

# RDS ISOCAN

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## Precision Farming Software Module User Guide



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## 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 on ISOCAN Precision Farming functions. 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.

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## Operator Safety

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 applicators, etc.).
- The Device and Machine must be locked when not in use.

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# 1 Introduction

This manual includes basic instructions for the Precision Farming Software module (e.g. single-channel/ multi-channel application from a treatment plan, or receiving a rate from a 3rd party controller).

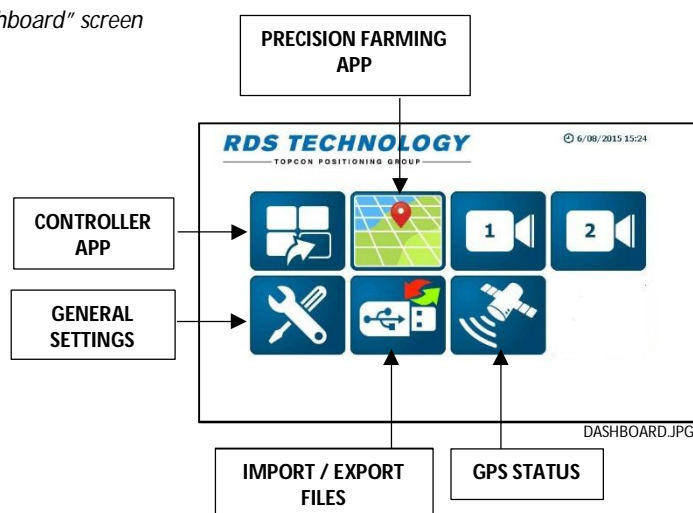
PF capability is included in Isocan software for Artemis (seed drills), and Apollo (fertiliser spreaders). It is however, an optional feature and will only function after entering an activation code purchased via the RDS website.


**NOTE:** A suitably accurate GPS receiver with a minimum 10Hz update rate is recommended.



## 1.1 Startup

1. Press the rubber endcap on the left-hand side of the ISOCAN to switch it on. After a short period loading the individual apps, the "Dashboard" screen is displayed.

Figure 2 The "Dashboard" screen




2. Press the  key to go to the controller application. On initial startup, the main operating screen is displayed.

**NOTE** Pressing the  key returns to the dashboard. Pressing the  key again, will revert to the primary screen page or sub-menu that was last displayed.

## 1.2 PF Settings

### 1.2.1 PF Activation

1. Press  and note down the displayed code.
2. Go to [www.rdstec.com](http://www.rdstec.com). From the home page, click on "Technical Support" > "Activation Site" > "ACTIVATION CODE".
3. Sign into your RDS account, (or request an account if you are a new customer).
4. Enter the code from step 1, and other product details as prompted.
5. Click "Next" and follow the instructions to receive the activation code.

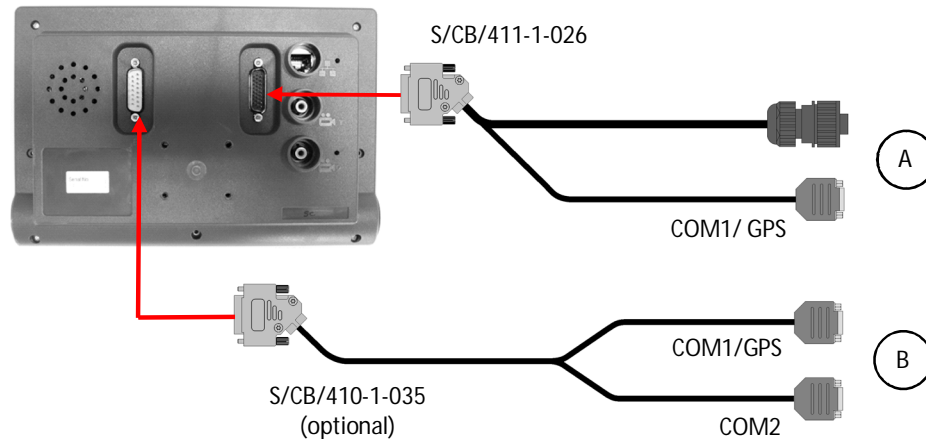
5. Select  > "Global Settings" > "Software Activation Code", and enter the purchased code.

### 1.2.2 RS232 Serial Port connection


The standard head unit cable ('A') enables COM1 only. Either the GPS receiver is connected if the Isocan is operating as a standalone controller, or a third-party controller if the Isocan is to receive external rate instructions.

In some instances e.g. where it is necessary to have a GPS input (e.g. VTG message for forward speed) but also receive external rate instructions, then an additional splitter cable ('B') may be connected to the spare 15way 'D' connector, enabling both COM1 and COM2.

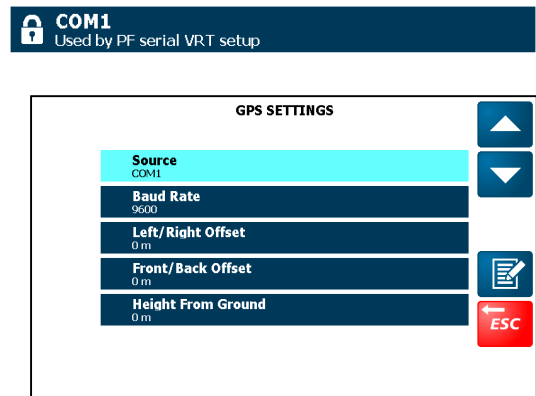
Refer to "GPS Setup" or "VRT Setup" for configuration.



