

AIRTEC MB2

SPRAYER CONTROLLER

Calibration

RDS Part.No.:	S/DC/500-10-254
Doc. Issue:	3 : 29/11/01
Software Issue:	PS512-011 rev. 0

Electromagnetic Compatibility (EMC)



This product complies with Council Directive 89/336/EEC when installed and used in accordance with the relevant instructions.

IMPORTANT, READ THIS BEFORE USING THE MB2

The *AIRTEC MB2* instrument can be configured for Variable Rate Treatment ("VRT mode") as part of an RDS Precision Farming System ("the System"). It is very important that you follow the described calibration procedures before operating the instrument in VRT mode. Calibration and operation must be in accordance with these instructions. Use of the System is subject to the following disclaimer;

1. So far as is legally permissible RDS Technology ("RDS"), shall not be liable, whatever the cause, for any increased costs, loss of profits, business, contracts, income, or anticipate savings or for any special, indirect or inconsequential damage whatsoever (death or personal injury excluded).
2. The capabilities and functions of the Precision Farming System ("the System") are limited as set out in the specification of the System, details of which are contained in the Help files and product literature and which must be read before using the System.
3. Without prejudice to the generality of the above it is hereby acknowledged that the System is not designed nor intended to a) originate variable treatment plans or b) achieve or avoid any application rate outside application parameters, which in both cases shall be the responsibility of the operator.
4. The standard terms and conditions of RDS (except clause 7), a copy of which is available on request, apply to the supply and operation of this System.

Service and Technical Support

For service and support please contact;

CLEANACRES MACHINERY LTD
HAZELTON, CHELTENHAM
GLOS. GL54 4DX,
UK

TEL: + (44) 01451 860721
FAX: + (44) 01451 860139

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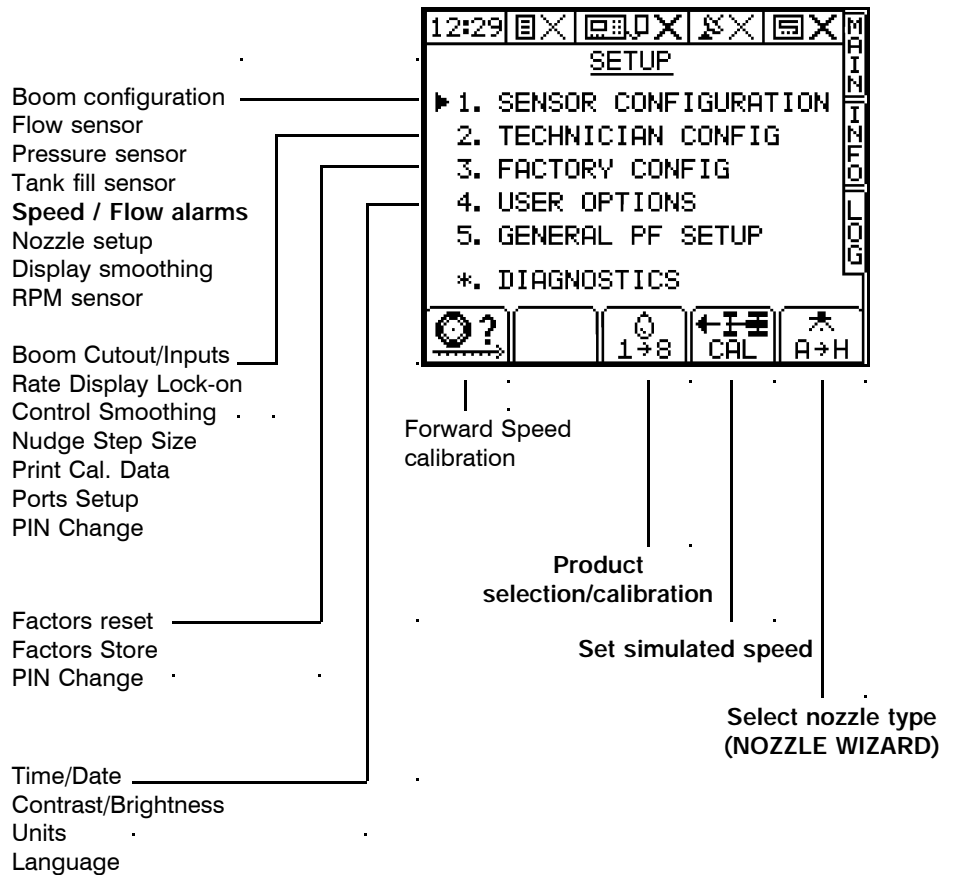
1 Overview

The instrument must be calibrated before commencing normal operation. Many settings are made only on initial installation e.g. from the 'SENSOR CONFIGURATION' screen. Other calibration settings may need to be altered on a regular basis according to the liquid being sprayed, nozzle types being used etc.

1.1 The "Setup" Screen page

Press the  key to select the SETUP menu (fig. 1). The complete menu is shown on page 6.

Figure 1
The information displayed on the SETUP screen




1.1.1 Flow/Pressure calibration on installation


On machines fitted with Airtec and conventional lines, the air pressure sensor and liquid pressure sensor should be calibrated initially with the Airtec nozzle.


Following this, you should then perform a nozzle jug test. If the expected flow rate from the nozzle deviates from the nozzle parameters screen at the given speed/flow rate, the correction should be made via the "CAL NUDGE" screen. Once this adjustment is made, the Airtec nozzle should be flow checked again. Assuming that this is then satisfactory, the conventional line is calibrated. The flow calibration procedure is described in section 3.


1.2 Data Entry

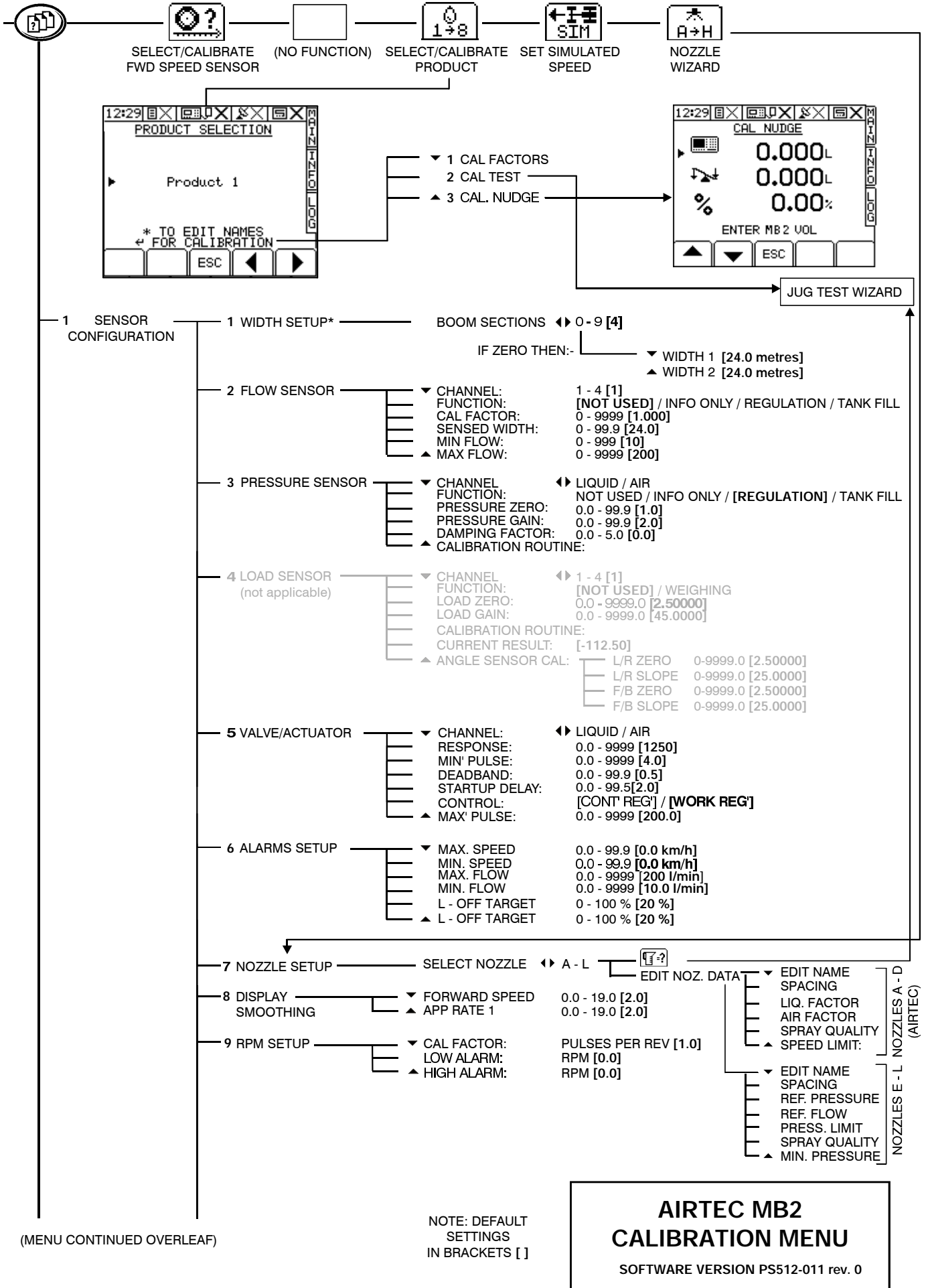
Alpha-numeric values are entered via the right hand keypad. You must press the key from 2 to 5 times to select the required letter. (Some keys have additional special characters not shown on the key legend).

