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# ISOBUS Artemis

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## Seed Drill Controller Calibration and Operation Manual



## Electromagnetic Compatibility (EMC)

This product complies with European Council Directive 2014/30/EU when installed and used in accordance with the relevant instructions.

### Preface

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This manual provides information about calibrating and operating the RDS "ISOBUS Artemis" system. Correct use and maintenance is important for safe and reliable operation. Please take time to read this manual and complete appropriate training before use before using the system.

Information in this manual is correct at the time of publication. The system may vary slightly from that described herein. Topcon reserves the right to redesign and change the system as necessary without notification.

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### Warning

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#### Please read the following important information very carefully.

##### TERMS AND DEFINITIONS:

Console – The Topcon Agriculture console mounted inside the cab of the tractor used for primary control of the Machine.

Application – Topcon Agriculture mobile application product that allows features of Topcon Console(s) to be monitored and controlled from a Device.

Device – A mobile device (e.g. phones and tablets) on which the Application is installed and operated.

System – The combination of the Device and the Console used to control and monitor the Machine.

Machine – The combination of a tractor and associated farming implements (whether self-propelled, towed by the tractor or mounted to the tractor).

You – The person using the application to control and monitor the Machine.

Device – A mobile device (e.g. phones and tablets) on which the Application is installed and operated.

Documentation – The user documentation and manuals relating the use and operation of the covered Topcon Agriculture product, including, but not limited to, the Console user manuals/materials and Application end user license agreement.

**IMPORTANT:** You must read and follow the Documentation and complete appropriate training before use. If You do not operate the System properly, it may not correctly apply the Application to Your requirements. This can result in damage to property and/or malfunction of the product, death or serious injury to persons, poor yields and/or crop damage or failure. If You are in any doubt regarding any aspect of operating the System, then before commencing operation You should obtain further guidance from a suitably qualified source.



**WARNING:** It is YOUR responsibility to read and understand the safety sections in this book before operating the system. Remember that YOU are the key to safety.

**PRODUCTS/MATERIALS APPLICATION:** As limited by the applicable software, You are responsible for accurately entering the information required for the Machine to apply products/materials to Your requirements, including measurement units (e.g. metric or Imperial), vehicle dimensions, rate of application, vehicle speed, weight or other required input.

As limited by the applicable software, You are responsible for the calibration of the Machine and ensuring products/materials are applied in accordance with their specifications (including wind, temperature and moisture conditions, material properties, dilution and withholding periods).

Without prejudice to the generality of the above You hereby acknowledge and agree that the system or application is not designed nor intended to:

- originate variable treatment plans; or
- achieve or avoid any application rate or other target setting outside application parameters, which in both cases are Your responsibility.

Failure by You to comply with the above may result in incorrect operation of the System, or injury to You or others. You should monitor at all times that the System is performing as required.

### General Safety

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**DANGER!** It is essential that the following information and the product-specific safety information is read and understood.

Most incidents arising during operation, maintenance and repair are caused by a failure to observe basic safety rules or precautions. Always be alert to potential hazards and hazardous situations. Always follow the instructions that accompany a Warning or Caution. The information these provide aims to minimize risk of injury and/or damage to property. In particular follow instructions presented as Safety Messages.

## Safety Messages and Warnings

The safety symbol is used with the relevant word : DANGER, WARNING or CAUTION. Messages marked in this way recommend safety precautions and practices. LEARN and apply them.



**DANGER** : Indicates an imminently hazardous situation that, if not avoided, could result in DEATH OR VERY SERIOUS INJURY.



**WARNING** : Indicates a potentially hazardous situation that, if not avoided, could result in DEATH OR SERIOUS INJURY.



**CAUTION** : Indicates a potentially hazardous situation that, if not avoided, could result in MINOR INJURY.

## Operator Safety

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Good safety practices not only protect you, but also the people around you. Study this manual as part of your safety program. This safety information only relates to Topcon equipment and does not replace other usual safe work practices.



- **WARNING:** Never operate the machine with any panels or safety guards removed. Any illustrations or photos in this manual that show panels or guards removed are solely for demonstration purposes. If the removal of panels and guards is necessary for calibration or maintenance, they **MUST** be replaced before operation.
- Always check that any suspended vehicle attachments or load arm(s) are lowered to the ground before beginning repair or maintenance work on the machine.
- Machine and implement parts can become hot during operation and may be under pressure. Refer to the machine/implement manual(s).
- Wear appropriate protective clothing for the task being undertaken.
- Check the Machine is correctly setup/configured and ready for the intended use.
- Be aware of safety instructions for/on the Machine including hazards such as crush zones.
- Prevent the Machine from being accidentally started if working on it e.g. remove the ignition key, place a warning notice in the cab etc.
- Check that the area of Machine operation is clear of people, animals, and obstacles and identify any other possible hazards.
- Keep other persons required to be in the vicinity of the Machine fully aware of Your immediate intentions.

If a Topcon Agriculture mobile application is used to augment Your ability to perform tasks that are traditionally performed on the Console directly, then in addition to observing the above warnings and all other pre-determined site safety requirements that apply when operating a Machine from the Console, You must also observe the following additional requirements when operating the Machine via the Application:



- **WARNING:** The Application must only be operated by You, the single Console operator wholly responsible for the operation of the Machine.
- The Application must only be used when the Machine is not on public roads.
- The Device must be affixed to a rigid mount when used inside the cab while the Machine is moving to avoid a temporary loss of control if the Device is dropped or misplaced.
- The Application must only be used outside of the Machine cab when the Machine is stationary.
- When operating the Application outside of the cab of the Machine You must remain within a reasonable distance such that You can return to the cab-mounted Console in a timely manner to resume control of the Machine under any of the following circumstances:
  - Battery failure on the Device
  - Wifi signal is lost or signal strength is too weak for proper operation
  - The Device is redirected to another application (e.g. a phone call is received)
  - The Device becomes incapacitated (e.g. device is dropped and damaged)
  - Any other event that causes the Device to no longer be fit for control of the Application and/or Machine.
- Stand well clear of any moving parts of the Machine (e.g. hydraulic folding booms, spreader spinners, etc.) and areas of product application (e.g. Spray Nozzles, NH3 appliers, etc.).
- The Device and Machine must be locked when not in use.

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# 1 Introduction

This manual provides operator basic instructions for both single-channel and multi-channel generic Isobus “Artemis” Seed Drill Controller application. It also includes settings in the “Drill Setup” menu accessible by the operator. Information on Technician and Factory level settings are not included in this manual.

*NOTE: Illustrations in this manual are based on a Topcon X25 terminal. The actual Artemis app screen display/button layout and functions may vary slightly from that shown, depending on the specific implement being controlled, the UT the app is being run on, its GUI and user-defined settings. If necessary, please refer to the manufacturers user manual for setup and loading the Artemis app on other UT's.*

## 1.1 System Overview

The Artemis is an ISOBUS-compatible, monitoring and application control system for seed drills. It may be configured with up to 4 control channels. Forward speed measurement and cutout sensing enables full proportional control, to maintain (within limits) a set application of one or more products irrespective of changes in forward speed.

In its simplest application, the Artemis may be setup in a single-channel configuration to control a single motor as shown in figure 1. Additional CAN modules enable multi-channel configurations for combined seed/fertiliser/pellet application (including electro-hydraulic control), to suit a wide range of drill makes and models.

### 1.1.1 System Components

The system will vary depending on the drill make and model, but will be some combination of one or more of the following,

The main electronic components are,

- **ISOBUS UT**
- **ISOBUS/CAN Bridge Module** – the “brains” of the system, containing the control software. It also contains the graphics (the ‘Object Pool’), for the GUI to be displayed on any ISOBUS-compliant terminal.
- **Motor Control (MCM) CAN Module** – CANBUS interface for a gearmotor and sensors.
- **Applicator Control (APM) CAN Module** – CANBUS interface for an Applicator system (optional).
- **I/O (HBM) CAN Module** – CANBUS interface for other switches, sensors and actuators.