### 1.2.3 GPS Setup

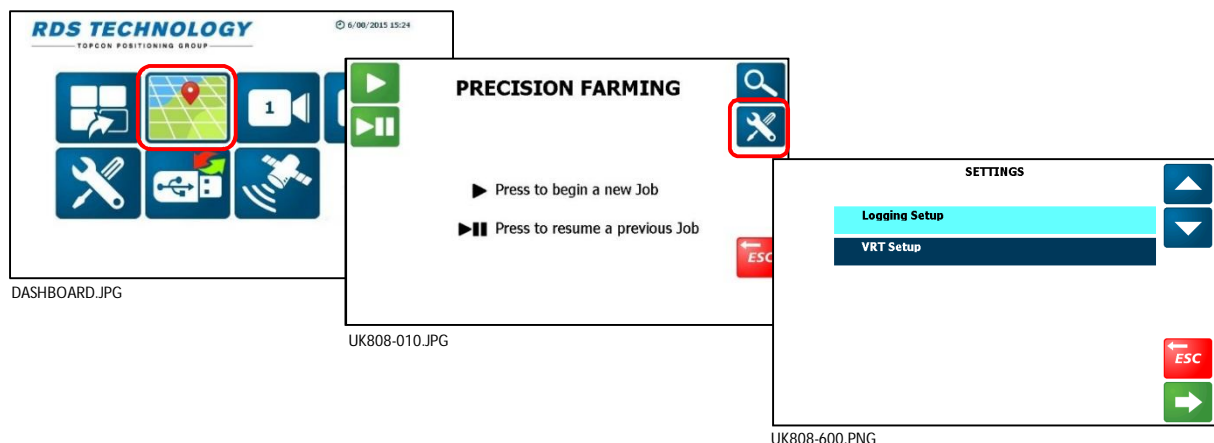
1. From the "Dashboard", select  > "GPS Settings".
  2. To enable GPS input, set "Source" to "COM1".
- NOTE:** If COM1 has previously been set for receiving rate instructions, then go into "VRT Setup" and set the VRT source for the appropriate control channel(s) to "None" or "Treatment File".
3. Select the appropriate baud rate (4800, 9600, 19200, 38400).
  4. The receiver position is defined in relation to the tractor hitch point, "Left/Right Offset" – positive value to the right and negative value to the left of the centre line.  
"Front/Back Offset" – positive value if in front of the hitch and negative if behind the hitch.  
"Height from Ground"

These settings are normally left at zero.



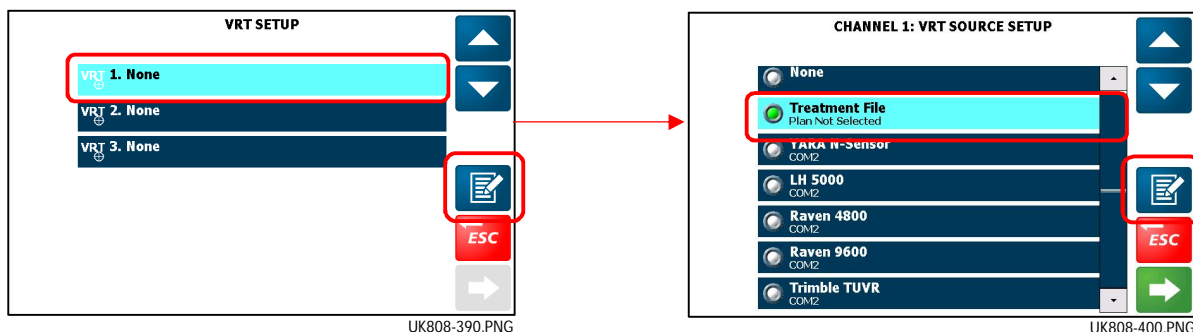
UK808-610.JPG

### 1.2.4 VRT Setup / Receiving Rate instructions




In the case of multiple control channels, select the source of the rate instructions to be applied for each channel in use.

For the RDS controller, select **"Treatment File"**. All VRT plans and subsequent work record files will be read/written from/to the SD card. If receiving rate instructions from a third-party controller, then select it from the list.



These settings become the default when you start a VRT job (ref. 2.2). The VRT source can of course still be changed as part of the PF job setup process if required.

**NOTE:** Other settings relating to PF functions (e.g. GPS settings) are setup directly from the dashboard "Settings" icon (  ).

### 1.2.5 Logging interval

Select **"Logging Setup"** and press .

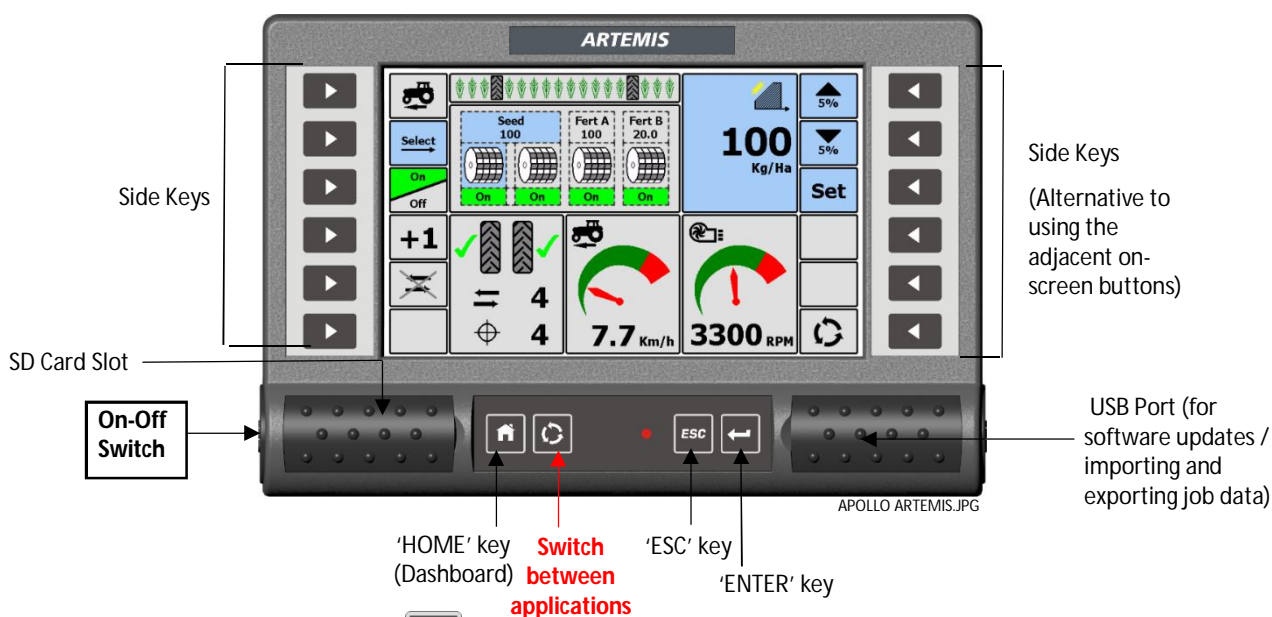
You can set the logging interval by time or by distance.