The  key will either toggle between lower and upper case characters or when preceding a numerical entry, will set a MINUS value.

The  key will toggle between 0 and a SPACE.

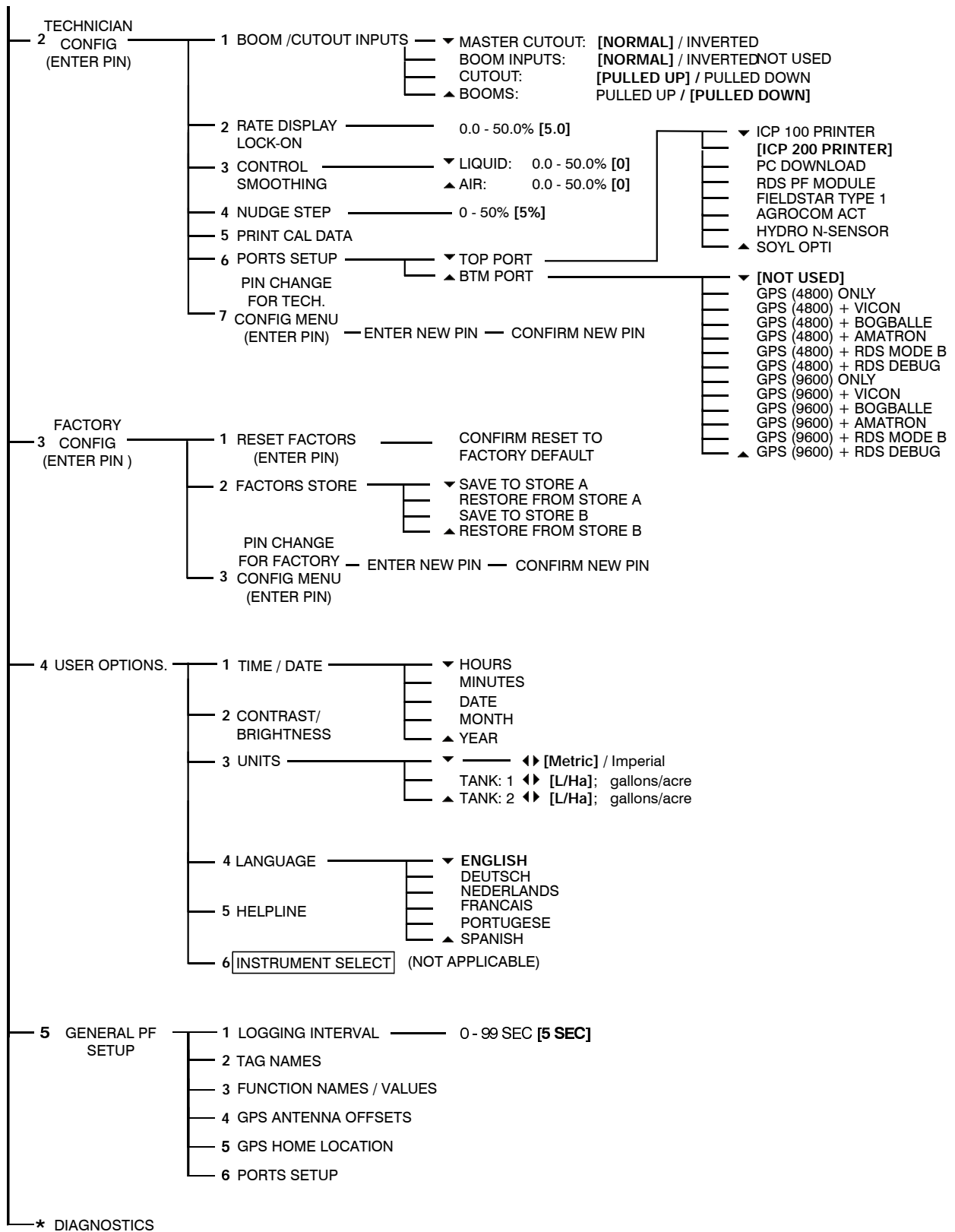
The  key will BACKSPACE the screen cursor if you need to re-enter a character.

The  key is the RETURN key and is normally pressed to confirm the data entry into memory.



(MENU CONTINUED OVERLEAF)

Calibration Menu



2 Sensor Configuration

Calibrate the Forward Speed Sensor and Flow / Pressure Sensors before commencing liquid calibration.

2.1 Forward Speed Sensor



The Speed Sensor Factor ("SSF") is the distance travelled forward in the time between two pulses from the forward speed sensor. This could be calculated based on the nominal tyre diameter or rolling distance and then entered manually, however this does not take into account wheel slip, compaction, or tyre deformation under practical operating conditions. The best method is to do an "Auto Cal".

2.1.1 Select Wheel Size (Wheel sensor fitted) / Radar Sensor

If the sprayer has a standard wheel sensor and magnets installed, you can programme the instrument with two speed sensor factors e.g. one for flotation tyres and another for row crop wheels. Remember to select the appropriate factor after changing wheels.



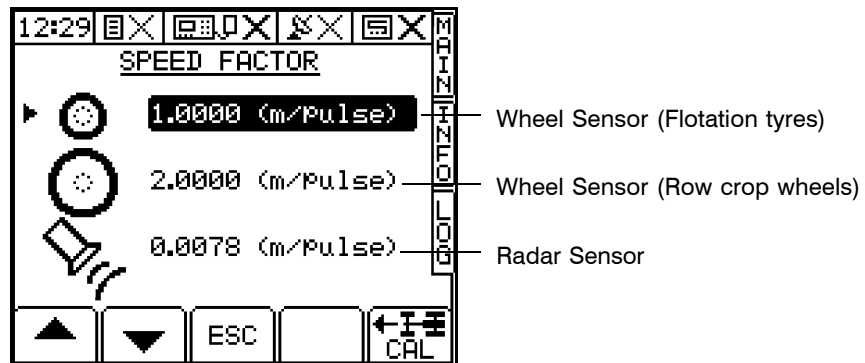
- 1 Press  to select the "SPEED FACTOR" screen (fig. 3).
- 2 Move the arrow cursor to select the factor appropriate for flotation tyre or row crop wheel size (or radar sensor if fitted), and press  to confirm.


Figure 3
Selecting the wheel size / Radar Sensor




2.1.2 "Auto Cal"

The "Auto Cal" procedure is the same for a wheel sensor or a Radar Sensor.

Mark a set distance of 100 metres (or 100 yards depending on the units set on the instrument) by suitable means. The surface should be representative of the average field conditions (i.e. not a paved surface). Position the vehicle with the first marker level with a suitable reference point on the vehicle.

With the appropriate setting highlighted on the "SPEED FACTOR" page, press ENTER, then select "Auto Cal". Press  and then follow the screen instructions.

Stop the vehicle when the second marker lies up with the predetermined reference point on the vehicle and press  to end the "Auto Cal" procedure. The Speed Sensor Factor is automatically re-calculated and stored in memory.

NOTE: If you overrun the marker, do not simply reverse - repeat the "Auto Cal" procedure from the beginning.

2.1.3 Manual Calibration

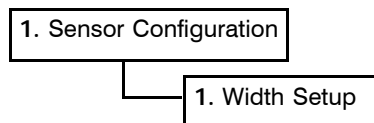
If a two-magnet wheel sensor is fitted, drive in field conditions for exactly 10 turns of the sensed wheel.

If a propshaft sensor is fitted, drive in field conditions for exactly 20 turns of the propshaft.

In either case calculate the factor = $\frac{\text{Distance travelled}}{10}$ and enter the value.

If an RDS Radar sensor is fitted (at the correct angle of $37 \pm 1^\circ$),

- 1 Accept the default factor of 0.0078 metres/pulse.
- 2 Set the implement full width to 100m.



- 3 Select the "INFO" screen to display area accumulation and drive over a 100 metre measured distance. This must be a rolling 100 metres, not a start-stop 100 metres.