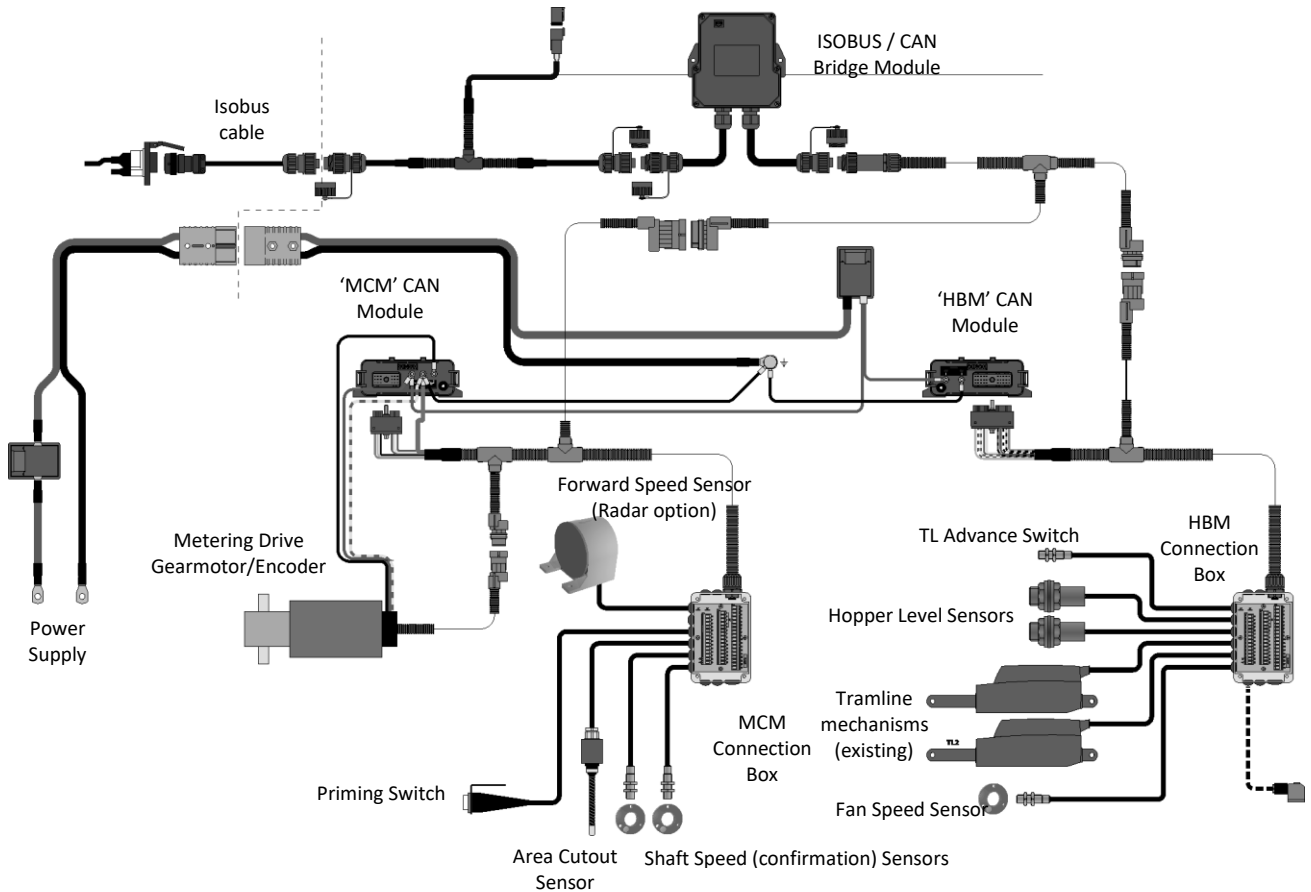
Connected via the Motor Control Module (‘MCM’)

- **Gearmotor** – driving either single or multiple metering units.
- **Shaft Speed Confirmation sensor** – a magnetic sensor that confirms that the motor is driving the metering unit.
- **Forward Speed Sensor** – Speed signal sent from ISOBUS UT.
- **Area Cutout Switch(s)** - one or two magnetic sensors or finger switch positioned to detect when the drill is lowered/raised into or out of work. It can be configured to also provide the tramline advance signal.
- **Priming Switch** – manually operates the metering motor to dispense product for calibration purposes.

Connected via the Tramline Control Module (‘HBM’)

- **Fan Speed Sensor(s)** - a magnetic sensor on the fan drive.
- **Hopper Level Sensor(s)** – An upper “pre-level” sensor provides an early-warning alarm, giving the operator advance notice to refill. A lower sensor provides a second warning when the hopper is about to run out.
- **Tramline Advance Switch** - provides the tramline advance signal (if not a function of the Area Cutout Switch).
- **Tramline mechanism (existing)** – the solenoid or motor-type mechanisms are rewired into the HBM connection box to be controlled by the Artemis.
- **Pre-emergence Markers (existing)** – re-wired into the HBM connection box to be controlled by the Artemis.
- **Bout Marker Sensors (optional)** – magnetic sensors detect when the Marker arms are lifted/lowered.

Figure 1: Single-motor Artemis System



## 1.2 Artemis Main Functions

The Artemis is designed to allow automatic, variable rate control of any drill. Also it can control an auxilliary Applicator system e.g. for Slug Pellets etc. You can at any time manually override the predetermined rate as field conditions require.




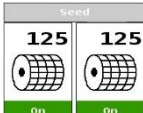


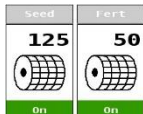


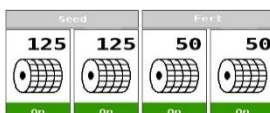





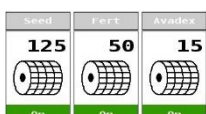



The basic functions are:

- Variable Rate Control
- Tramline Control
- Forward Speed Alarms
- Hopper Level alarm
- Fan Speed & alarm
- Information totals

The instrument has a special software routine that makes calibration of the metering unit(s) very easy. In the calibration mode each metering unit is controlled via a 'priming switch' to dispense the product. During normal operation the control system is started and stopped automatically via magnetic sensor(s) as the drill is put into and taken out of work.

## 2. Multiple Channels / Products

The Artemis has 4 control channels. Each motor / MCM or APM requires a control channel, therefore the number of channels used depends on the particular drill configuration. Here are some examples.

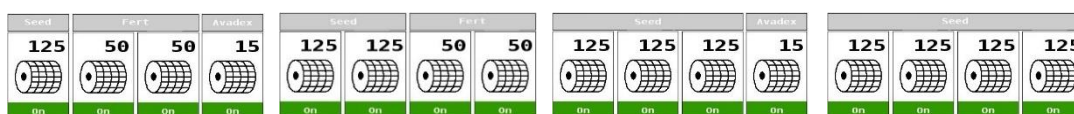
PRODUCT	CHANNELS	PRODUCT /MOTOR / METERING UNIT CONFIGURATION	SCREEN DISPLAY
SEED	1	1 PRODUCT SINGLE MOTOR / METERING 	
	1+2	1 PRODUCT 2 x SINGLE MOTOR / METERING 	
	1 2	2 PRODUCTS SINGLE MOTOR / METERING (SEED)  SINGLE MOTOR / METERING (FERT A) 	
SEED + FERTILISER	1+2 3+4	2 PRODUCTS 2 x SINGLE MOTOR / METERING (SEED)  2 x SINGLE MOTOR / METERING (FERT) 	
	SEED + FERTILISER	1+2 3	2 PRODUCTS 2 x SINGLE MOTOR / METERING (SEED)  SINGLE MOTOR / METERING (FERT A) 
1 2 3		3 PRODUCTS SINGLE MOTOR / METERING (SEED)  SINGLE MOTOR / METERING (FERT)  SINGLE MOTOR / METERING (APPLICATOR) 	
EED + FERTILISER + +PELLETS		1+2 3 4	3 PRODUCTS 2 x SINGLE MOTOR / METERING (SEED)  SINGLE MOTOR / METERING (FERT)  SINGLE MOTOR / METERING (APPLICATOR) 

### 2.1 Linked Channels

When a configuration requires multiple hoppers / metering units to dispense a single product, then the control channels are linked (via the “Factory Setup” menu).

Two, three or four single, adjacent control channels may be linked in this way, and assigned a product type “Seed”, “Fert A”, “Fert B” or “Pellets”.

Examples:



**NOTE:** Linked channels are not currently recognized as linked by other software modules outside of the Artemis application. So for example, if 4 channels are in active use but all are linked for single product application, they will be recognized as 4 channels instead of effectively one channel.

If starting a Precision Farming job, the VRT (rate instructions) source is uniform across linked channels (ref. section 7.3).