It is recommended that you use the default time interval setting of 2 seconds. This should be adequate for variable-rate treatment (and yield mapping). To ensure correct application from treatment plans with a smaller cell size however, may require a shorter logging interval to be set.

Decreasing the logging interval may affect the responsiveness of the control system and generate larger log files. An exception is when you are boundary mapping (where less data is being generated), you can reduce the logging interval to get better definition of the field boundary.

**NOTE:** If you choose to log by distance, data points are logged only when moving, and it enables a fixed cell size (area) for the field map.

## 1.3 ISOCAN Terminal - Features and Controls



**NOTE:** When in the control app, pressing  will return you to the app 'Home' screen.



### 1.3.1 Touchscreen

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The instrument has a 5-wire resistive touch screen. 5-wire technology offers superior life and reliability without requiring re-calibration. However, it consists of a polyester film outer layer that must be treated with respect, compared to a non-touch display with toughened instrument glass. Therefore, please observe the following,



DO NOT use a sharp-pointed object - the screen will be damaged beyond repair!

Do NOT wipe or otherwise attempt to clean using any kind of solvent cleaner!.

Do NOT wipe using a dirty cloth or gloves. Use only computer screen wipes designed for the purpose!.

You may use a blunt, smooth-ended plastic object (e.g. a pen body / cap) as a stylus, if found necessary!

## 2. Data Logging and Variable-Rate Treatment (VRT)

This enables the system to be controlled via treatment instructions prepared using Precision Farming software in conjunction with DGPS position data.

To enable fully automatic variable-rate treatment for Precision Farming applications, the controller requires a suitable DGPS receiver and a formatted SD data card to implement treatment plans generated in the Precision Farming software.

Shape files (.SHP) can be also imported and will automatically be converted to the RDS file format. A work record file is automatically created on the card to log data confirming the actual treatment. The job summary data is also appended to this file, which can be viewed in the Precision Farming software.

### 2.1 Job Options

#### 2.1.1 APPLY FROM A PLAN (Variable-Rate Treatment or 'VRT')

- (a) The Isocan receives the rate from a treatment plan stored on the SD card, and controls the application via the RDS control system. An "as applied" work record of the *actual* application is generated and saved on the SD card.
- (b) The Isocan receives the rate from a third-party controller and controls the application via the RDS control system. The Isocan sends back the actual application rate to the other controller. For a treatment plan generated by RDS Plot/Plan, an "as applied" work record of the *actual* application is saved on the SD card.

Both setups allow the operator to commence a full VRT application. The associated "as applied" work record file can be viewed in mapping/treatment plan software. Job summary data (7.1.3) is also appended to the work record file.

#### 2.1.2 LOG TREATMENT (Dynamic Data Logging)

A full application record is generated, logging rate and other parameters (e.g. "tags") in real time, attributing this data to a specific location. The associated "Dynamic Logging" file is viewed in the mapping/treatment plan software. The data generated by dynamic logging is saved onto the SD card. Job summary data (7.1.3) is also appended to the dynamic logging file.

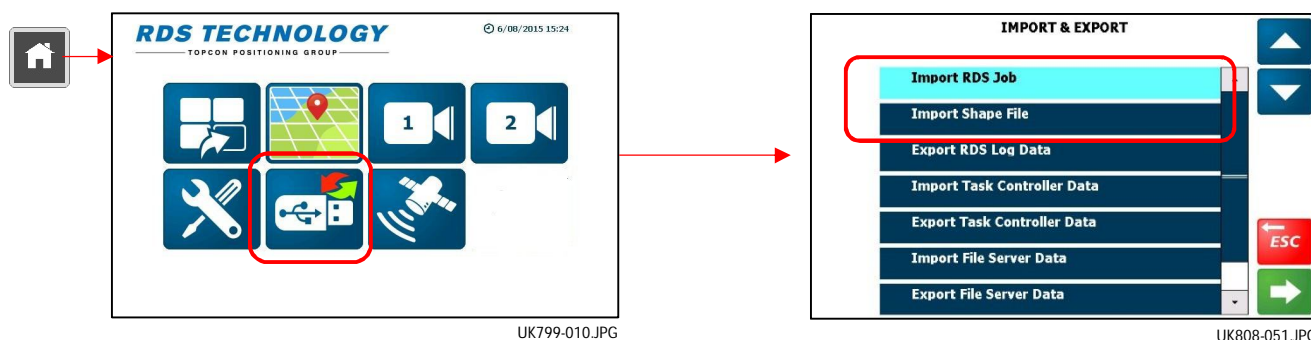
#### 2.1.3 LOG SUMMARY ONLY (Field Data Logging)

For simple farm record keeping and traceability purposes, you can record a summary of each job or work session on the SD card.

## 2.2 Importing / Exporting PF Data

PF data is read from and written to the SD card by the PF app, and the SD card should always be left in the instrument.

Data is transferred between the Isocan SD card and the office via a USB stick utilizing the Import / Export app on the 'Dashboard'.



**NOTE:** If importing a shape file, it is automatically converted and saved onto the SD card in the RDS format.

## 2.2.1 Importing RDS treatment files

To upload RDS treatment plans to the SD card, insert the USB stick and from the Dashboard, select '**Import RDS Job**' > '**OK**'.

If necessary, navigate to the appropriate directory using the   keys. Select the 'RDS\_DATA.XXX' folder containing the file(s) and press .

Existing files with the same filename in the RDS\_DATA.XXX folder on the SD card will be overwritten.