If the TGSS factor is correct, the AREA display will show 1.000 hectares. If not (for example if the angle of the sensor is not within $\pm 37^\circ$) then adjust the factor based on the following calculation,

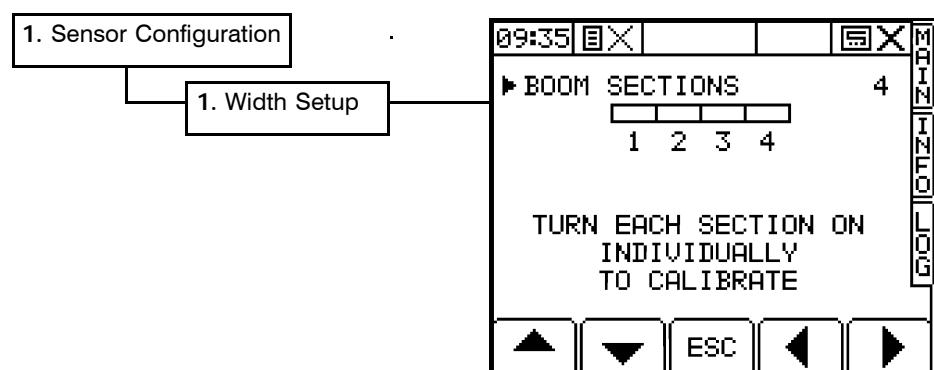
New factor = existing factor x displayed area (ha)

- 4 Go back to the "SPEED FACTOR" screen and enter the new factor. Don't forget to reset the implement width to normal.

2.2 Boom Configuration

Select the "Width Setup" screen.

Figure 4
Setting the number of boom sections



2.2.1 Set the number of boom sections

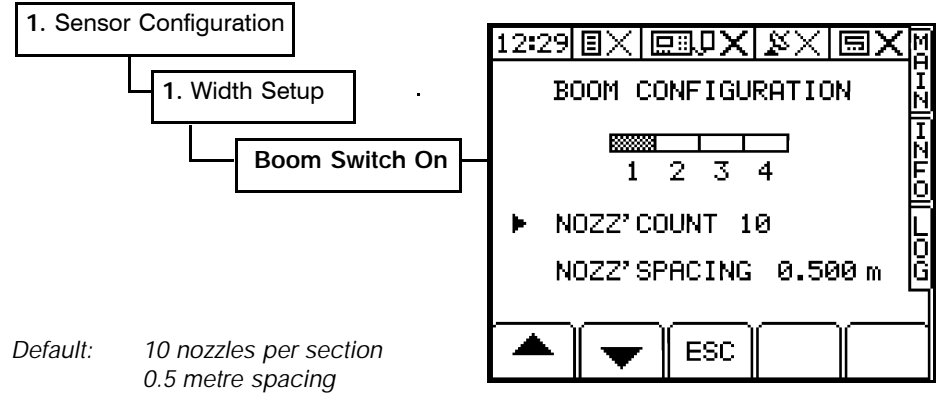
With the screen cursor opposite "BOOM SECTIONS", enter the number of sections from 0 to 9 and press the ENTER button. When a boom section is switched on, the boom section block is filled in.

NOTE: If the boom sections are set to zero then the whole boom is seen as one unit. The boom section inputs are ignored and the full spraying width is programmed.

2.2.2 Set Nozzles per Section and Nozzle Spacing

Switch on each boom section in turn to configure the number of nozzles and the nozzle spacing. This screen (fig. 5) appears when a boom switch is switched on.

Figure 5
Setting the nozzle spacing and number of nozzles per section



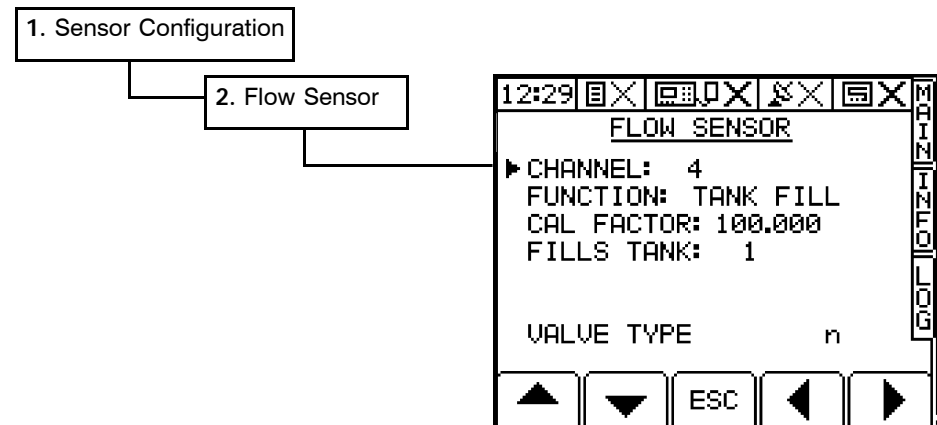
2.3 Flow / Pressure Sensor Setup

The Airtec system is a two channel pressure-based regulation system. Channel 1 monitors and controls the liquid pressure via a pressure sensor and control valve, and similarly channel 2 monitors and controls air pressure.

Do the Flow / Pressure Sensor Setup before doing the liquid calibration.

2.3.1 Tank In-flow Sensor configuration

Figure 6
Tank In-flow Sensor Setup




Being pressure-based, the Airtec system does not require a flow sensor, therefore accept the default settings for channels 1 - 3.

The exception is where an optional tank inflow sensor is fitted for measuring tank refilling. Channel 4 is configured by default for a tank-filling sensor.

2.3.2 Calibrating a Tank-filling Sensor

- 1 Accept the default factor (pulses per litre or pulses per gallon) for a 2" turbine.


Turbine size	pulses/litre	pulses/Imperial gallon	pulses/US gallon
2"	1 00.0	4 546	3 785

- 2 Select the "INFO" screen and press  to access the TANK FILL screen.
- 3 Set the "NOW" volume to zero.
- 4 Fill the empty tank with the known volume (e.g. 2000 litres) of water via the inflow sensor and note the "NOW" volume displayed.

The correct Cal. factor = $\frac{\text{Initial Factor} \times \text{"NOW" volume}}{\text{Actual volume}}$

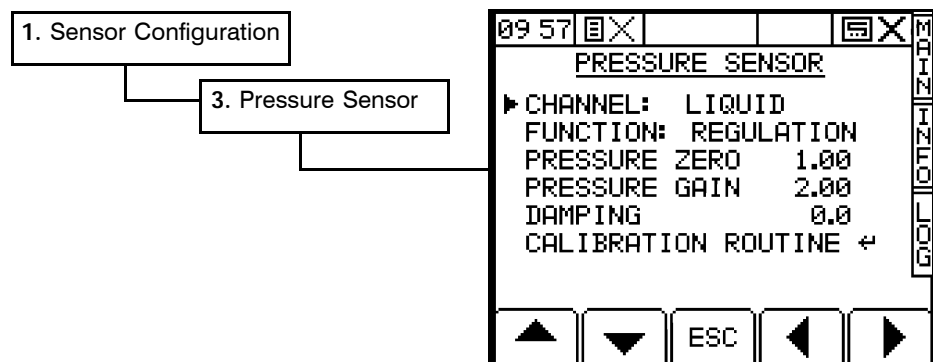
e.g. Initial Cal. Factor = 100 and the "NOW" volume reads 1750 litres after filling 2000 litres;

New Cal. Factor = $100 \times (1750/2000) = 87.5$

- 5 Re-access the "FLOW SENSOR" screen and select channel 4. Key-in the new Cal. Factor and press .
- 6 Press ESC to return to the menu.

2.3.3 Calibrating LIQUID and AIR pressure Sensors

Figure 7
Pressure Sensor Setup



There are two channels for the LIQUID and AIR sensors. Both function for REGULATION. Both need to be calibrated in exactly the same manner, so the following procedure should be repeated for both the LIQUID and AIR channels.

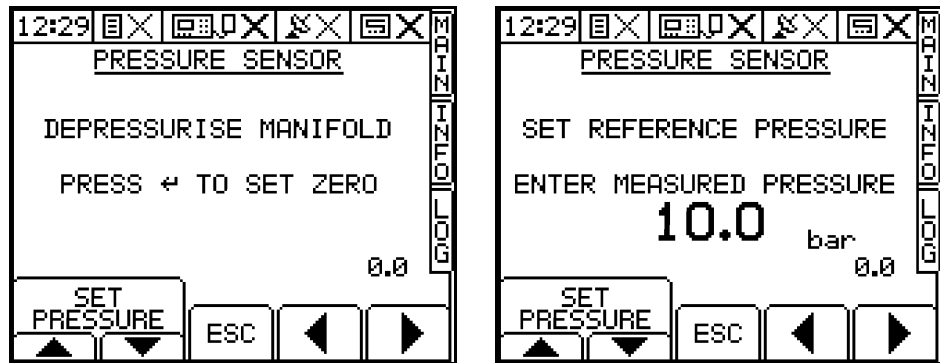
The calibration routine for pressure zero and pressure gain should be carried out first for the Airtec nozzles.



- 1 Depressurize the manifold.

NOTE: Switch the master switch and boom switches ON, otherwise the zero calibration will be based on 0V and not the measured volts. This also ensures that the pressure is evacuated.

- 2 Press  to set "PRESSURE ZERO" (fig.8a)

Figure 8a and 8b
Calibrating the Pressure Sensor



- 3 Start the sprayer and set the reference pressure (the typical working pressure) using the  keys (fig. 8b).
- 4 Key-in the pressure indicated on the sprayer pressure gauge and press . The "PRESSURE GAIN" is then set and is displayed on the "PRESSURE SENSOR" screen (fig. 7).