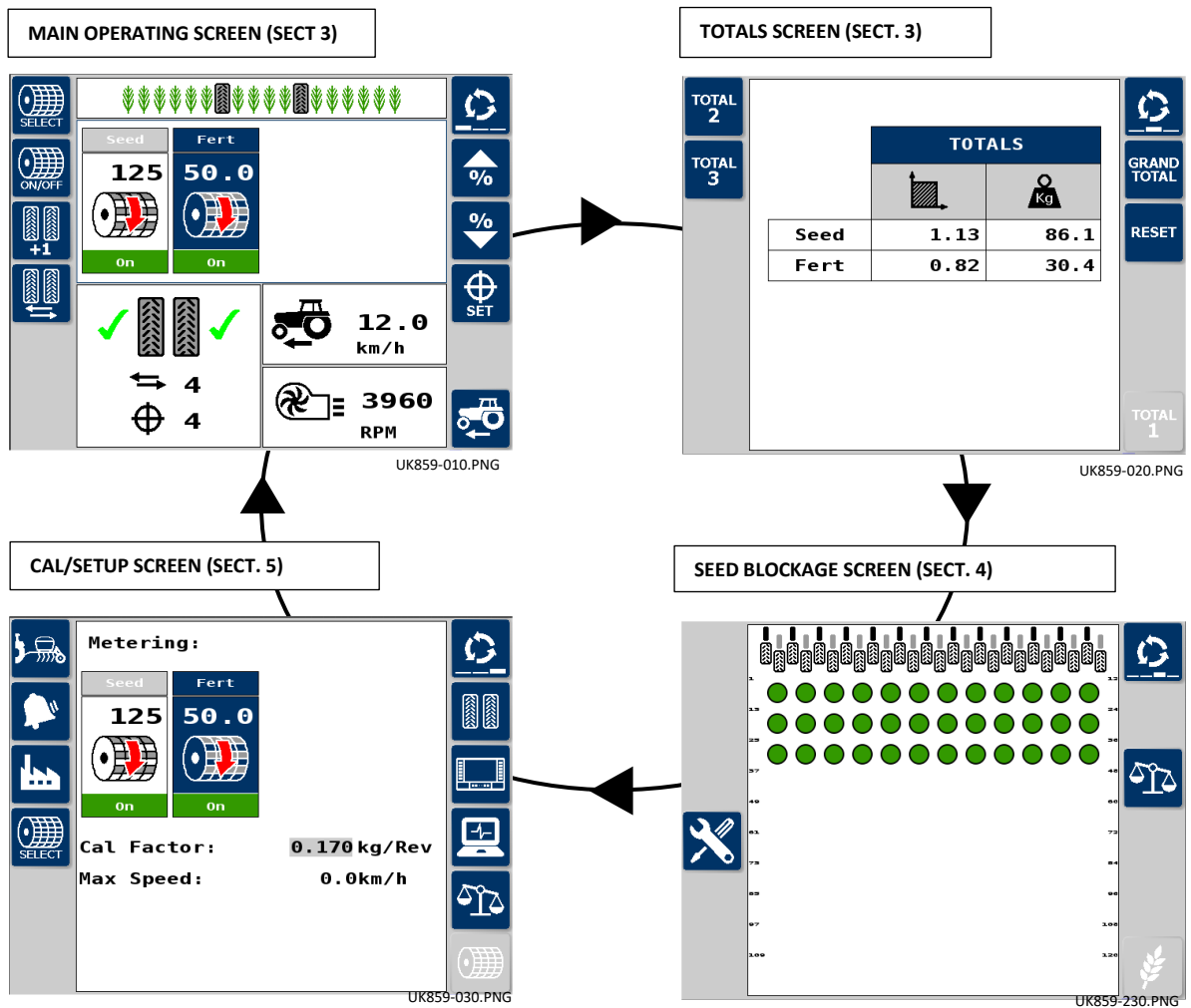
### 3. Operation

The RDS Artemis application is displayed in the Universal Terminal (UT) window. The Artemis control keys are those within the UT window.

**NOTE:** The screens illustrated are as shown on a Topcon UT, and in this case the key locations are configurable. However, the key layout may be different for other other terminals, and the key layout may or may not be configurable depending on the terminal. Please refer to the OEM manual for the terminal in question.

#### 3.1 Artemis Primary Screen Pages

There are 5 primary screen pages. Press  to cycle between the primary screen pages – **Main, Totals, Seed Blockage, Hydraulic Functions** (see Note 1) and **Settings**.



**NOTE 1:** The hydraulic functions screen is specific to particular drills and is not present unless enabled in the “Factory Setup” menu.

### 3.2 The Main Operating screen - Summary

**Channel Toggle [3.3]**  
Select channel. The selected channel is highlighted blue

**Channel [3.3]**  
Shows the status of in-use channels with the target rate

**Target Rate [3.5]**  
Shows the current target rate of the selected channel

**Work Status [3.4]**  
Shows the drill in/out of work status and when on a tramlining bout

**Channel On/Off [3.3]**  
Turn the channel on / off (i.e. start/stop the metering motor)

**Tramline Advance [3.7]**  
Increases the tramline bout number by 1

**Tramline Hold [3.7]**  
Hold the current tramline when the drill is lifted/lowered

**Tramline Status [3.7]**  
Displays Target Bout, Current Bout and green ticks when tramlining.

**Forward Speed [3.8]**  
Displays the live forward speed, or the simulated speed when enabled.

**Fan Speed [3.9]**  
Displays the live fan speed for 1 or 2 fans.

**Cycle**  
Cycle between the MAIN, Hydraulic functions, Info and Setup screens


**Nudge Rate [3.5]**  
preset increments

**Set target Rate [3.5]**  
Displays a keypad to enter the target rate for the selected channel

**Prestart [3.6]**  
Runs the drill at a simulated speed for a specified time. Used when going into work until the target speed is reached (e.g. 8km/hr for 5secs)

### 3.3 Channel Selection and Status

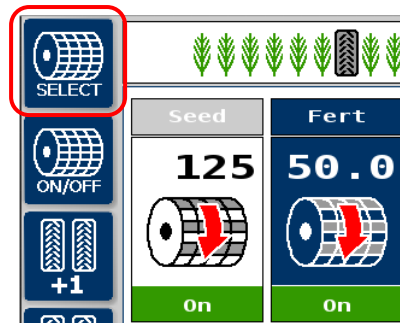
The currently selected channel is highlighted blue.

Either press , or touch a channel icon to select another channel.


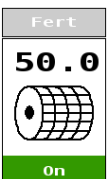
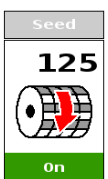
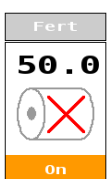
Repeatedly pressing  cycles through the channels.

The channel icon indicates the product and the target application rate.

The target rate can be then set or nudged for the selected channel.



The channel icon also indicates the status of the metering motor. The motor speed is proportional to forward speed, and so when the drill is in work, the icon automatically becomes animated as the metering unit starts to turn. It also is animated when you select the Prestart sequence, or if you have a simulated forward speed activated.

<p><b>Metering Motor switched OFF</b></p> 	<p><b>Metering Motor switched ON - drill raised out of work / stationary</b></p> 	<p><b>Metering Motor switched ON - drill lowered in to work and moving</b></p> 	<p><b>Metering Motor switched ON - drill lowered in to work but with ASC override</b></p> 
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### 3.3.1 Switching Metering motor(s) On-Off / Manual Override / Half-Width Drilling

The metering motor(s) can be stopped manually as desired, eg:

- (i) An area of field needs further cultivation before seeding.
- (ii) In the case of a front-mounted hopper, the metering motor is switched off just before the end of the bout to clear the seed through (the opposite of the 'pre-start function).
- (ii) You want to drill at half-width.

The currently selected channel is highlighted blue.

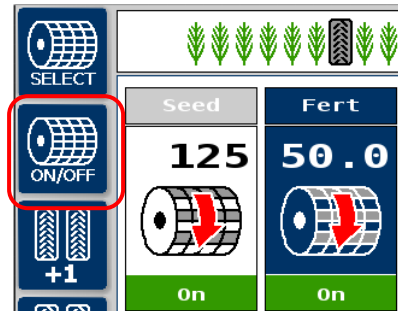
**To switch an individual channel:**

Briefly press  to switch the currently selected channel On/Off.

Alternatively, briefly touch a channel icon to switch it On/Off.

To switch all channels:

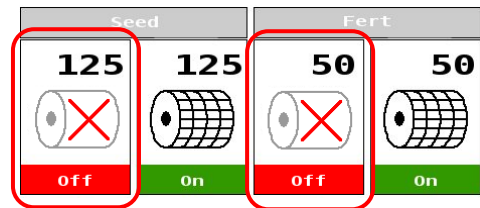
Press and hold  for 3 seconds.



**Half-width Drilling:**

Applicable for drills configured with 2 linked channels, where normally for full-width drilling the motors are controlled in tandem (indicated by channel icons 1+2 and/or 3+4 being linked across the top as shown).

When half-width application is required, either left or right metering motor may be switched off by briefly touching the appropriate channel icon(s).



### 3.4 Work Status

Sensor(s) detect when the drill is raised out of work or lowered into work, and the work status is displayed at the top of the screen.

Drill is out of work / Metering is stopped / Area totals accumulation is stopped.



Drill is in work / Normal metering is in progress (unless being manually overridden – ref. section 3.4) / Area totals are accumulating.



As above and also indicating a tramlining bout (ref. section 3.8).




## 3.5 Setting the Application Rate

### 3.5.1 Seed and fertiliser

The drilling rate is metric units only i.e. kgs/ha.

To set the Target rate for a selected channel:

First select the channel that you want to set the rate for.


Press , enter the required rate then touch "OK".

The maximum speed to maintain the application is calculated and displayed. Press "OK" to return to the main screen.

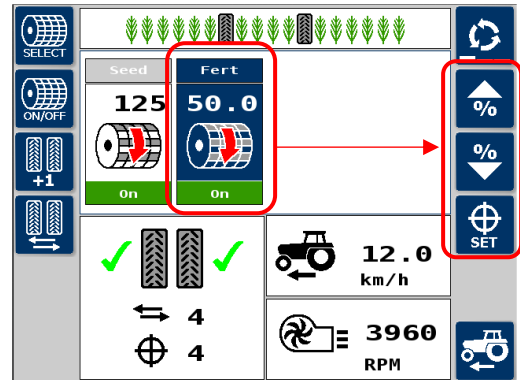
The system will then automatically maintain this rate respective of forward speed (within limits).

#### To manually override the Rate for a selected channel:

For the selected channel, at any time you can adjust the rate up or down in 5% increments to suit field conditions, up to a maximum  $\pm 50\%$  from the target rate.



Press  to return to the target rate.

**NOTE:** The main screen page will not display or otherwise remind you of an off-target rate set for a channel, unless that channel remains selected.