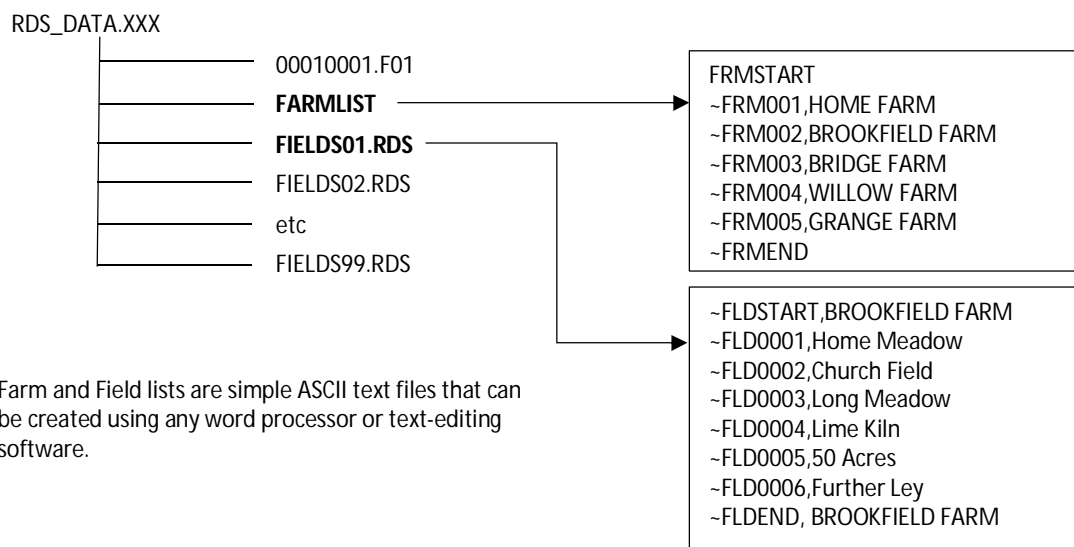
## 2.2.2 RDS filenames, Farm and Field lists

To enable farm and field lists to be displayed and to search for a related plan, two text files are created in the RDS\_DATA.XXX folder,

- A Farm No / Farm Name text file <FARMLIST.RDS> listing all farms.
- A Field No. / Field Name text file <FIELDSxx.RDS> for each farm, where 'xx' is the farm no.

**NOTE:** In the absence of the above text files on the SD card, the Isocan initially creates default files <FARMLIST.RDS> and <FIELDS00.RDS> automatically for farm no. 00 "UNKNOWN" and field no. 00 "UNKNOWN"

### Farm and field lists

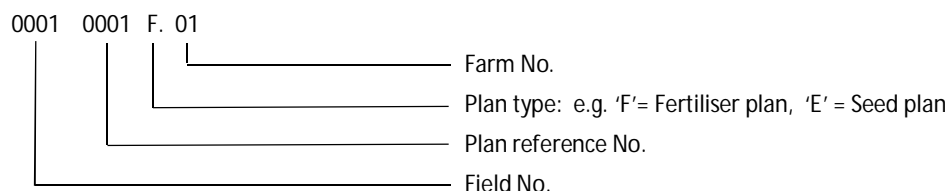


Farm and Field lists are simple ASCII text files that can be created using any word processor or text-editing software.

### RDS filename

When creating a plan, the filename should adhere to the following convention, so that the Isocan can search and select the plan relating to a given farm and field during the plan selection process.




E.g. 00010001.F01

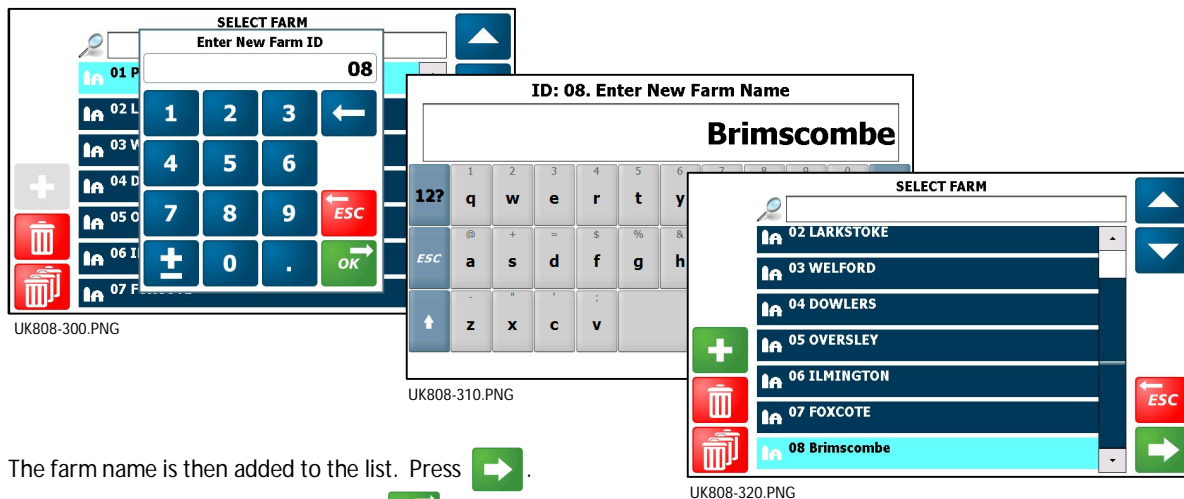





### 2.2.3 Adding a new farm / field reference

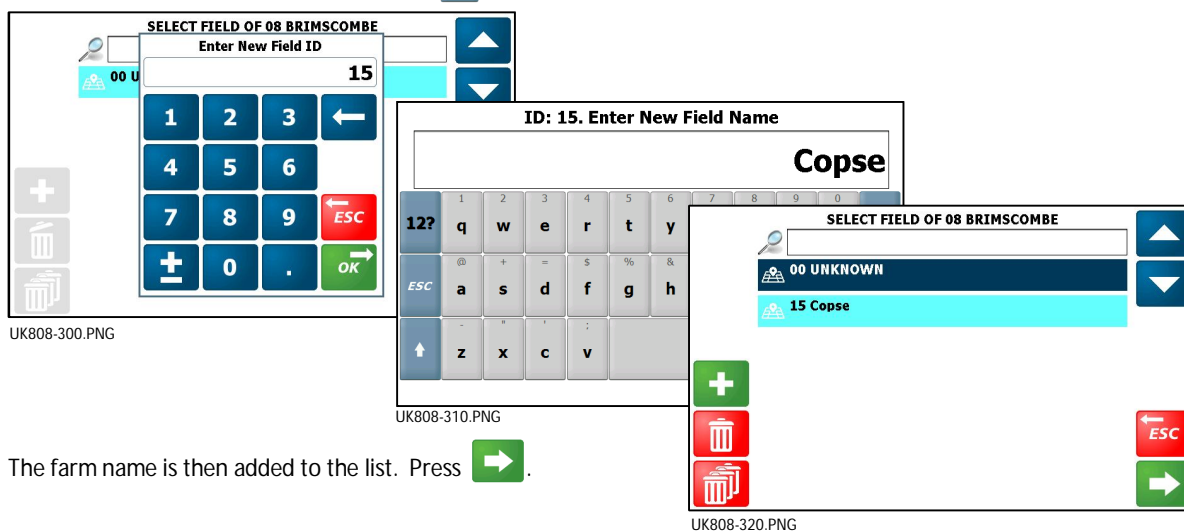
If a plan is imported where the farm / field reference no. does not correspond to an existing entry in the farm / field list, then you can create a new farm and field reference for that file from the 'SELECT FARM' screen.


