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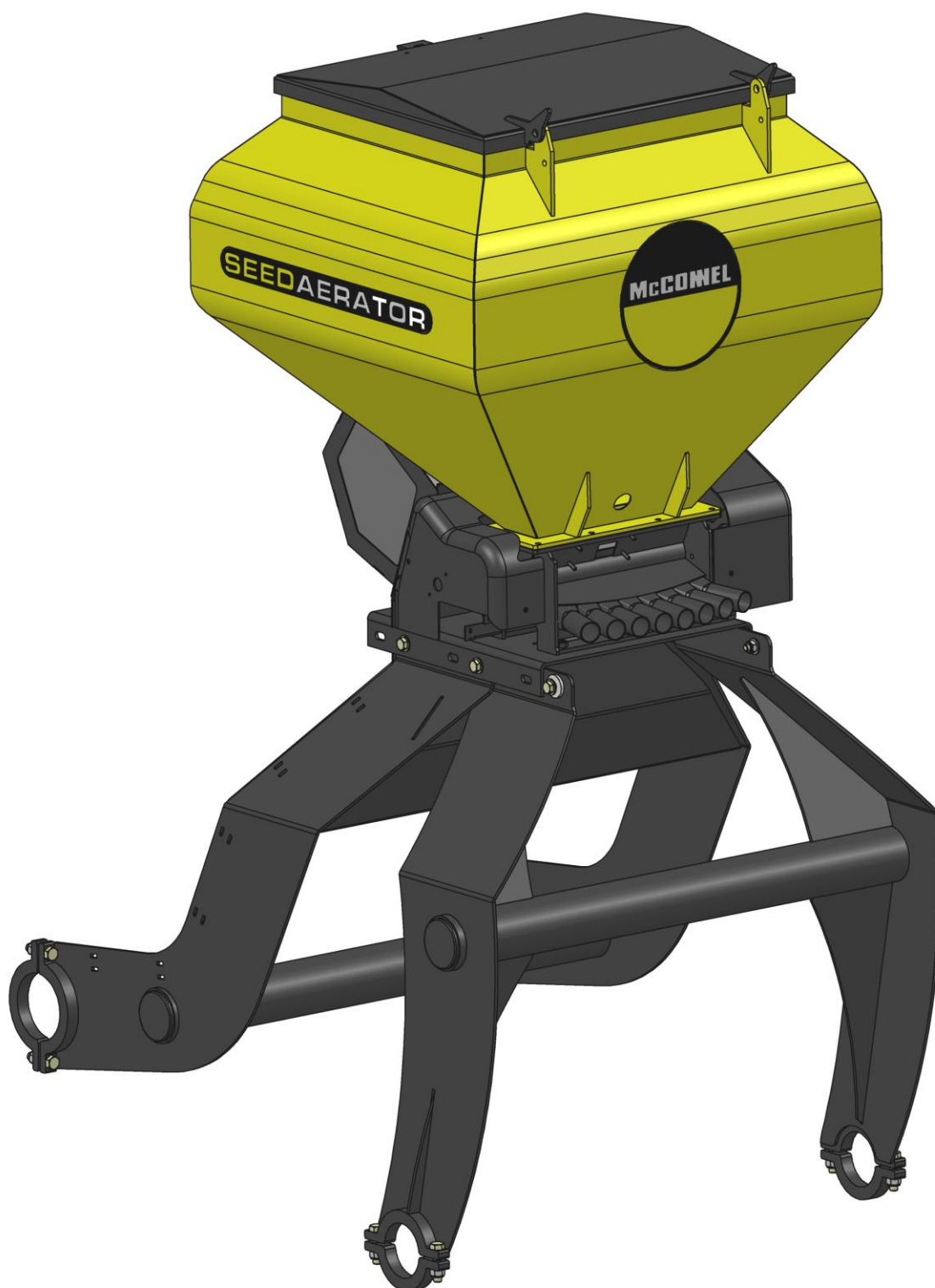


ProSeed Applicator

Operation Manual

For use with McConel

SEEDAERATOR



ProSeed Applicator

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ProSeed Applicator

1. Introduction

This manual applies to the ProSeed applicator.