NOTE: *It is important to calibrate the liquid sensor with Airtec nozzles and not conventional nozzles.*

There will always be a pressure drop between the manifold where the pressure sensor is fitted and the boom line where the sprayer gauge line is connected. This pressure drop will increase as the flow rate increases. As the sprayer gauge indicates the pressure in the boom line (which will be lower than the pressure at the pressure sensor), sensor calibration will be less accurate at the higher flow rates of conventional nozzles, and as a result the pressure reading on the sprayer gauge will be lower than the pressure reading displayed on the MB2.

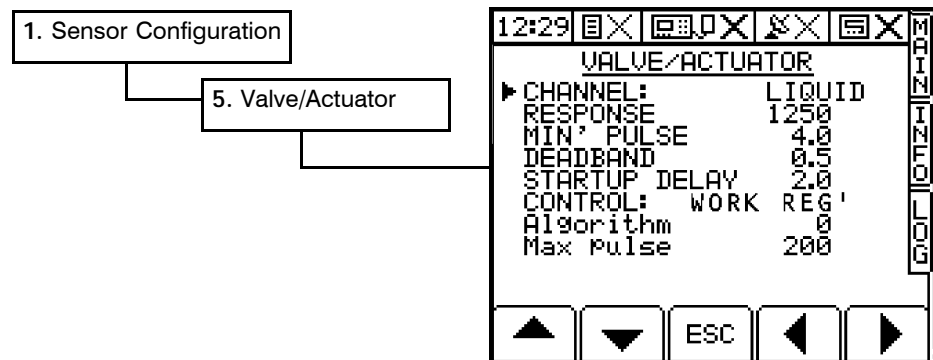
Airtec nozzles on the other hand, have a relatively low liquid flow rate compared to conventional nozzles for the same application rate, so the pressure drop is minimised and calibration will be more accurate.

2.3.4 Damping

The damping factor enables fluctuations in the pressure readings to be smoothed out. By default the damping factor is zero.

2.4 Configuring the Control Valve

Figure 9
Configuring the
Control Valve



There are two channels for the LIQUID and AIR control valves. The functions and default values apply to both LIQUID and AIR channels.

2.4.1 Response

The System Response function sets the frequency at which the system adjusts the control valve when reacting to a change in forward speed. A lower setting results in a slower response, and increases the time taken for the application rate to match the target rate. A higher setting results in a faster response. If the application rate is unstable and varies about the target rate, then the response setting may be too high.

Default: 1250 *Range:* 0.1 - 9999

2.4.2 Minimum Pulse

The Minimum Pulse Length function sets the length of pulses driving the pressure control valve. The pulses becomes shorter as the application rate nears the target rate. A lower setting gives shorter pulses - too short and the flow rate may not change sufficiently. If the pulse is too long, the system may be unstable about the target rate.

Default: 4.0 (milliseconds x 4 = 16ms) *Range:* 0.1 - 9999

2.4.3 Deadband

The Deadband function sets the range over which the flow rate will vary about the target rate before the control valve will respond. A lower value will make the control respond to a smaller variation in flow and vice versa. If the value is too low the system may be unstable about the target rate.

Default: 1.0 *Range:* 0.1 - 99.9

2.4.4 Startup Delay

If a spray boom is empty of liquid, the flow into it is rapid until it pressurises. The flow rate then reduces to the correct flow rate. Consequently the system takes some time to stabilise at the target rate. The instrument must be stopped from reacting to the initial flow surge.

Set the delay time to equal the time it takes for the sprayer system to reach the normal working pressure. When the whole boom or individual section is switched on, the control valve will not operate for this time period.

Default: 2.0 *Range:* 0.5 - 99.5

2.4.5 CONTROL: (Control Method)

"WORK REG"- The power supply to the control valve is inhibited when the sprayer is switched off (e.g. on the headland), and the control valve is frozen at it's regulating position.. This enables a faster return to the target rate when the sprayer is switched on at the beginning of the next bout.

"CONT' REG"- The control valve continues to regulate when the sprayer is switched off and will close in response.

In general, set the control method to "WORK REG" for any sprayer. "CONT REG" is only necessary in certain circumstances e.g. when controlling certain slurry spreaders. *Default: WORK' REG*

2.4.6 Algorithm

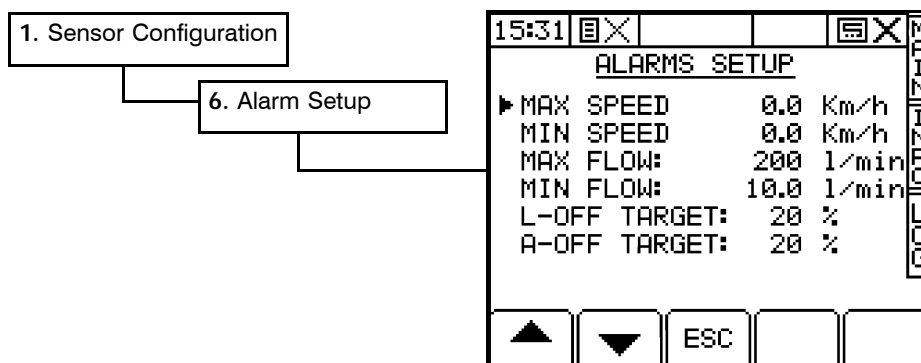
This sets mathematical parameters used by the control program and is subject to ongoing development. Do not change this setting. *Default: 0 Range: 0 - 3*

2.4.7 Max. Pulse

The Maximum Pulse Length function limits the length of pulses driving the pressure control valve. Do not change this setting. *Default: 200 Range: 0 - 250*

2.5 Alarms Setup

Figure 10
Alarms Setup



MAX. SPEED and MIN. SPEED

These values set the thresholds for the forward speed alarm. The Forward Speed alarm and Flow alarms function independently from the minimum and maximum values displayed on the nozzle wizard screen.

MAX. FLOW and MIN. FLOW

These values set the thresholds for the "FLOW HIGH" and "FLOW LOW" alarms during operation. Minimum and maximum flow can also be set from the "FLOW SENSOR" screen. Primarily intended for flow-based sprayer installations, nevertheless on pressure-based systems you can for example, set in a flow rate corresponding to the maximum pump capacity of the sprayer.

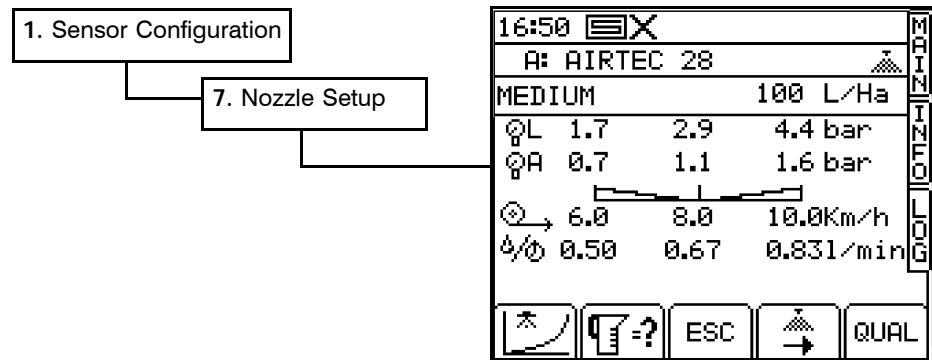
OFF TARGET


The difference between the actual pressure and the required pressure before the instrument alarms, are the "L-OFF TARGET" (for liquid pressure) and A-OFF TARGET" (for air pressure) settings, preset by default at $\pm 20\%$. These settings may be reduced or increased as desired (fig. 10).

NOTE: A setting of 0% will disable the Off Target alarms.

2.6 Editing Nozzle Data

Figure 11
The "Nozzle Wizard"



NOTE: The Nozzle Setup screen (the "Nozzle Wizard") is also accessed by pressing the  key directly from the "SETUP" screen.

The instrument is pre-programmed with nozzle data for 4 AIRTEC nozzles 28, 25, 40 and 50 (nozzles A to D), and 8 ISO standard nozzle types (nozzles E to L).

If the nozzles fitted do not correspond to any of the 8 preset types, then you can easily edit the data for any of the nozzle types A to H.