Take for example, a seed plan with the filename 00150001.E08. Farm no.08 is not on the current list.

1. From the 'SELECT FARM' page, press .
2. Enter the farm no. (e.g. '08') and press .
3. Enter a farm name (e.g. "Brimscombe") and press .



4. The farm name is then added to the list. Press .
5. Enter the field no. (e.g. '15') and press .
6. Enter a field name (e.g. "Copse") and press .





7. The farm name is then added to the list. Press .

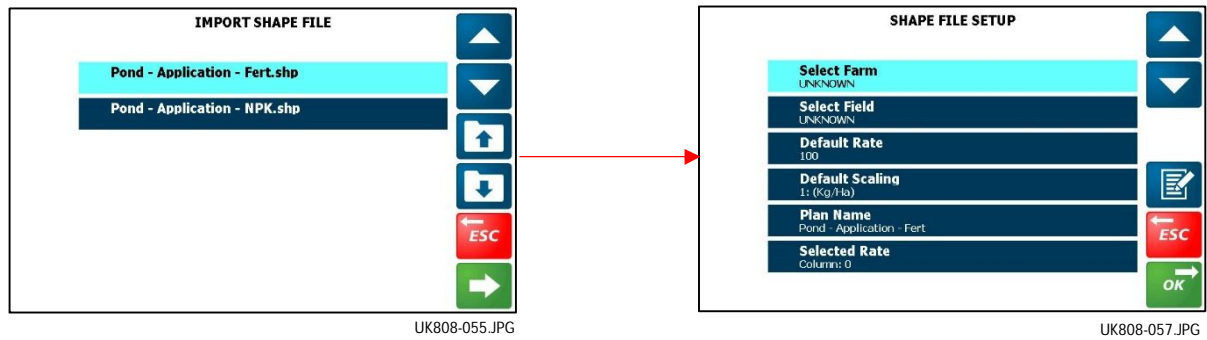
The farm reference is then appended to the existing 'FARMLIST.RDS' file, and a new file 'FIELDS08.RDS' added to the RDS\_DATA.XXX folder on the SD card.

### 2.2.4 Importing Shape files

To upload shape files to the SD card, insert the USB stick and from the Dashboard, select 'Import Shape File' > 'OK'.


If necessary, navigate to the appropriate directory using the  keys. Select the file and press .





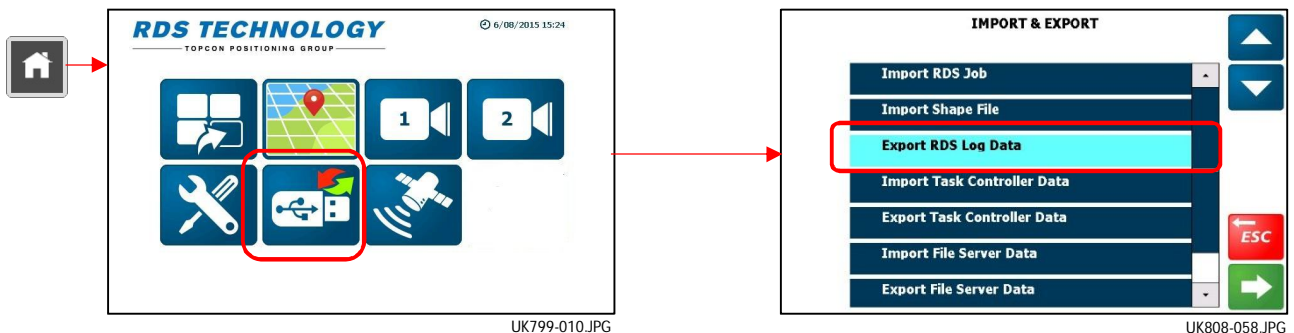
You then have the option to edit the shape file settings,

- Select Farm
- Select Field
- **Default rate** This is the base rate that the plan is based on and to which the system will apply, for example in the absence of GPS data, when outside the field boundary etc.
- **“Default scaling”** (the units - e.g. kg/ha etc)
- Plan name
- **“Selected Rate”** This specifies which data column in the associated shape file database (.DBF) file the system will interpret as the rate instructions.

Press  to import the file. The shape file (.SHP) will be automatically converted to the RDS file format upon transfer.

## 2.2.5 Export Job Data


To download application records / job summaries, insert the USB stick and from the Dashboard, select 'Export RDS Log Data' > 'OK'.



## 2.3 Starting a VRT job

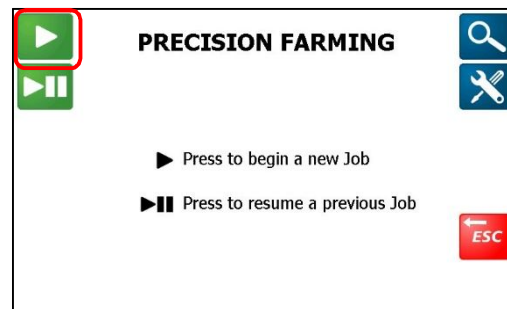
**NOTE:** In the case of multiple control channels in use, the VRT source and VRT plan must be individually set for each channel.

### (i) Select the farm and field

1. If not already done, upload the required treatment plan(s) to the SD card (2.2).
2. Start the PF software via the 'Dashboard', then press  to begin the job setup process.