UK859-010.PNG

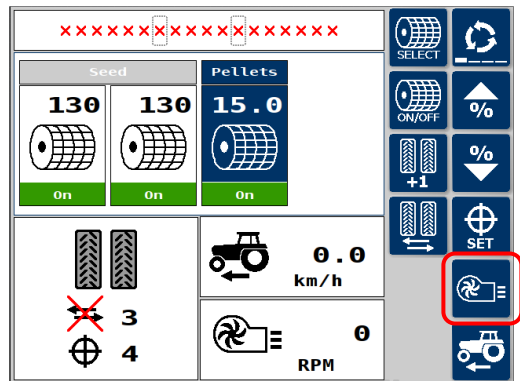
### 3.5.2 Pellet/ Small seed Applicator

Where fitted, a pellet / small seed applicator will be factory-configured for either of two modes of operation – 'Fan' or 'Spinner'. The mode is indicated by the  or  key.

#### Applicator in Fan configuration

Set / manually override the target rate as for other seed / fertiliser channels (3.5.1)

The fan is normally left on but should you need to, press  to switch it off (indicated by ) as required.




UK859-400.PNG

**NOTE:** The fan on/off control operates independently of the metering motor on/off control.

#### Applicator in Spinner configuration

Set / manually override the target rate as for other seed / fertiliser channels (3.5.1)

The spinner speed may be set between 0 -100% (PWM). It is a matter of trial and error to establish the % setting to achieve the desired spread width.

Press , enter the required % speed then touch "OK".




UK859-410.PNG

### 3.6 Pre-start Sequence

Particularly useful in the case of a front-mounted hopper, the pre-start function helps to avoid an un-seeded area on entering work. It starts the metering unit at the calibration speed while the drill is still stationary, and ‘primes’ the drill so that the seed reaches the coulters just as the drill enters work.

**User Settings:**



Cycle to the ‘Drill Setup’ screen and touch the  tab to view the ‘Pre-start Duration’ and ‘Pre-start Mode’.

**Pre-start Duration:**

The pre-start duration is established by trial and error tests when the system is first set up. The duration can be set from zero to 9.9 seconds.

**Pre-start Mode:**

‘**AUTO**’ mode – the Pre-start function is automatically triggered when the drill is switched into work.

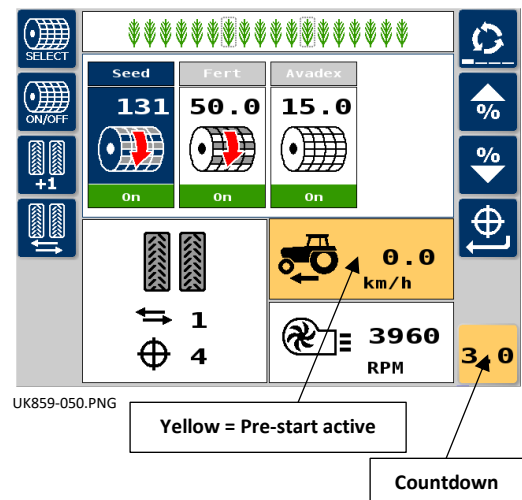
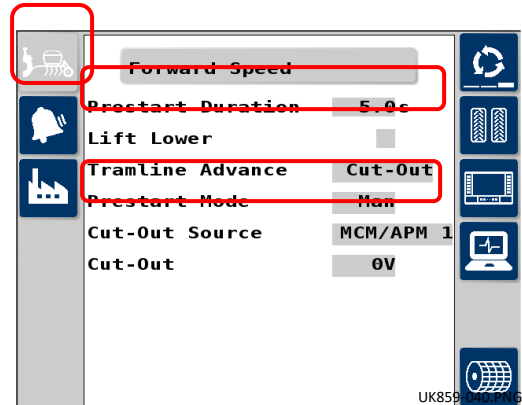
‘**Man**’ mode - the pre-start sequence is optional.

As required, simply press the  key before moving off.

The metering motor will run at the calibration speed for the set duration, or until the forward speed exceeds the simulation speed, when full proportional control then takes over.

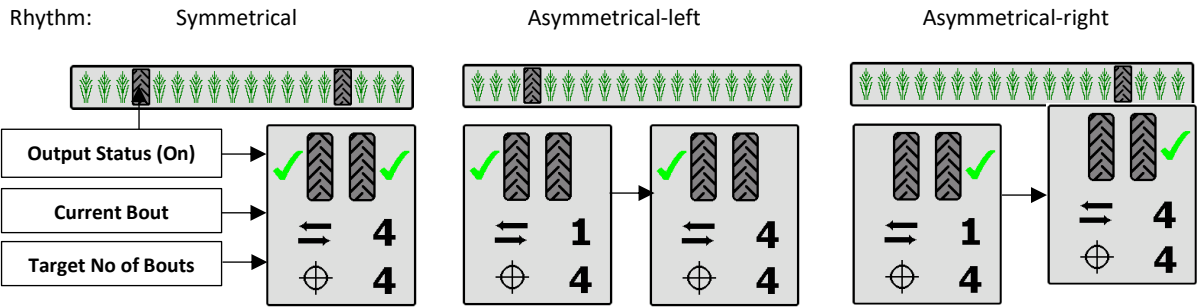
While the pre-start duration is active and the forward speed remains below the simulation speed, the duration counts down and the Forward Speed display is highlighted yellow.

Once the simulation speed is reached, pre-start is cancelled and the screen returns to the normal forward speed display.



### 3.7 Tramlining

The main screen shows the current status of tramlining e.g.




The target no. of bouts can be selected up to 99, with symmetrical, asymmetrical-left or asymmetrical-right rhythm selectable. A number of special asymmetric rhythms can also be selected to suit the following drill/sprayer width combinations.

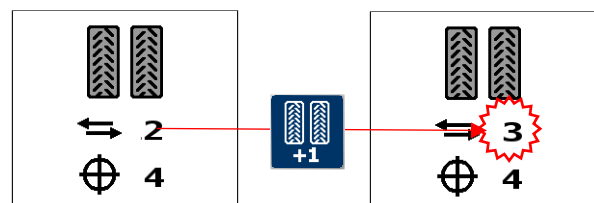
The special tramline sequences ('L' – Left, 'R' – Right) are as follows:

Bout	8-pass	10-pass	10-pass (2)	14-pass	16-pass	18-pass	22-pass
1							
2	R	R	L				
3				L	R	L	
4	L	L					L
5	L		R				
6			R				
7	R	L		R		R	
8				R	L		
9		R	L		L		
10							
11							R
12				L		R	R
13							
14					R		
15							
16						L	
17							
18							
19							L
20							
21							
22							

#### 3.7.1 Advancing the Bout Number

On starting up the instrument the tramline sequence always starts at '1'.


If entering work on a bout other than bout 1 of the tramline sequence, then you can press the  key to select the correct, current bout number.




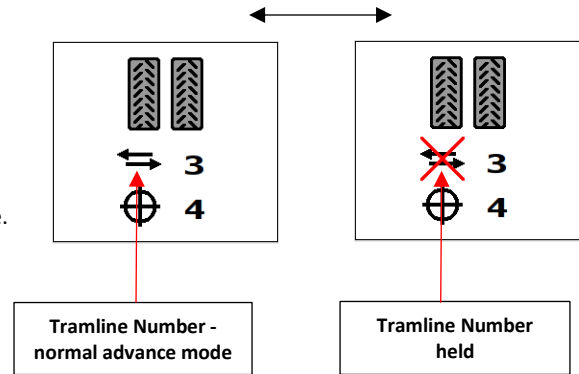
### 3.7.2 Holding the Bout Number

If it is necessary to take the drill out of work other than the normal headland turn, or depending on the drill setup - lift a marker to negotiate a field feature, the bout number will still automatically increment by 1.


You can however, press the  key to hold the current bout number (e.g. to prevent the bout no. advancing).

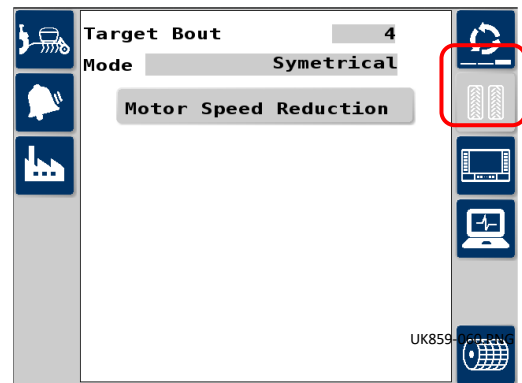
The  icon indicates that the bout no. is held.

Press the  key again to resume normal bout advance.



### 3.7.3 Setting the Tramline Rhythm

Cycle to the 'Drill Setup' screen and touch the  tab to view/edit the 'Target Bout' and 'Mode' (rhythm) settings.

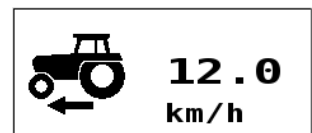


## 3.8 Forward Speed Display

The drilling rate is metric units only i.e. km/hr.

The forward speed signal is sourced from either,

- RDS Satspeed 2 (converts a GPS NMEA VTG message to a radar-compatible speed pulse).
- Radar Sensor



### 3.8.1 Forward Speed Alarm

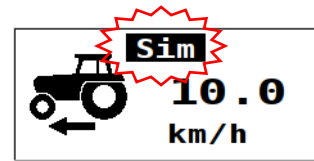
If while the drill is switched into work and the indicated forward speed is below 0.2 km/hr, the display will flash continuously and the metering units are stopped.

This is intended to alert the operator in the event that the forward speed signal input has been lost for whatever reason. In this event however, you can activate a simulated forward speed so that you are able to continue drilling.