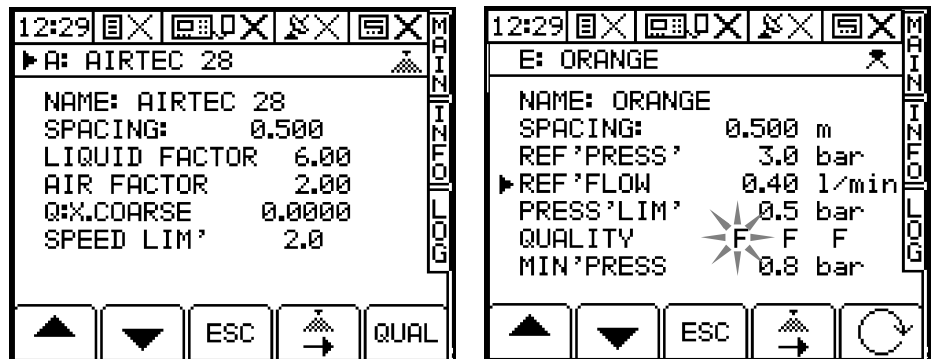


Press  to select the "NOZZLE EDIT" screen (fig. 12). For all parameters, move the cursor to the appropriate line and enter the new data via the alpha-numeric keypad.

Figure 12
Preset nozzle data for AIRTEC and conventional type nozzles

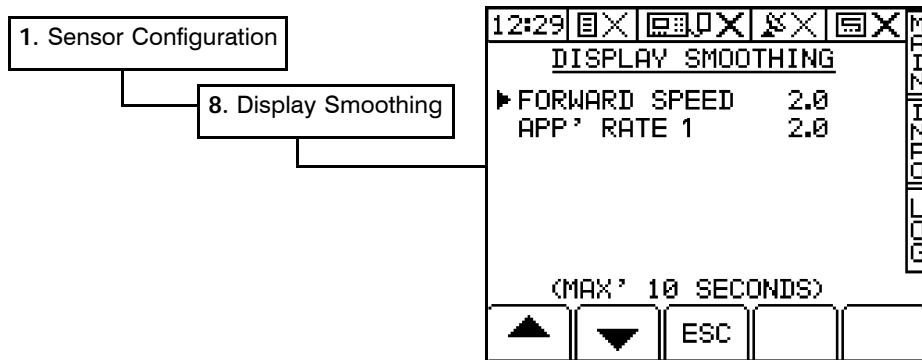


For all parameters except "QUALITY", move the cursor to the appropriate line and enter the new data via the alpha-numeric keypad.

To change the "QUALITY" settings for conventional nozzles, press the  key to select one of the three settings and then press the  key to cycle between "F" (fine droplets), "M" (medium droplets), and "C" (coarse droplets).

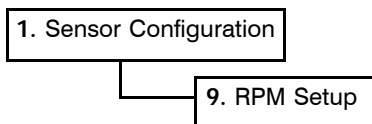
2.7 Display Smoothing

Figure 13
Setting the Display Smoothing time



The Forward Speed and Application Rate displays are electronically damped. If the readouts are constantly changing by small increments you can increase the damping time to give a steadier read out.

2.8 Calibrating an (optional) RPM Sensor



The following calibration procedure applies regardless of the speed output being sensed e.g. Engine RPM, PTO Speed, Shaft Speed, Fan Speed etc, depending on the particular installation.

In all cases, run the sensed component at a known speed. If necessary measure this speed using a hand-held tachometer. Note the speed displayed on the "INFO" screen.


The correct Cal. factor = Initial Factor x $\frac{\text{Displayed Speed}}{\text{Actual Speed}}$

Re-access the "RPM SETUP" screen, key-in the new Cal. Factor and press .

Default: 1 pulse per rev (PPR)

2.8.1 RPM Alarms

From the "RPM SETUP" screen you can also set a minimum and maximum RPM at which an alarm is triggered.

Simply key-in the values and press  to confirm.

3 Flow Calibration

On machines fitted with Airtec and conventional lines, the air pressure sensor and liquid pressure sensor should be calibrated initially with the Airtec nozzle.

Following this, you should then perform the initial flow calibration by means of a nozzle jug test using clean water. If the expected flow rate from the nozzle deviates from the nozzle parameters screen at the given speed/flow rate, the correction should be made via the "CAL NUDGE" screen. Once this adjustment is made, the Airtec nozzle should be flow checked again. Assuming that this is then satisfactory, the conventional line may be calibrated by following the same procedure.

3.1 Initial Flow Calibration - using the "Jug Test Wizard"



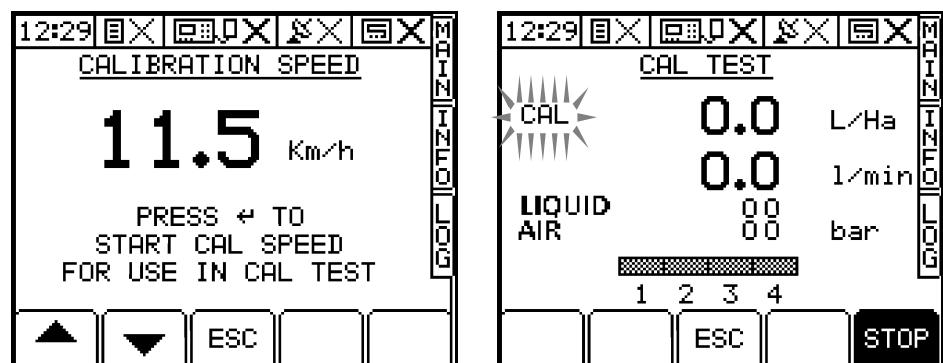
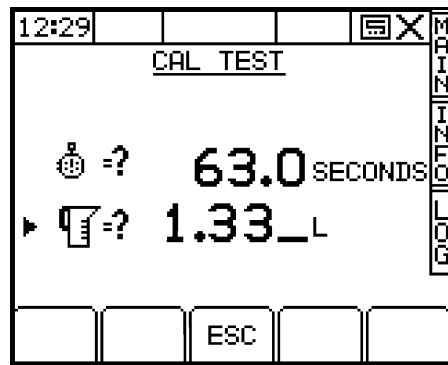
- 1 Set the simulation speed to match the desired speed during spraying, and set the target rate to equal the desired application rate. Target speed can be set from the "Nozzle Wizard" or from the main screen.
- 2 Select the most suitable nozzles from the nozzle wizard (section 2.3 in the operation manual).
- 3 Press  to start the calibration routine. The target (calibration) speed is then displayed (fig. 14a).
- 4 Change the the calibration speed if necessary, from that displayed and press  to accept (an adjusted speed is only in effect for the cal test and will not reset the target speed). The "CAL TEST" screen is then displayed. It flashes "CAL" to indicate that speed is being simulated, and gives the message "TURN ON NOW".
- 5 Switch the sprayer on. The "CAL TEST" screen shows "----" until the control system has stabilised. The display then shows the actual measured / calculated application rate and individual nozzle flow rate. The air and liquid pressure are also displayed (fig. 14b).

Figure 14a and 14b
Nozzle calibration routine



- 6 Once a steady state is achieved, carry out the jug test by collecting a quantity of water sprayed by a single nozzle, and record the collection time. Press the STOP key (or switch the sprayer off) to terminate the test. The display then prompts you to enter the test time and test volume (fig 15).
- 7 Enter the actual test time and press ENTER.
- 8 Enter the actual test volume and press ENTER.

Figure 15
Enter jug test
measurements



The instrument then calculates and displays the new calibration factors:-

- Nozzle Flow Rate (litres/min/nozzle) at the test pressure, when conventional nozzles are selected.
 - either the calibration factor if a conventional nozzle was selected, or the LIQUID FACTOR and AIR FACTOR if an AIRTEC nozzle was selected.
- 9 Press "YES" to confirm and set the new factors into memory. The factors are automatically updated in the Nozzle Wizard. **If you don't want to accept the calculated result, you can either;**
- (i) Press "NO". The "CAL TEST" screen will then display the *existing* calibration factor. You may at this point either key-in a different value or press ESC to return to the previous screen.
 - (ii) Press "ESC" to go back through the "CAL TEST" screen sequence (e.g. to re-enter the test volume and/or the test time after repeating the jug test).

NOTE: *The jug test is not the most accurate method of calibration as the test volume is small. It is therefore recommended to subsequently perform a full tank calibration, spraying a full tank in the field and subsequently adjust the flow calibration using the "CAL NUDGE" screen (section 3.2).*

3.1.1 Airtec Nozzle Data

Nozzle:	Liq. Factor	Air Factor	Quality Factor 'Q'					
			VF	F	M	C	VC	EC
35	4.54	0.50	1.90	1.50	1.10	0.60	0.30	0.08
40	2.80	0.43	2.50	2.00	1.50	1.00	0.30	0.05
50	1.32	0.27	3.00	2.34	1.68	1.02	0.35	0.05

3.1.2 LERAP ** Operational Settings

Nozzle:	Air (bar)	Liquid (bar)	Flow Rate (l/min)	Fwd Speed
35	0.55	2.35	0.69	6 - 10 kph
40	0.55	2.48 - 2.69	0.85 - 0.89	6 - 10 kph

3.1.2 LERAP *** Operational Settings

Nozzle:	Air (bar)	Liquid (bar)	Flow Rate (l/min)	Fwd Speed
35	0.35	2.14 - 2.76	0.60 - 0.80	6 - 10 kph
40	0.55	2.97	0.95	6 - 10 kph
40	0.35	2.28	0.86	6 - 10 kph
50	0.69	1.93	1.12	6 - 10 kph
50	1.03	3.45	1.55	6 - 10 kph

3.2 Full-Tank Calibration (AIRTEC and conventional Nozzles)

The calibration figure should be subsequently "fine-tuned" after spraying out a full tank in the field. **Be certain of the the volume sprayed out since the sprayer sight gauge may not be accurate enough for calibration purposes.** The liquid calibration should be checked and adjusted regularly over the season to compensate for factors including nozzle wear.