DASHBOARD.JPG







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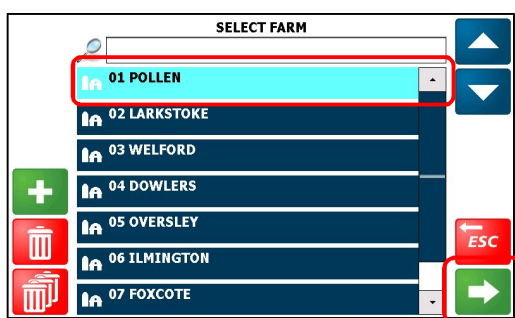
3. Choose the job option ("Apply from a Plan" being the default, so just press 'OK').



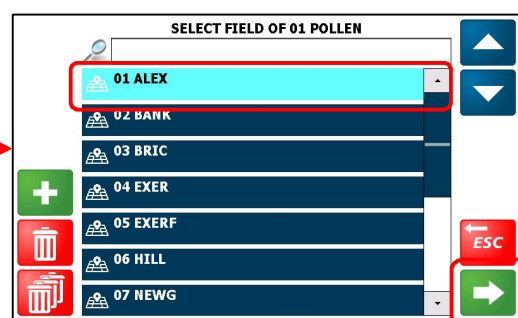
UK808-020.JPG

4. Select the required FARM reference and press  (or press  to add a new farm and reference – ref. 2.2.3).
5. Select the FIELD reference and press .

**NOTE:** You can also select the farm / field using the search function (  ) by entering a search term.



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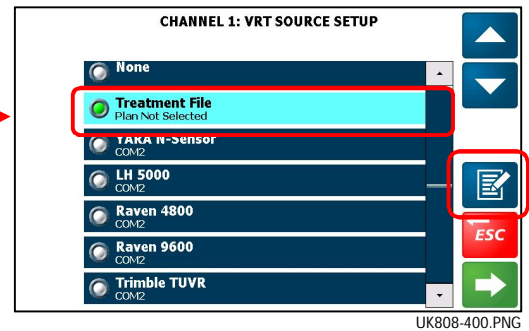
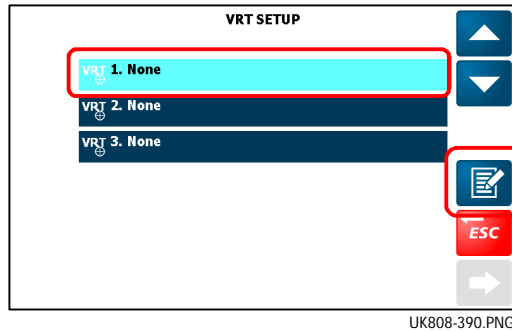


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**(ii) Select VRT source**

6. In the case of multiple control channels, if not already set by default (ref. 2.7.2), select the source of the rate instructions to be applied as **"Treatment File"** for each channel in use.

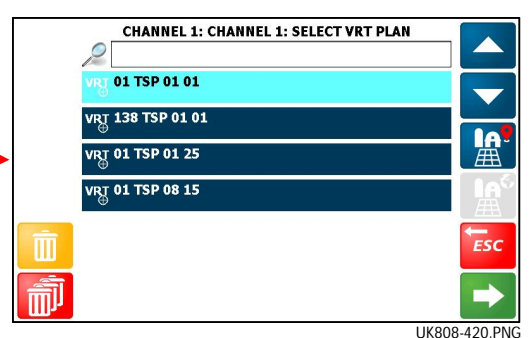
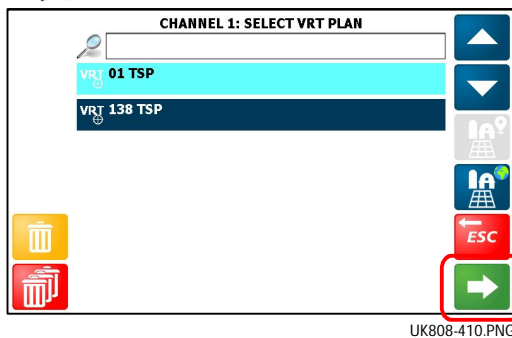
**NOTE:** If receiving rate instructions from a third-party controller, unless the instrument is already configured to default to that controller, then select it from the list.

**(iii) Select plan(s)**

7. For the selected channel, press to select a plan stored on the SD card.

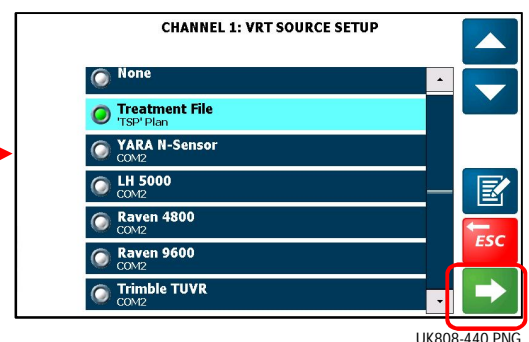
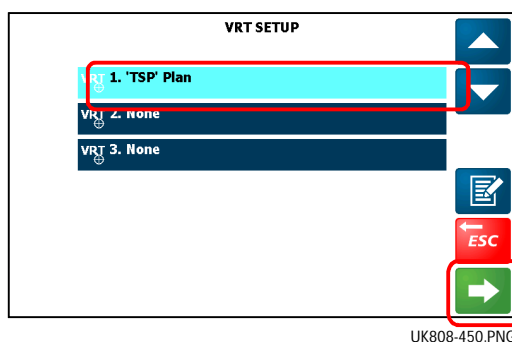
By default, the instrument lists all treatment plans that are associated with the selected farm and field ( ).  
e.g. "01 TSP 01 01" indicates [Plan ref. no.]\_[Product]\_[Farm no.]\_[Field no.]


**NOTE:** Pressing displays ALL treatment plans on the SD card. If desired you can also select a plan using the search function ( ) by entering a search term.




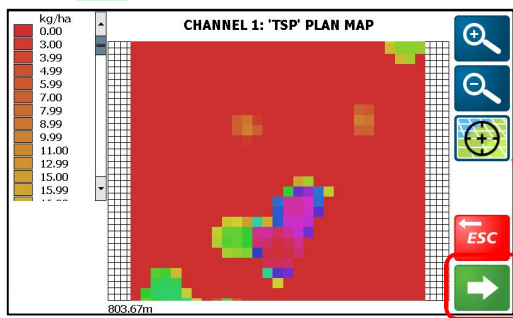
8. Select the plan and press to confirm the selection.