### 3.8.2 Simulated Forward Speed

When the forward speed is simulated, the “Sim” icon appears on the display. Speed simulation is activated either,

- (i) Automatically during product calibration (in order to dispense product while the drill is stationary).
- (ii) Manually in the event of losing the forward speed signal input (in order to continue drilling). Remember though that your actual forward speed should match the simulated speed as close as possible, otherwise the drilling rate will not be correct. Drive faster than the simulated speed and you will under-apply, and vice-versa.




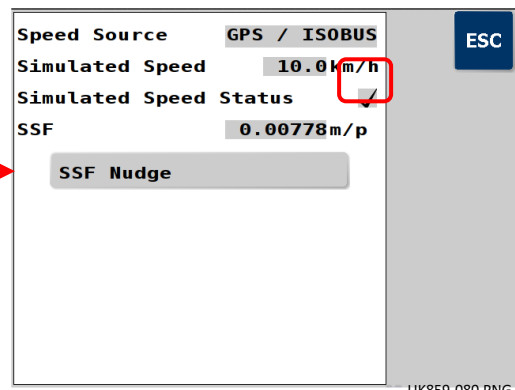
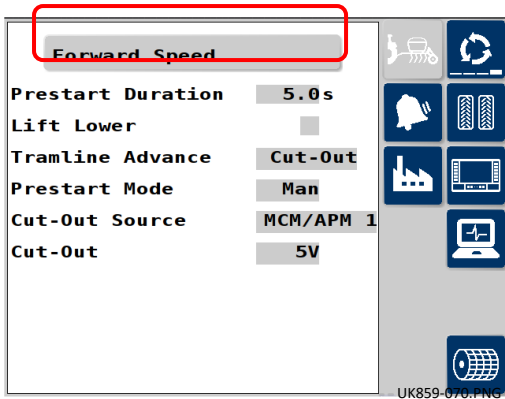
**NOTE:** The Pre-start mode also uses the simulated speed setting. Pre-start will be de-activated when the actual forward speed exceeds the simulated speed.

The simulated speed is set and manually activated via the “Drill Setup” menu as follows,

#### User Settings:



Cycle to the ‘Drill Setup’ screen and touch the  tab, then select “Forward Speed”.



#### Set Simulated Speed:

Go to “Simulated Speed”. The factory default simulated forward speed is 10 km/hr, however this can be changed to match your typical forward speed for drilling.

#### Start / Stop simulated Speed:

Go to “Simulated Speed Status” and check the tickbox to enable.

**NOTE:** Speed simulation can only be activated when the drill is switched out of work.




### 3.9 Fan Speed Display

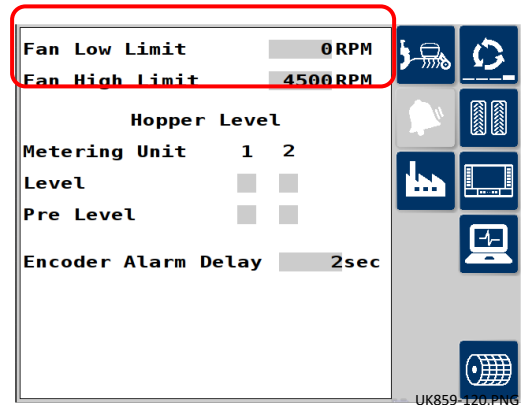
The Artemis can monitor and display the speed of either 1 or 2 fans depending on the drill configuration. If monitoring two fans, the display will alternate every 6 seconds between fan “1” and fan “2”.

#### 3.9.1 Set Fan Speed Alarms

There are both low speed and high speed programmable alarms. The low and high alarm speed thresholds can be set via the “Drill Setup” menu as follows,



Cycle to the ‘Drill Setup’ screen and touch the  tab to view/edit the ‘Fan Low Limit’ and ‘Fan Hi Limit’ settings.




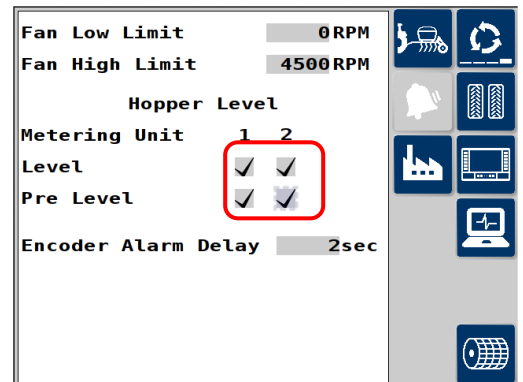
### 3.10 Hopper Level Alarms

Hopper level alarms will alert the operator when the product is running low and/or has nearly run out. Depending on the drill configuration, for each hopper there is either,

- (i) a single low-level sensor.
- (ii) Both a low-level sensor and an upper “Pre-Level” level sensor. The additional “pre-level” sensor is positioned higher up in the hopper to provide the operator a more advanced warning. This can avoid a possible disruption to drilling a long bout or unnecessary delay in replenishment.



To view the level sensor configuration applicable to each metering unit, cycle to the ‘Drill Setup’ screen and touch the  tab.



Check the relevant tickbox to enable a sensor.

### 3.11 Totals



The total Area and Weight of each product accumulates to the previously selected memory register, “Total 1”, “Total 2” or “Total 3” as shown.

The total is the total since last reset.

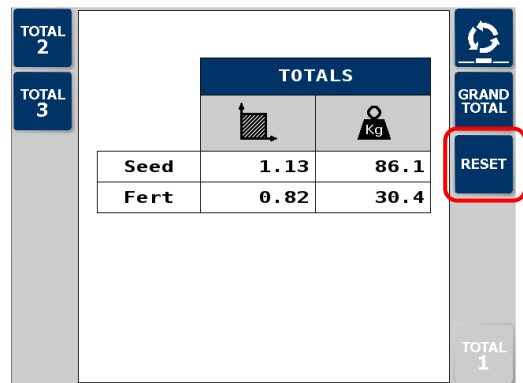
To reset any of the total registers, first select it and touch



You must then touch



The Grand Total memory register cannot be reset.



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## 4. Blockage Monitoring (optional)



Blockage monitoring is an optional feature. When enabled, this screen page appears after the ‘Totals’ screen page.

In the instance of a dual-product setup, select,



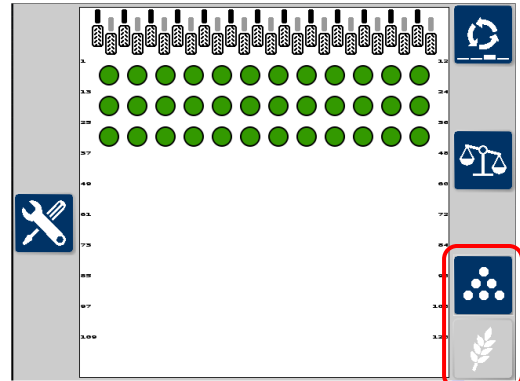
to view the sensor status for seed,



to view the sensor status for fertiliser.

The sensors are identified by the row number being monitored.

**NOTE:** On a dual-metering setup (e.g. Seed Left / Seed Right), when a channel is switched off, the sensor indicators will turn red, but there will not be an alarm.



UK859-230.PNG





### 4.1 Blockage sensor status and alarms

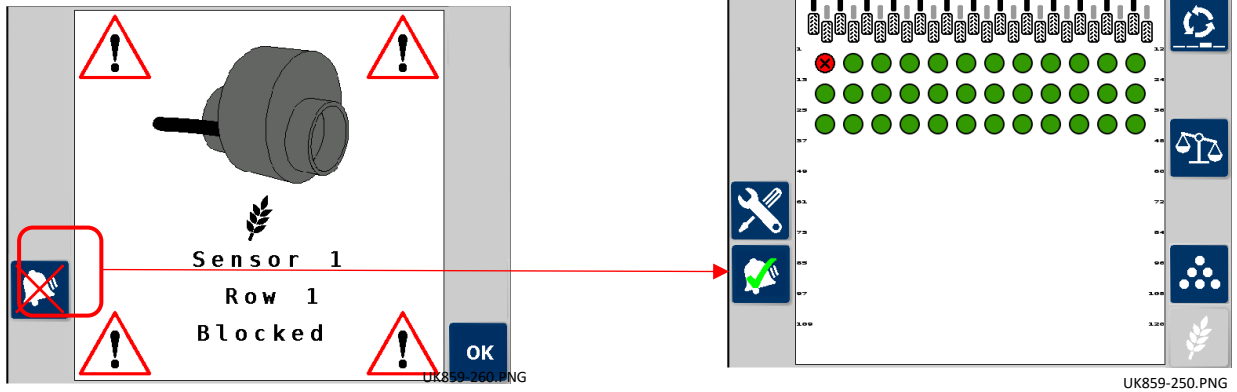
**NOTE:** Lifting the drill out of work cancels all alarms.

