194
177	0.208
189	0.222
200	0.235
212	0.249
224	0.264
236	0.278
248	0.292
260	0.306

Kg/Ha	Cal. Factor (Kg/rev)
21	0.021
40	0.040
59	0.059
78	0.078
97	0.097
117	0.117
136	0.136
155	0.155
174	0.174
194	0.194
213	0.213
232	0.232
251	0.251
270	0.270
289	0.289
309	0.309
328	0.328
347	0.347
366	0.366
385	0.385
404	0.404

Kg/Ha	Cal. Factor (Kg/rev)
28	0.033
45	0.053
62	0.073
79	0.093
96	0.113
113	0.133
130	0.153
147	0.173
164	0.193
181	0.213
198	0.233
216	0.254
234	0.275
251	0.295
268	0.315
285	0.335
302	0.355
320	0.376
337	0.396
354	0.416
371	0.436

English	Vetoes	English	Maize	English	Fertiliser	English	Rye	English	Grass
Italian	Grano	Italian	Grano	Italian	Grano	Italian	Grano	Italian	Grano
Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe	Dutch	Tarwe
Spanish	Trigo	Spanish	Trigo	Spanish	Trigo	Spanish	Trigo	Spanish	Trigo
Swedish	Vete	Swedish	Vete	Swedish	Vete	Swedish	Vete	Swedish	Vete
Danish	Hvede	Danish	Hvede	Danish	Hvede	Danish	Hvede	Danish	Hvede
German	Weizen	German	Weizen	German	Weizen	German	Weizen	German	Weizen
French	Blé	French	Blé	French	Blé	French	Blé	French	Blé
Polish	Pszenica	Polish	Pszenica	Polish	Pszenica	Polish	Pszenica	Polish	Pszenica
Czech	Pšenice	Czech	Pšenice	Czech	Pšenice	Czech	Pšenice	Czech	Pšenice

Kg/Ha	Cal. Factor (Kg/rev)	Kg/Ha	Cal. Factor (Kg/rev)	Kg/Ha	Cal. Factor (Kg/rev)	Kg/Ha	Cal. Factor (Kg/rev)	Kg/Ha	Cal. Factor (Kg/rev)
32	0.038	8	0.009	45	0.053	33	0.039	18	0.021
51	0.060	24	0.028	68	0.080	49	0.058	26	0.031
70	0.082	47	0.055	90	0.106	66	0.078	34	0.040
89	0.105	70	0.082	113	0.133	83	0.098	42	0.049
108	0.127	92	0.108	135	0.159	100	0.118	50	0.059
127	0.149	115	0.135	158	0.186	117	0.138		
146	0.172	137	0.161	180	0.212	134	0.158		
165	0.194	156	0.184	203	0.239	151	0.178		
184	0.216	175	0.206	225	0.265	168	0.198		
203	0.239	194	0.228	248	0.292	184	0.216		
222	0.261	212	0.249	270	0.318	200	0.235		
241	0.284	231	0.272	293	0.345	217	0.255		
260	0.306	249	0.293	315	0.371	235	0.276		
279	0.328	267	0.314	338	0.398	252	0.296		
298	0.351	285	0.335	360	0.424	269	0.316		
317	0.373	304	0.358	383	0.451	286	0.336		
336	0.395	323	0.380	405	0.477	302	0.355		
355	0.418	342	0.402	428	0.504	319	0.375		
374	0.440	361	0.425	451	0.530	337	0.396		
393	0.462	380	0.447	473	0.557	354	0.416		
412	0.485	398	0.468	496	0.583	371	0.436		

Small Seeds

Once the "Cal. Factor" value has been obtained from the calibration check procedure, the figure can then be compared with the results below; all the values on this page apply to **small seeds** only.

Firstly select the correct product, then locate the nearest application rate (Kg/Ha) and compare the resulting "Cal. Factor" (Kg/rev) to the value displayed on the Artemis control box. Although the values may not be an exact match, the figures should be within the same region, if not a recalibration may be required. E.g. If Oilseed Rape was required to be sown at 4.6 Kg/Ha, the Artemis unit would display a Cal Factor of approximately 0.005 Kg/rev, shown below.

English	OSR
Italian	Grano
Dutch	Tarwe
Spanish	Trigo
Swedish	Vete
Danish	Hvede
German	Weizen
French	Blé
Polish	Pszenica
Czech	Pšenice

English	R. Clover
Italian	Grano
Dutch	Tarwe
Spanish	Trigo
Swedish	Vete
Danish	Hvede
German	Weizen
French	Blé
Polish	Pszenica
Czech	Pšenice

English	Turnip
Italian	Grano
Dutch	Tarwe
Spanish	Trigo
Swedish	Vete
Danish	Hvede
German	Weizen
French	Blé
Polish	Pszenica
Czech	Pšenice

English	Grass
Italian	Grano
Dutch	Tarwe
Spanish	Trigo
Swedish	Vete
Danish	Hvede
German	Weizen
French	Blé
Polish	Pszenica
Czech	Pšenice

Kg/Ha	Cal. Factor (Kg/rev)
2.2	0.003
4.6	0.005
6.8	0.008
9.1	0.011
11.4	0.013
13.7	0.016
15.9	0.019
18.2	0.021
20.5	0.024
22.8	0.027

Kg/Ha	Cal. Factor (Kg/rev)
2.3	0.003
5.3	0.006
8.6	0.010
12	0.014
15.3	0.018
18	0.021
21.3	0.025
24	0.028
26.6	0.031
27.5	0.032

Kg/ha	Cal. Factor (Kg/rev)
2.5	0.003
5	0.006
7.5	0.009
10	0.012
12.5	0.015
15	0.018
17.5	0.021
20	0.024
21.5	0.025
23	0.027

Kg/Ha	Cal. Factor (Kg/rev)
2.8	0.003
5.2	0.006
7.2	0.008
9.2	0.011
11.2	0.013
13.2	0.016
15	0.018
16.2	0.019