**NOTE:** At this point, if you have a multiple channel setup, then select the next channel (e.g. "VRT 2") and repeat the plan selection process (steps 6, 7 and 8).

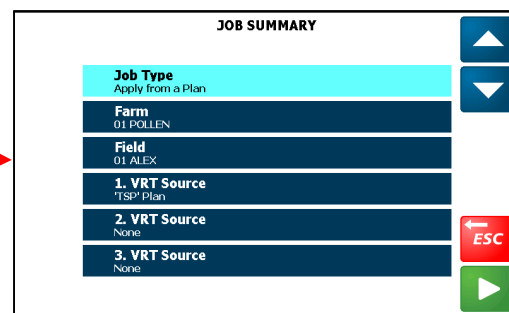


9. When you have finished selecting the treatment plan(s), then press  to view the treatment map.


10. Press  again to view the job summary.

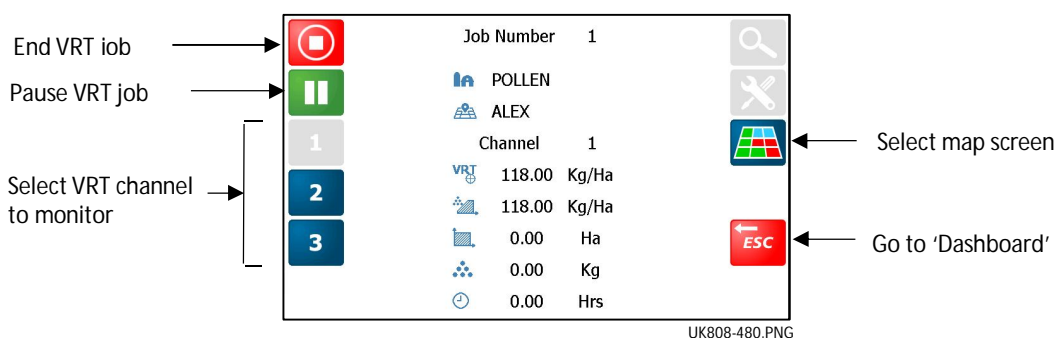


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UK808-470.PNG


11. Press  to start the treatment plan. The VRT information screen is then displayed.

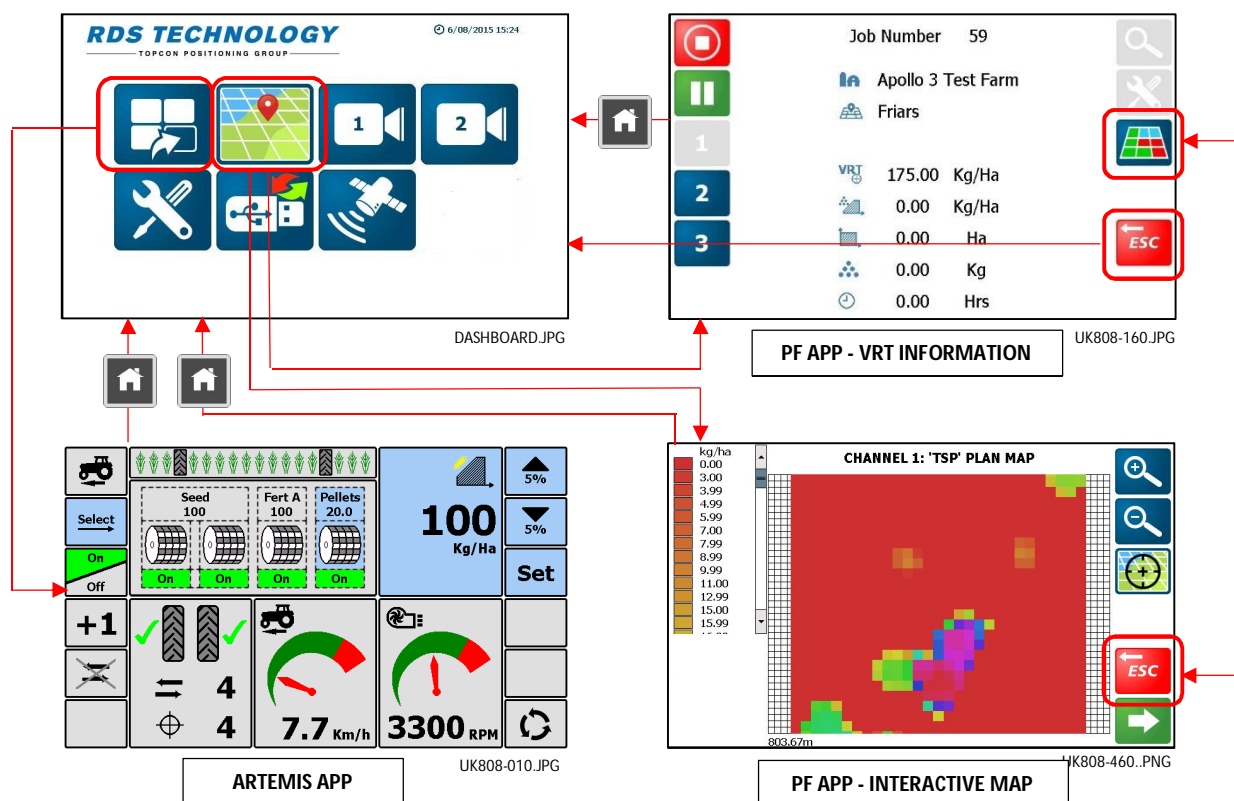


UK808-480.PNG

## 2.4 Viewing an active VRT job


At any time you can switch between the main operating screen, the interactive map view and the VRT information screen as shown below.


**NOTE:** Pressing  returns you to the "Dashboard" from any other screen. Re-selecting the app returns you to the app screen previously displayed.