Indication	Status
<b>GREEN</b>	The sensor is operating normally. The required seed flow is detected through the sensor.
<b>RED</b>	Sensor blocked, either at the coulter or at the distribution head. The alarm message “Seed Sensor [xx] Row [xx] Blocked” or “Fert Sensor [xx] Row [xx] Blocked” will appear. Remove the blockage. <i>Note: The Sensor No. relates to its position on the distribution head. The Row No. that the sensor is monitoring may not necessarily be the same as the Sensor No.</i>
<b>ORANGE (FLASHING)</b>	The sensor is detected on the CAN bus, however there is a break in communication with an adjacent sensor. The alarm message “Seed Communication Error” or “Fert Communication Error” will appear. Check the sensor connectors.
<b>BLACK</b>	A sensor is not being detected on the CANbus, and is breaking communication with the adjacent sensors. The alarm message “Seed Communication Error” or “Fert Communication Error” will appear Check the sensor connectors, otherwise the sensor may be faulty and need to be replaced. <i>Note: A replacement sensor must be configured with the same ID No.</i>

## 4.2 Blockage sensor alarm override


When a blockage occurs, after a pre-defined delay time, the alarm screen appears. You can choose to either,

- (i) press  to temporarily cancel the alarm. Until the blockage is cleared, the alarm will re-activate after 30 seconds.
- (ii) press  to ignore the alarm. The sensor icon changes to . Press  to revert to the normal alarm function.



## 4.3 Sensor Calibration

It is recommended to calibrate the sensors at the start of each drilling day. Start drilling and make sure everything is up to full speed and at normal operating condition.

Cycle to the Seed Sensor screen page. If all sensor indicators are showing green, then simply press  to automatically calibrate all the sensors.

Once calibrated, the sensitivity of the sensors is adjusted automatically for varying forward speed / application, e.g for Variable Rate Treatment from a plan.


## 5. Product Calibration


There are two ways of running the calibration test,

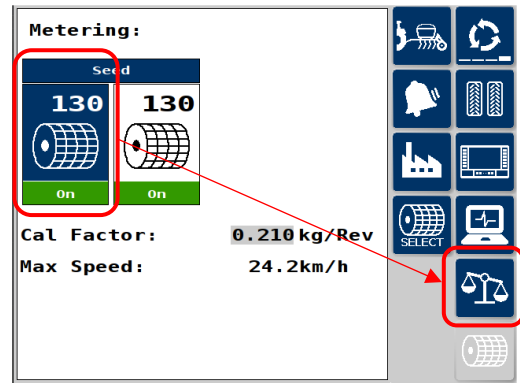
- from the head unit.
- via the relevant priming switch on on the drill.

### 5.1 Running the test from the Cab



1. From the main drilling screen, set the target rate for the channel(s) to be calibrated.
2. Setup the drill in the usual way for a bucket test on the appropriate metering unit.
3. Cycle to the 'Drill Setup' screen.

The screen displays the channel configuration as shown on the main operating screen. If multiple channels are configured, the calibration routine must be repeated for each channel including linked channels (  ).


4. Select the channel to calibrate, then press  .

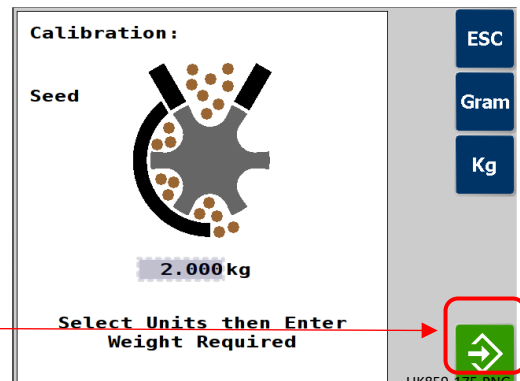


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5. Press  or  , (your preference) and enter the weight that you wish to meter out for the bucket test.




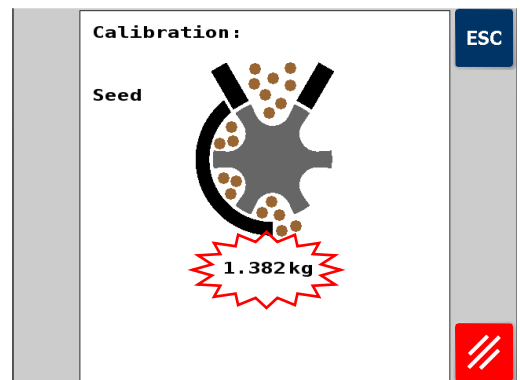
6. Press  .



UK859-175.PNG


The metering unit will then operate (based on the simulation speed) to dispense the programmed amount of product, then stops.

**NOTE:** At any time you can touch  to curtail the test.



UK859-180.PNG

The instrument then displays a weight figure based on the existing, programmed product calibration factor.

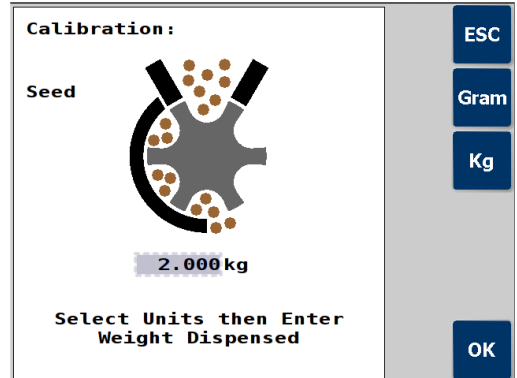
**NOTE:** In the case of a single motor / dual metering configuration (  ) the product collected, weighed and programmed is that from BOTH metering units.

So in this case, before going to step 7, press **ESC** and repeat steps 5 and 6 for the second metering unit, then total both weights.

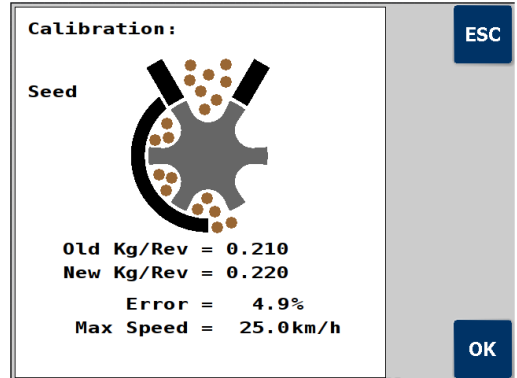
7. Weigh the contents of the container. Press **Gram** or **Kg** and enter the weight THAT WAS DISPENSED

8. Press **OK**.  
The new calibration factor (kg/rev), % error and the maximum forward speed that is permissible based on the application rate set for the channel.

9. Press **OK** to return to the "Drill Setup" screen.



UK859-190.PNG



UK859-200.PNG

## 5.2 Running the test using the Priming Switch

1. From the main drilling screen, first set the target rate for the channel(s) to be calibrated.
2. Setup the drill in the usual way for a bucket test on the appropriate metering unit.
3. Press the priming switch to meter out the desired amount of product.


**NOTE:** Depending on your particular drill configuration, the priming switch(es) will be setup for either momentary or latching operation.

If set to latching, then press and release the switch to start metering, then press and release again to stop.

If set to momentary, then press and hold the switch to start metering, and release to stop.

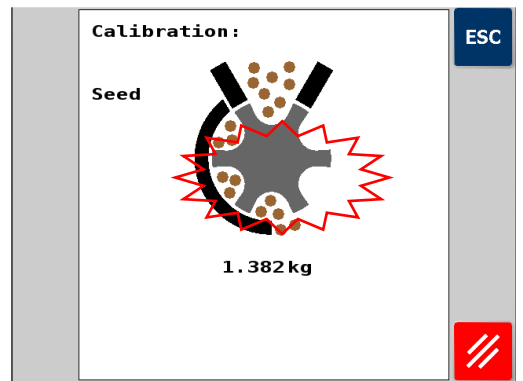
The displays switches automatically to the calibration screen once the priming switch is pressed.

When the metering unit is stopped, the instrument then displays a weight figure based on the existing programmed product calibration factor.

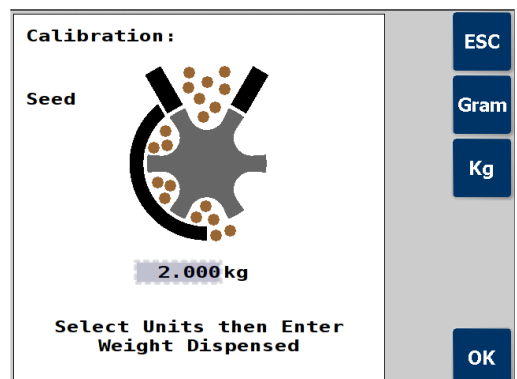
**NOTE:** In the case of a single motor / dual metering configuration (  ) the product collected, weighed and programmed is that from BOTH metering units.

So at this point, press **ESC** and repeat steps 2 and 3 for the second metering unit, then total the dispensed weights.

4. Weigh the contents of the container. Press **Gram** or **Kg**, (your preference) and enter the weight THAT WAS DISPENSED.

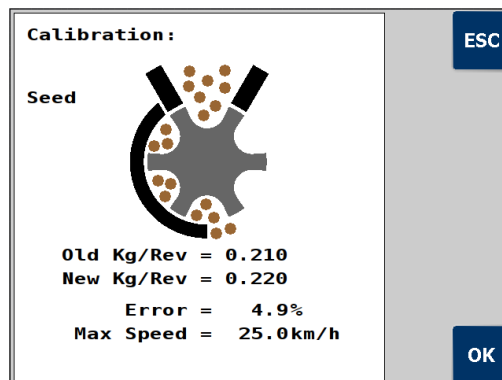


UK859-180.PNG



UK859-190.PNG

5. Press **OK** .  
The new calibration factor (kg/rev), % error and the maximum forward speed that is permissible based on the application rate set for the channel.
6. Press **OK** to return to the main operating screen.