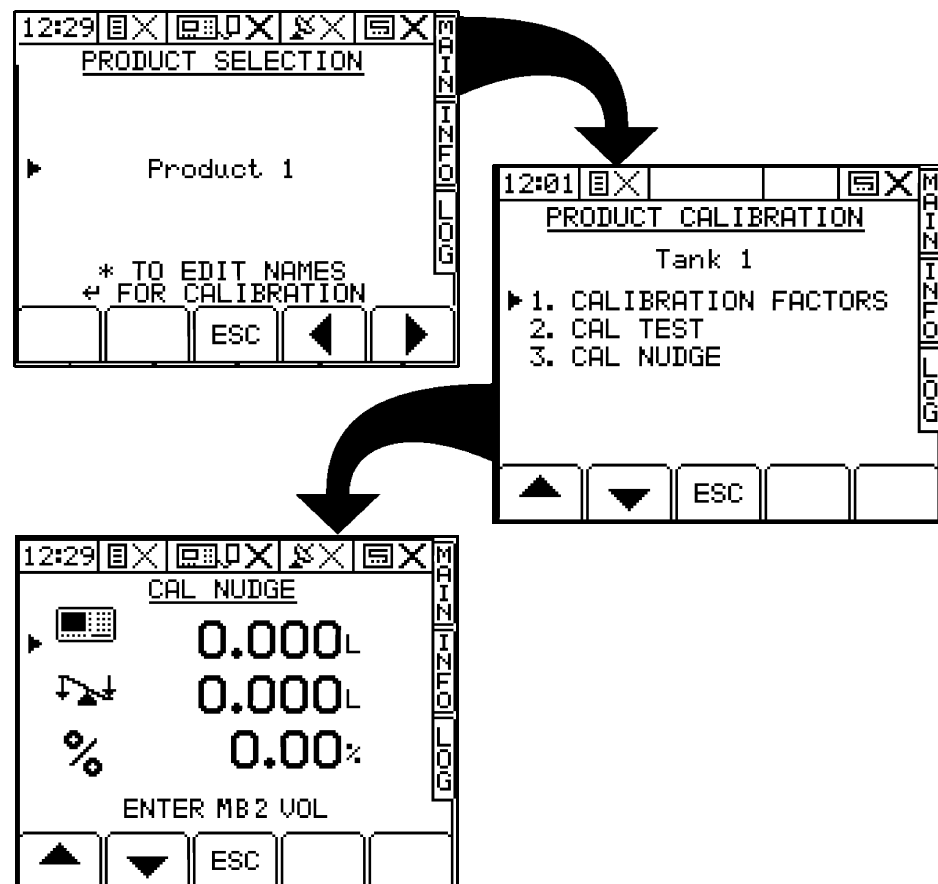





- 1 From the SETUP page press  to select the "PRODUCT SELECTION" page.
- 2 If you are spraying clean water or chemicals, check that the product (default name = "Spray A") has density set to 1.00. If spraying liquid fertiliser, check the product and density is selected and programmed.
- 3 Select the "INFO" screen and reset the "PART TOTAL" to zero.
- 4 Spray out the whole tank then select the "INFO" screen and note the "PART TOTAL" clocked.
- 5 Compare this with the known volume sprayed out. If there is a difference between the two figures, then correct the error via the CAL NUDGE screen as follows:
- 6 Go back to the "PRODUCT SELECTION" page, select "PRODUCT CALIBRATION" and press  (fig. 16).
- 7 Select "CAL NUDGE" and press  (fig. 16) .

Figure 16
Nudging the calibration factors



- 8 Enter the instrument total  and press , then the known volume  sprayed out and press . Finally, press  again to confirm the nudge.

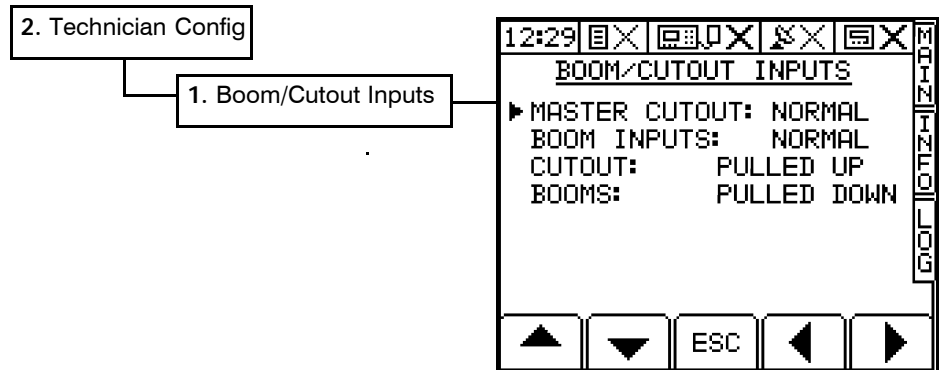
The appropriate calibration factors are then adjusted accordingly.

4 Technician Configuration

The operator is unlikely to need access in normal use. Access to this menu can be restricted by creating or subsequently changing the PIN number from within the menu.

4.1 Boom / Cutout Inputs

Figure 17
Selecting the
BOOM/CUTOUT options



Master Cutout

NORMAL: The sprayer is ON when the cutout input is NOT recognised.
INVERTED: The sprayer is ON when the cutout input is recognised.

Boom Inputs

NORMAL: The boom section is ON when the boom section input is recognised.
INVERTED: The boom section is OFF when the boom section input is recognised.

Cutout

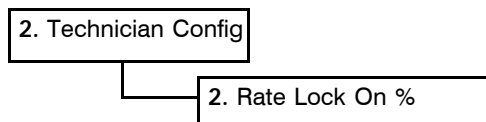
PULLED UP; Master cutout input is recognised when it closes to 0V.
PULLED DOWN: Master cutout input is recognised when it closes to +V.

Booms

PULLED UP; Boom section input is recognised when it closes to 0V.
PULLED DOWN: Boom section input is recognised when it closes to +V.

Default settings shown in bold. Change as required using the arrow keys.

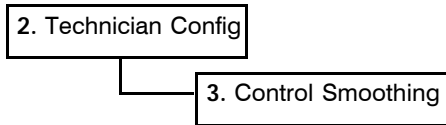
4.2 Rate Lock-on %



"RATE LOCK-ON sets the % by which the application rate fluctuates either side of a nominal application rate *before* the instrument display then changes.

For example, if your actual application rate fluctuates in normal operation from 97 to 103 l/ha at a nominal application rate of 100 l/ha, you may decide that it is acceptable for the instrument to display a steady read out of 100 l/ha between those limits i.e. $\pm 3\%$. In this case the lock-on figure should be set to 3.0.

4.3 Control Smoothing

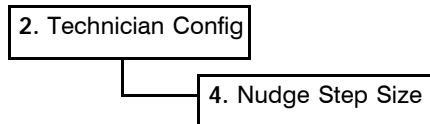


These are damping factors (for liquid and air). It will make the control system less reactive to pressure pulses that might occur from some sprayer pumps.

If pressure pulsation is causing problems, then experiment with this factor.

The default settings are 0.0 i.e. this function is switched off. Range = 0 - 50

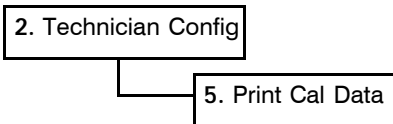
4.4 Nudge Step Size



The "NUDGE STEP SIZE" sets the % increase / decrease when you vary off the target rate in AUTO mode.

Default: 5%

4.5 Print Calibration Data



It is always a good idea to keep a record of calibration data either in the back of the manual, or as a printout. Connect the printer to the upper serial port. Ensure first that the port has been configured for a printer.

Selecting the "PRINT CAL DATA" menu function immediately sends the data to the serial port. The message "Printer Busy" is displayed while data transfer is occurring.

If the bar on the screen stops filling up part way, the instrument cannot establish communication with the printer. Check the connections.

4.6 Ports Setup - Top Port

4.6.1 Enabling Printer Output

The default setting is for an RDS ICP200 printer.

The data protocol for RDS printers are :

	ICP 100	ICP 200
Baud rate:	4 800	4 800
Data Bits:	7	8
Stop Bits:	2	1
Parity:	N one	N one
Handshake:	H ardware	H ardware

These settings cannot be changed. If you are connecting a different printer, it must be conform to either of these protocols.

4.6.2 Connecting an RDS Data Module

Set the top port to "RDS PF MODULE".