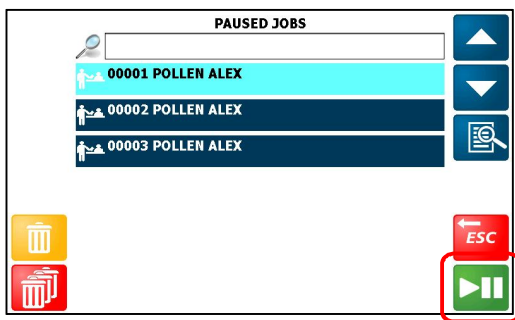






To return to a previously paused job, from the PRECISION FARMING screen, press .

If more than one job has been previously paused and saved, then select the job to resume from the list, and press .




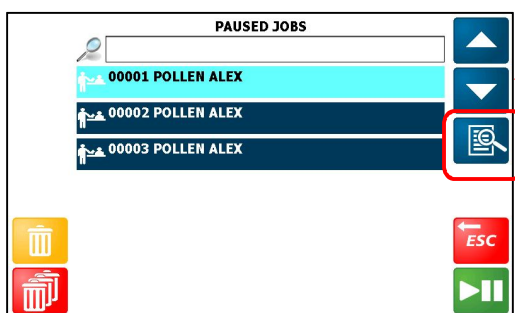
UK808-490.PNG

The job will now be resumed. The associated work record file is re-opened and subsequent logging data will be appended to it.

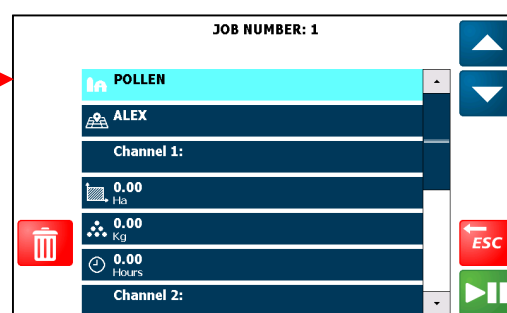
## 2.5.2 View summary / delete paused jobs

From the PRECISION FARMING screen, press .

Press  to see view a summary of a paused job.



UK808-490.PNG




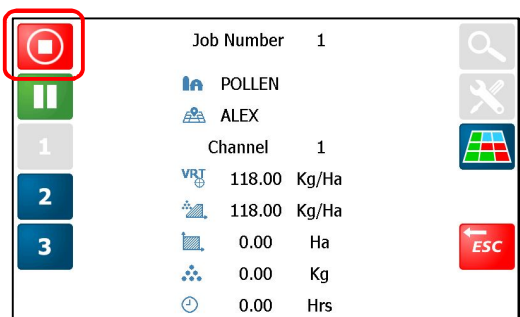
UK808-500.PNG

Press  to delete the selected job.

Press  to delete ALL paused jobs

## 2.5.3 End a job

Return to the VRT information screen (ref. 2.3) and press  to to end a job.




UK808-480.PNG


## 2.6 Search / View / Delete Summary Data

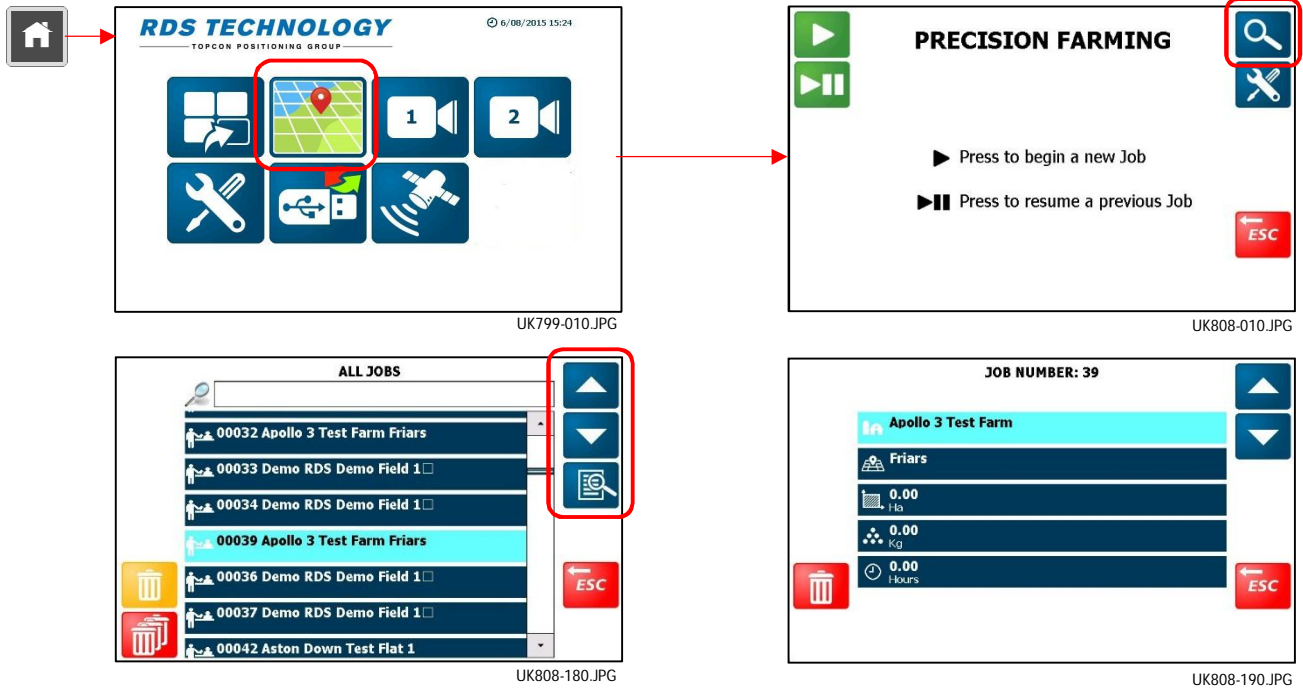
Summary data is recorded to the SD card for every PF job including,

- VRT
- Dynamic Data Logging
- Field Data Logging

Every PF job started is given a reference number which is assigned sequentially by the software.

Press  to view the completed jobs list.

Press  to select the job to view / delete.



Press  to delete the selected job.

Press  to delete ALL paused jobs.

Issue Ref.	Date	Notes
A	6.10.17	1 <sup>st</sup> Draft
1.0	10.10.17	Original issue

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