UK859-200.PNG

### 5.3 Calibrating systems with ‘Accord’ type metering mechanisms.

When changing from a low rate to a high rate i.e. 3kg/ha to 100kg/ha

For each channel,

1. Move the metering slide to a position for the higher rate.
2. Perform the calibration test and enter the weight dispensed (as in 5.1 / 5.2).
3. The error will be considerable, but press **OK** to accept the error and continue.
4. From the main drilling screen, set the required target rate for the channel.
5. Perform the product calibration routine again.
6. The error this time will be marginal.
7. Press **OK** to accept the error, and begin drilling.

When changing from a high rate to a low rate i.e. 100kg/ha to 3kg/ha :

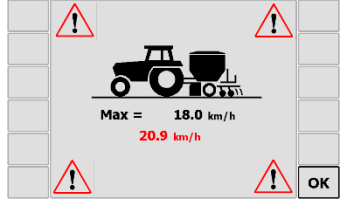
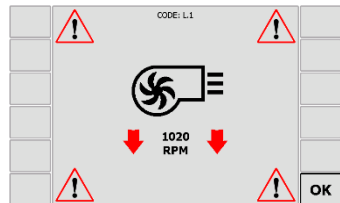
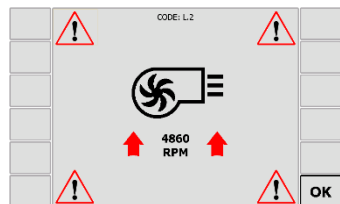
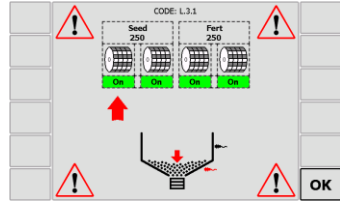
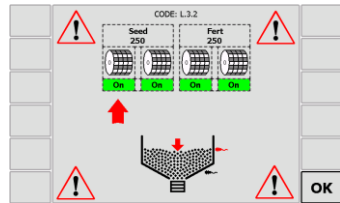
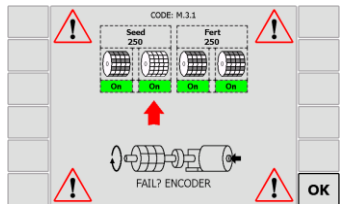
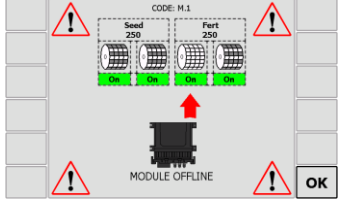
For each channel,

1. Move the metering slide to a position for the lower rate.
2. Perform the calibration test and enter the weight dispensed (as in 5.1 / 5.2).

*NOTE: If using the priming switch simply dispense a small amount of product and enter the weight.*

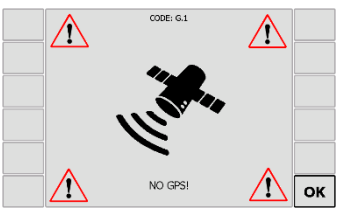
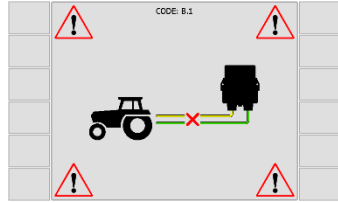
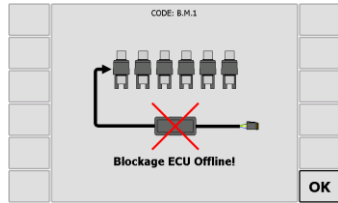
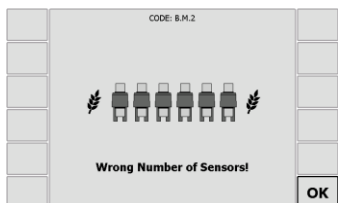
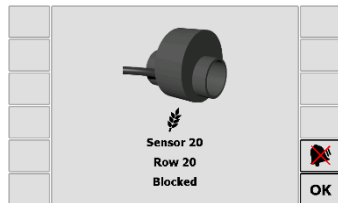
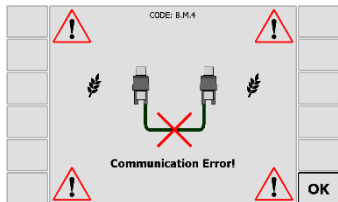
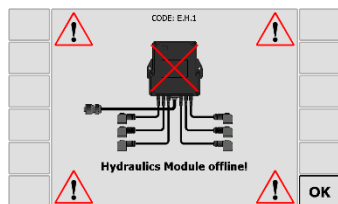
3. The error will be considerable, but press **OK** to accept the error and continue.
4. From the main drilling screen, set the required target rate for the channel.
5. Perform the product calibration routine again, this time dispensing a suitable amount of product.
6. The error this time will be marginal.
7. Press **OK** to accept the error, and begin drilling.

## 6. Alarm Codes

No.	Code	Screen	Reason	Check?
1	N/A		<b>High forward speed</b> Forward speed exceeds the maximum calculated and displayed on the RATE screen	<ul style="list-style-type: none"> <li>Target application rate is as required</li> <li>Calibration factor is realistic</li> <li>Adjust metering unit and recalibrate which will increase kg/rev factor and therefore increase maximum achievable forward speed</li> </ul>
2	L.1		<b>Low fan speed</b> Fan speed below the low alarm value programmed	<ul style="list-style-type: none"> <li>Fan is actually operating</li> <li>Sensor &amp; target functioning and correct</li> <li>PPR value programmed correctly</li> </ul>
3	L.2		<b>High fan speed</b> Fan speed is above the high alarm value programmed	<ul style="list-style-type: none"> <li>Sensor &amp; target functioning and correct</li> <li>PPR value programmed correctly</li> </ul>
4	L.3.1		<b>Low hopper level alarm</b> Channel with low level highlighted	<ul style="list-style-type: none"> <li>Level is actually low</li> <li>Sensor is functioning correctly</li> <li>Wiring between sensor and connection box is correct</li> <li>Wiring between connection box and CAN module is correct</li> </ul>
5	L.3.2		<b>Pre-Level hopper alarm</b> Channel with low pre level highlighted	<ul style="list-style-type: none"> <li>Level is actually low</li> <li>Sensor is functioning correctly</li> <li>Wiring between sensor and connection box is correct</li> <li>Wiring between connection box and CAN module is correct</li> </ul>
11	M.3.1		<b>Motor speed signal from motor not being received</b> Motor being operated and pulses received from shaft confirmation sensors but no motor speed signal	<ul style="list-style-type: none"> <li>Signs of mechanical damage to encoder or cabling on motor</li> <li>3way connector between motor and harness is correct</li> <li>Wiring between 3way connector and module connector is correct</li> </ul>
12	M.1		<b>MCM or APM is offline'</b>	<ul style="list-style-type: none"> <li>Check wiring between 6way connector and module connector on MCM harness</li> </ul>

No.	Code	Screen	Reason	Check?
13	M.1.2		<p><b>Module overload shutdown</b></p> <p>Motor current requirement exceeded, so the module is shutdown and motor operation is inhibited</p>	<ul style="list-style-type: none"> <li>The Motor is stalled.</li> <li>Excessive drag on the metering unit, requiring motor high current.</li> </ul>
14	M.1.3		<p><b>Motor module temperature shutdown</b></p> <p>Module temperature has exceeded the value programmed</p>	<ul style="list-style-type: none"> <li>The Motor speed is very low.</li> <li>Excessive load applied to motor which for a prolonged time, causing the module high temperature and shutdown.</li> <li>Check metering unit for damage / obstruction.</li> <li>Re-calibrate to get motor turning faster.</li> </ul>
15	M.2.L		<p><b>Motor speed low</b></p> <p>Error between actual motor speed and target motor speed is greater than 10%</p>	<ul style="list-style-type: none"> <li>Target motor speed to high</li> <li>Erratic forward speed signal</li> <li>Erratic loading on motor via metering unit</li> </ul>
16	M.2.H		<p><b>Motor speed high</b></p> <p>Error between actual motor speed and target motor speed is greater than 10%</p>	<ul style="list-style-type: none"> <li>Target motor speed to high</li> <li>Erratic forward speed signal</li> <li>Erratic loading on motor via metering unit</li> </ul>
17	M.3		<p><b>Metering unit is not going around</b></p>	<ul style="list-style-type: none"> <li>Is metering unit rotating when motor rotates</li> <li>Sensor &amp; target functioning and correct</li> <li>PPR value programmed correctly</li> <li>Wiring between sensor and connection box is correct</li> <li>Wiring between connection box and CAN module is correct</li> </ul>
18	-		-	-
19	H.1		<p><b>Tramline module is 'offline'</b></p>	<ul style="list-style-type: none"> <li>Check module has got power from main battery power cable</li> <li>Check wiring between 4way connector and module connector on HBM harness</li> </ul>