4.6.3 Receiving Variable Rate Treatment instructions from other control systems

The *MB2* can act on variable-rate treatment instructions received from another controller. Presently it can receive instructions from FIELDSTAR (TYPE 1), SOYL OPTI, AGROCOM ACT and HYDRO-N SENSOR instruments.

Set the top port as appropriate.

4.6.4 Direct Transfer of Field Data to a PC

If you are connecting a PC using an RDS Download Lead in order to transfer ordinary field data and job memos, set the top port to "PC DOWNLOAD".

4.7 Ports Setup - Bottom Port

4.7.1 Enabling GPS Input

If the *MB2* is installed with an RDS control system, then set the bottom port to either "GPS (4800) ONLY" or "GPS (9600) ONLY" , according to the baud rate that your GPS receiver has been configured.

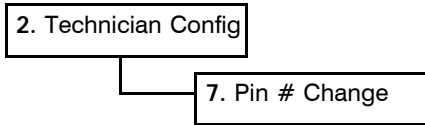
4.7.2 Sending Variable Rate Treatment instructions to other control systems

The *MB2* can also output variable-rate instructions to other control systems other than an RDS control system. Currently it can send instructions to Vicon, Bogballe and Amatron systems. Set the bottom port to the appropriate baud rate/control system option from the menu:

GPS (4800) + VICON
 GPS (9600) + VICON
 GPS (4800) + BOGBALLE
 GPS (9600) + BOGBALLE
 GPS (4800) + AMATRON
 GPS (9600) + AMATRON

NOTE: Ignore "RDS MODE B" and "RDS DEBUG" options.

4.8 PIN Change



The factory default PIN is 1234.

From the FACTORY CONFIG menu you can programme your own PIN for that menu. Just follow the screen instructions.

Make sure you write down the personalised PIN as well, in case it gets forgotten.

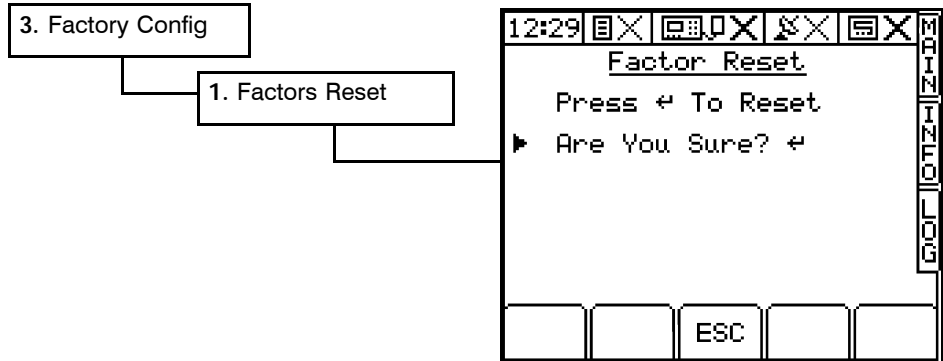
5 Factory Configuration

The operator is unlikely to need access in normal use. Access to this menu can be restricted by changing the PIN number from within the menu.

Enter the PIN number (default = 1234) to access the menu.

5.1 Total Software Reset

Figure 18
Resetting the calibration factors to the factory default values



A "FACTORS RESET" should be considered in two instances. Firstly, if the instrument is to be transferred to a different sprayer, it may be easier to re-calibrate the instrument from the factory default settings in a systematic way. Secondly, if you are encountering problems with the instrument during operation but cannot successfully resolve them, a total software reset may help in the troubleshooting procedure. Follow the screen prompts to reset the instrument to the factory default settings.

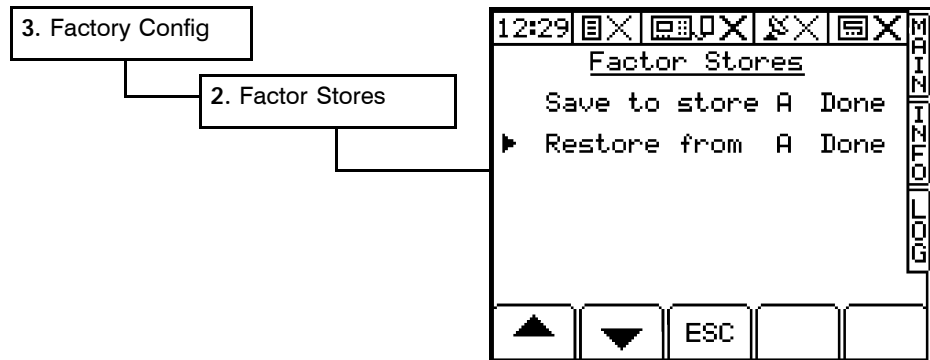
NOTE: All customised factors and other data will be lost. Keep a record of the existing calibration data.

5.2 Backing Up and Restoring Calibration Data

For extra security, calibration data can be manually saved to a separate memory area called "STORE A". This data will NOT be overwritten each time the instrument is switched off, but it WILL be cleared after a Total Software Reset ("RESET FACTORS").

If for example, any calibration data is unwittingly changed without keeping a record of previous settings or data is corrupted, you can restore the calibration data from "STORE A" at any time.

Figure 19
Storing / Restoring CAL data



5.3 PIN Change

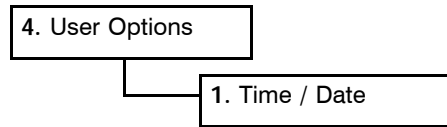
The factory default PIN is 1234.


From the FACTORY CONFIG menu you can programme your own PIN for that menu. Just follow the screen instructions.

Make sure you write down the personalised PIN as well, in case it gets forgotten.

6 User Options

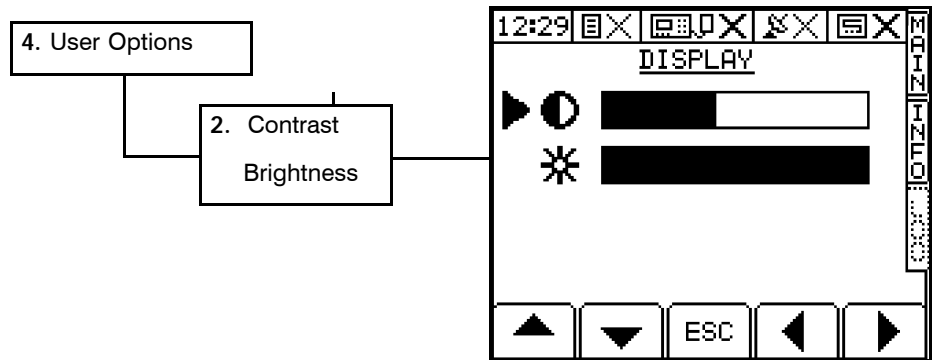
6.1 Set Time and date




If you need to change the time or date setting, position the cursor against the relevant line, key-in the new value and press .

6.2 Adjust Screen Contrast and Brightness

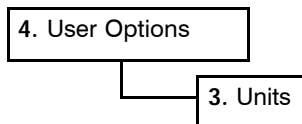
Figure 20
Adjusting Contrast and
Brightness



The screen may go darker at very high or very low temperatures. For example, on a very cold morning it may take a short period of time for the display to gain normal contrast as the instrument warms up. This is a normal characteristic of this type of display and does not mean the display is faulty.

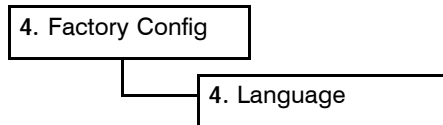
If by accident the contrast setting is adjusted so that the screen graphics can no longer be viewed (i.e. completely light or dark), don't panic! - you can navigate directly to the "DISPLAY" screen by pressing and holding the  key for at least 20 seconds. The instrument will bleep at 0.5 second intervals as long as the key is depressed. You can then adjust the display using the arrow keys.

6.3 Set Units



Units are either Metric (litres/hectare) or Imperial (gallons/acre).

6.4 Set Language



Select the language using the up/down arrow keys and press  .

7 General PF Setup

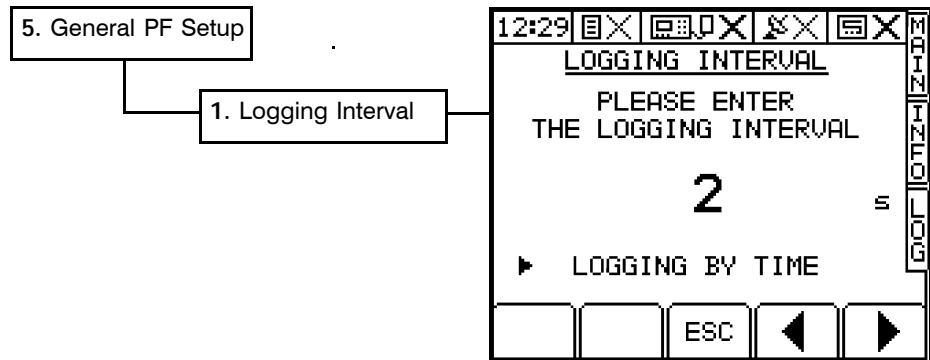
THE MB2 must be setup to recognise the Data Module (section 4.5.1) and GPS Input (section 4.6.1).

The "GENERAL PF SETUP" menu is common to all PS8000 control software modules so some settings may not apply in your current application.

For information on connecting and configuring RDS PF hardware e.g. the Data Card Module, Secondary Software Module, DGPS Receiver, cables etc, and data transfer to your PC, please refer to the "Precision Farming Supplement".


7.1 Set Logging Interval

Figure 21
Select Control Software



It is recommended that you use the default setting of 2 seconds. This should be adequate for variable-rate treatment and yield mapping.

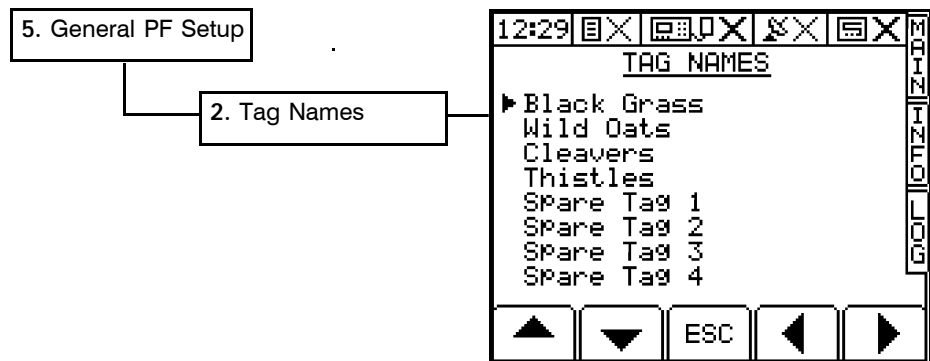
Decreasing the logging interval may affect the responsiveness of the control system and generate very large log files, therefore reducing the number of jobs that can be accommodated on the PCMCIA card. An exception is when you are boundary mapping (where less data is being generated), you can reduce the logging interval to get better definition of the field boundary.

Simply enter the interval value and press  to confirm.

Although the option to select the logging interval by distance is available (using the left / right arrow keys), it no longer recommended you do so.

7.2 Edit Tag Names

Figure 22
Edit Tag Names




Applies to yield mapping only.

While dynamic logging is in progress the operator can switch on or off any of up to 8 'tags' which effectively place markers on subsequent yield maps to denote particular features such as weed patches etc. Each tag can be named (up to 20 characters) to denote its meaning on the yield map. The first 4 tag names are factory preset as:-

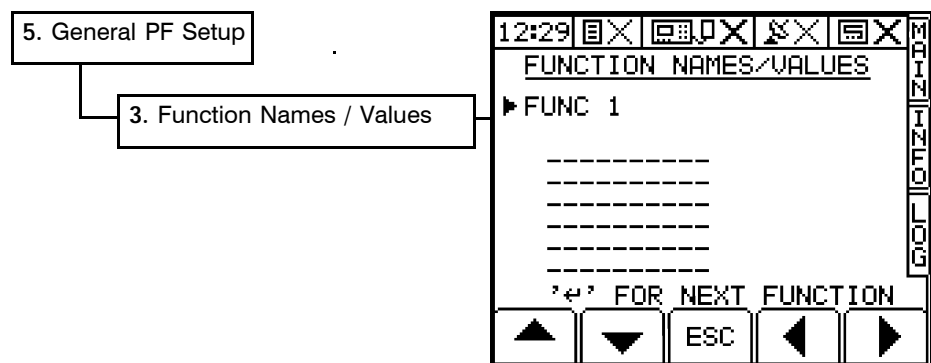
Black Grass
Wild Oats
Cleavers
Thistles

To change a name, first position the menu pointer against a 'Tag number' (fig. 22). Using the RIGHT ARROW key, move the screen cursor across to the tag name and enter the data (up to 20 alpha-numeric characters) via the alpha-numeric keypad.


Press  to confirm the data entry then repeat the procedure as required for further tag names.

7.3 Edit Function Names and Values

Figure 23
*Edit default Extended
Function Names and values*



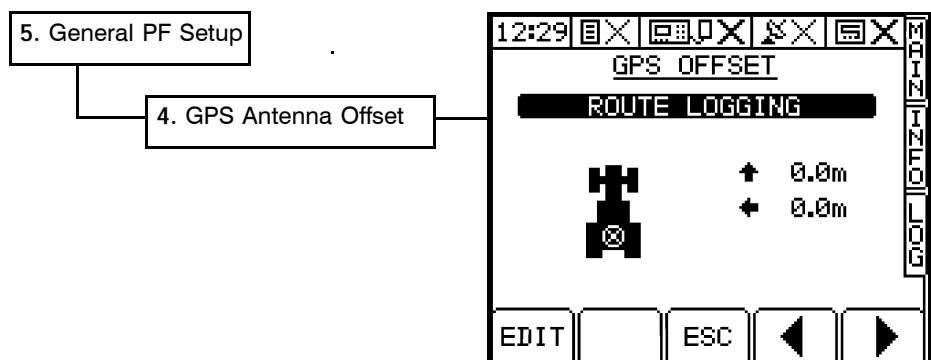
The default settings can be re-programmed for any of the extended data functions (default names = "FUNC 1" - "FUNC 12") e.g. Crop variety, Contractor information etc.

To change a name, first select the function number using the  key (fig. 23). Using the RIGHT ARROW key, move the screen cursor across to the function name and enter the data (up to 20 alpha-numeric characters) via the alpha-numeric keypad.

To enter a value, move the cursor down to the first line and enter the data. You can enter up to 6 lines each of 10 characters.

7.4 Set GPS Antenna Offset

Figure 24
Set GPS Antenna Offset



The "Antenna Offset" allows you to compensate for the difference in position between the GPS antenna and the feature being logged, centre of the spray boom/cutter bar/coulter bar, or the centre point of a spreading pattern. For example you might need a 2 metre side offset for boundary mapping from a quad bike. If you are using a front or rear-mounted sprayer/spreader (or both in some cases), you can make front / rear offsets for up to 4 "tanks".

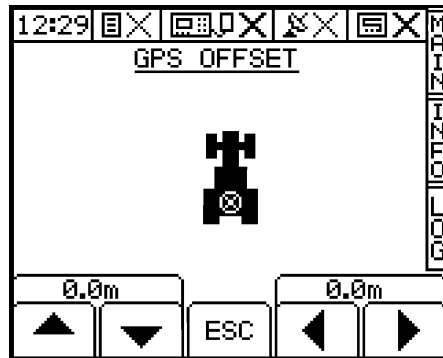
You can have six separate configurations for,

- ROUTE LOGGING
- SOIL SAMPLING
- PLAN CHANNEL 1
- PLAN CHANNEL 2
- PLAN CHANNEL 3
- PLAN CHANNEL 4

(Default for all configurations = no offset).

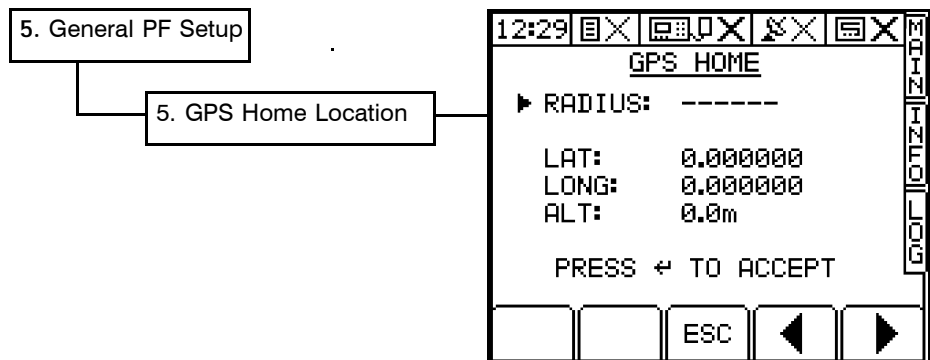
- 1 Select the configuration that you wish to edit and press the EDIT key (fig. 24).
- 2 Use the arrow keys to offset the antenna position in 0.5 metre increments (fig. 25).

Figure 25
Offsetting the antenna position




7.5 GPS Home Location

Figure 26
Set GPS Antenna Offset




7.5.1 Setting the Home Location and Operating Radius

This page should display your current position from your GPS receiver. Press  to store this position as the "home location" e.g. the farm.

Enter a radius value. Any position received outside the operating radius will be ignored and is assumed to be corrupt data.

7.5.2 Moving to another location

If you subsequently move outside the radius circling the home location, the instrument will automatically reset the "home location" to the current position ONLY IF it receives 10 consecutive, full differential GPS signals.

At any time, you can press the  key to manually set the home location to your current position.

Document History

Issue 1:	3/10/00	Original Issue - S/W Ver. PS 512-006
Issue 2:	10/9/01	Software version: PS512-010 rev.9
Issue 3:	29/11/01	Update to S/W Issue PS512-011 rev.0