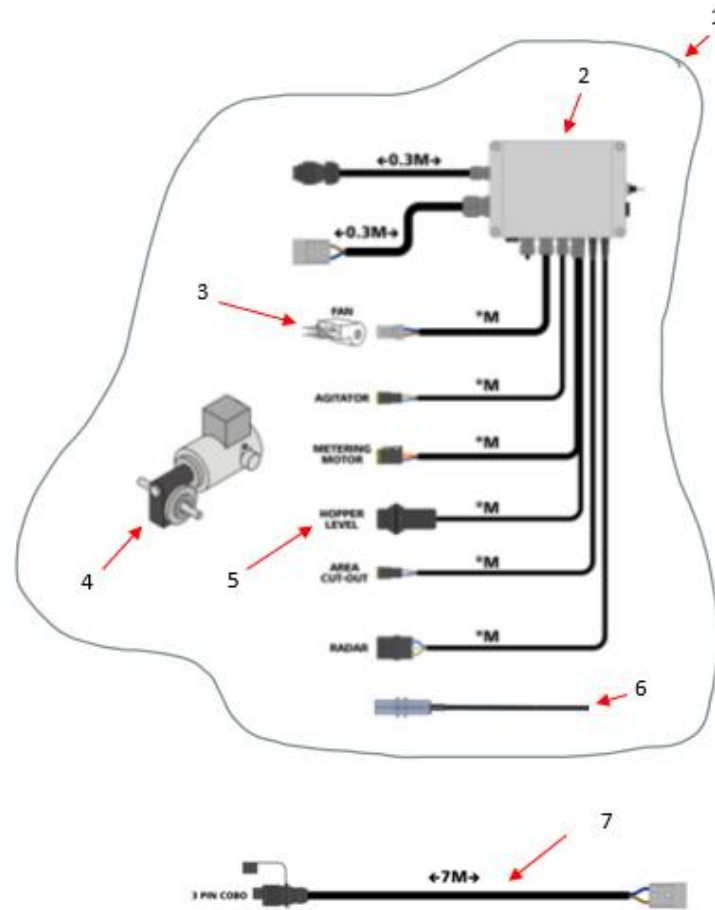


No.	Code	Screen	Reason	Check?
20	G.1		GPS signal lost.	<ul style="list-style-type: none"> <li>Check connections to GPS antenna.</li> <li>Check GPS coverage for Area</li> </ul>
21	B.1		Bridge Module is 'offline'	
22	B.M.1		Blockage monitoring ECU is 'offline'	<ul style="list-style-type: none"> <li>Check power supply to blockage ECU</li> <li>Check wiring between power harness and blockage ECU</li> <li>Check LEDs are lit and flashing on blockage ECU</li> </ul>
23	B.M.2		Wrong number of blockage sensors is detected	<ul style="list-style-type: none"> <li>The correct number of sensors is programmed in blockage ECU setup</li> <li>All sensors are wired correctly and connected</li> </ul>
24	B.M.3		Blocked sensor/row	<ul style="list-style-type: none"> <li>Row or pipe is actually blocked</li> </ul>
25	B.M.4		Communication break between blockage sensors	<ul style="list-style-type: none"> <li>Wiring between blockage sensors</li> <li>The correct number of sensors is programmed</li> </ul>
26	E.H.1		Electro hydraulic module offline	<ul style="list-style-type: none"> <li>Check wiring between 4way superseal and connection to the main loom.</li> </ul>

Issue Ref.	Date	Notes
A	14.10.16	1st Draft : Derived from UK805200
B	1.3.17	2 <sup>nd</sup> draft : re-formatted
C	23.3.17	3 <sup>rd</sup> draft : (Section 1 added note)
1.0	25.02.20	Released (no changes)

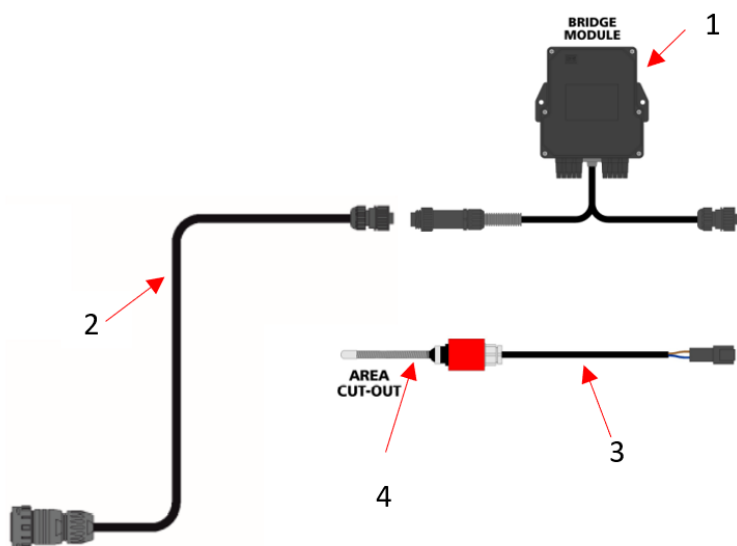
## Spare part list

### Base Kit



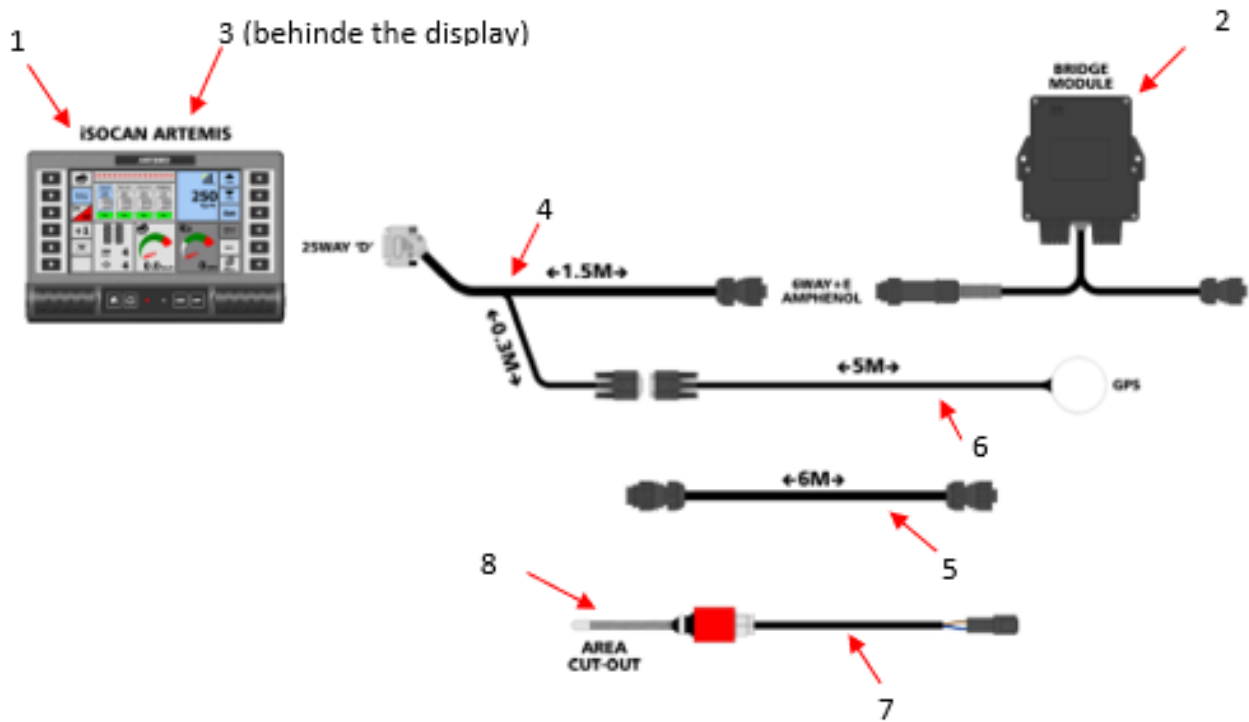
Pos	Item no.	Designation
1	0520002	Base Kit
2	0520010	Junction box for ISOBUS/ISOCAN
3	0539042	Fan (el)
4	0520474	Motor
5	332052778	Sensor f/tank capacity
6	332052777	Sensor f/metering roller
7	0520015	Light Duty Power Cable (only for lite Machines)

**ISOBUS ECU Kit**



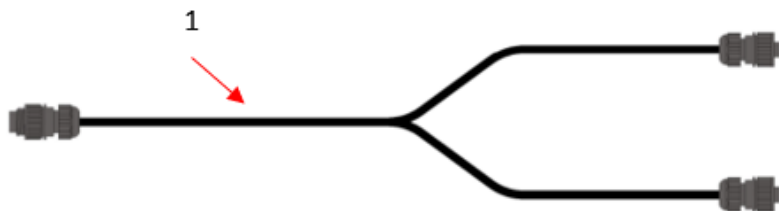
Pos	Item no.	Designation
	0520000	ISOBUS Kit
1	0520011	Bridge Module
2	0520018	Cable ISOBUS
3	0520021	Cable f/finger Switch
4	0520464	Finger Switch

**ISOCAN Display Kit**



Pos	Item no.	Designation
	0520001	ISOCAN Kit
1	0520005	ISOCAN display
2	0520011	Bridge Module
3	0520006	Mount Kit for ISOCAN display
4	0520019	Headunit Cable
5	0520017	Extension Cable
6	0520030	GPS 16 D9
7	0520021	Cable f/finger Switch
8	0520464	Finger Switch

**Additional Seeder Kit**



Pos	Item no.	Designation
1	0520040	Seeder T Piece



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