Whilst we take every precaution in selecting materials and components used in the manufacture of our machines to ensure maximum resistance to corrosion, we cannot accept liability for such damage to machines or resulting loss of efficiency, due to neglect, improper use, or the use of unsuitable materials by the operator.

Neither can we accept any liability for damage to our machines resulting from misuse or third party negligence, or from the employment of procedures different from those specified or implied in this manual.

Our policy is to improve our products continuously and we therefore reserve the right to discontinue or change specifications, models or designs without notice or obligation.

1.1. *Personal Protective Equipment*

Different agricultural products require differing levels of Personal Protective Equipment. If you are unsure about the level of protection required, seek further advice from the supplier of the product, or from the local office of the Health and Safety Executive. Read product labels thoroughly, follow the guidance given.

1.2. *Operators Responsibilities*

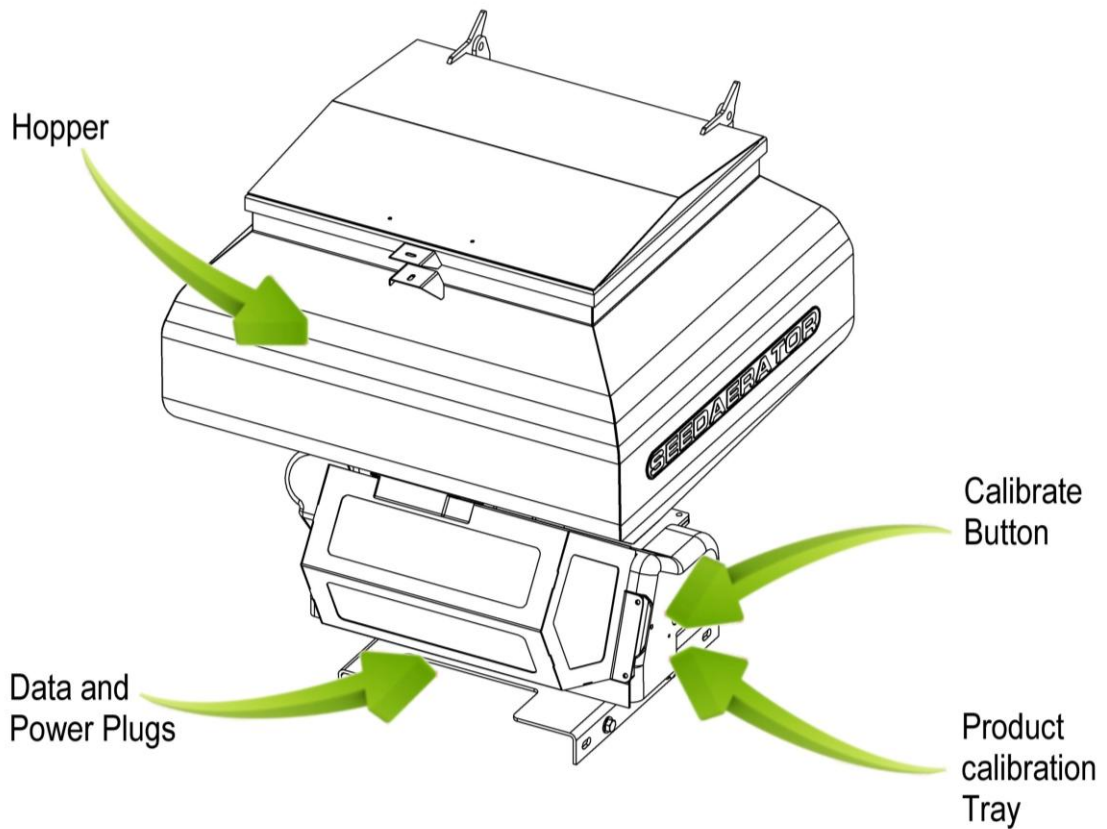
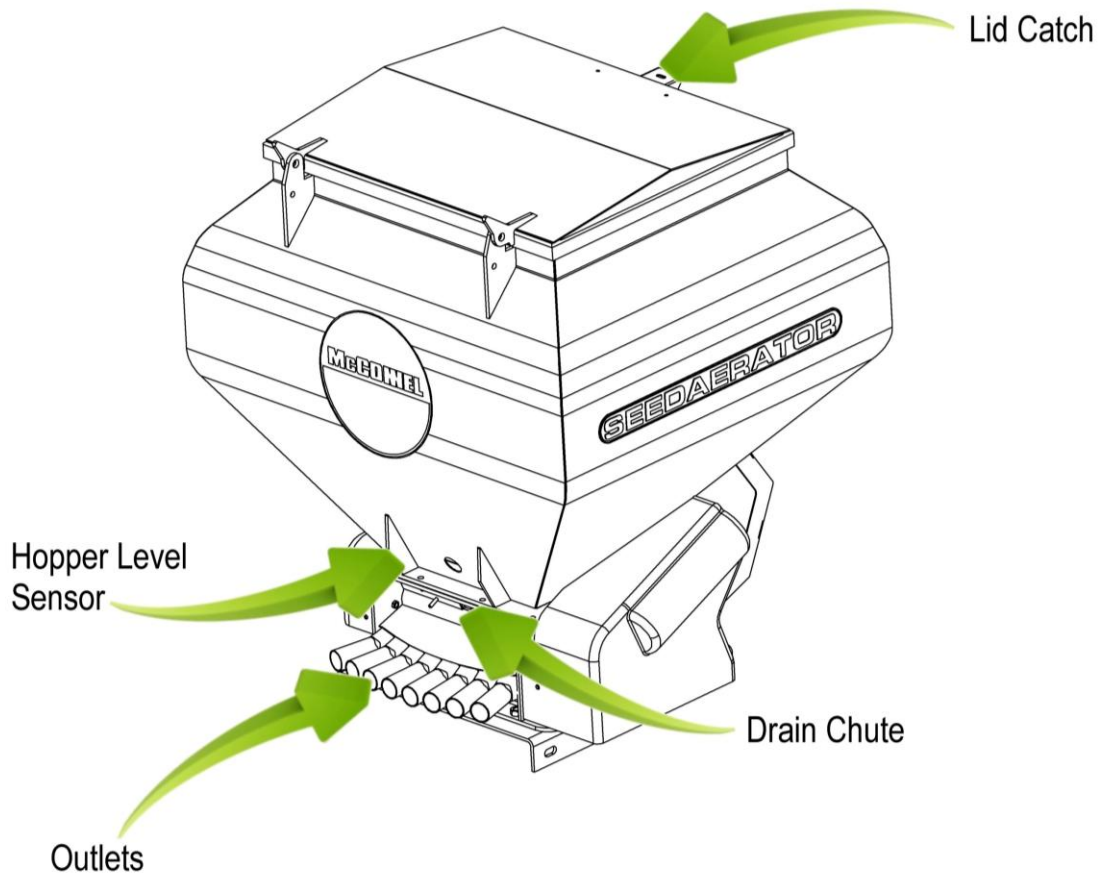
The operator is responsible for ensuring that the machine is clean and fit for use, and that it is properly calibrated.

The operator is responsible for the machine, the environment and any personnel within the machine's operating range.

The operator must make sure that all guards are correctly fitted and in good condition. Machinery that is not properly guarded must not be used.

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2. Product Diagrams



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3. Controller Overview

The Control System enables fully automatic control of the output rate of the Applicator.

The system automatically maintains a preset application rate as forward speed varies, with on-the-go adjustment of rate. The instrument measures and indicates;

- Forward Speed
- Part Area and Total Area worked
- Product Application Rate (kg/ha)
- Low Hopper Level

There are also audible and display alarms for,

- Minimum / maximum forward speed (beyond which the programmed product rate cannot be maintained).
- Feed motor stopped (no feedback)
- Low hopper content

The head unit is powered on and off via a toggle switch on the rear of the instrument.

The feed motor is switched on and off automatically via the implement-mounted cut-out switch as the implement is raised and lowered, or by the on/off switch on the cab switch box

Area totals and all calibration data are automatically stored in memory when the instrument is powered off.

The system must be initially calibrated for the product being applied. Product calibration is very simple to undertake via a priming switch provided on the wiring loom.

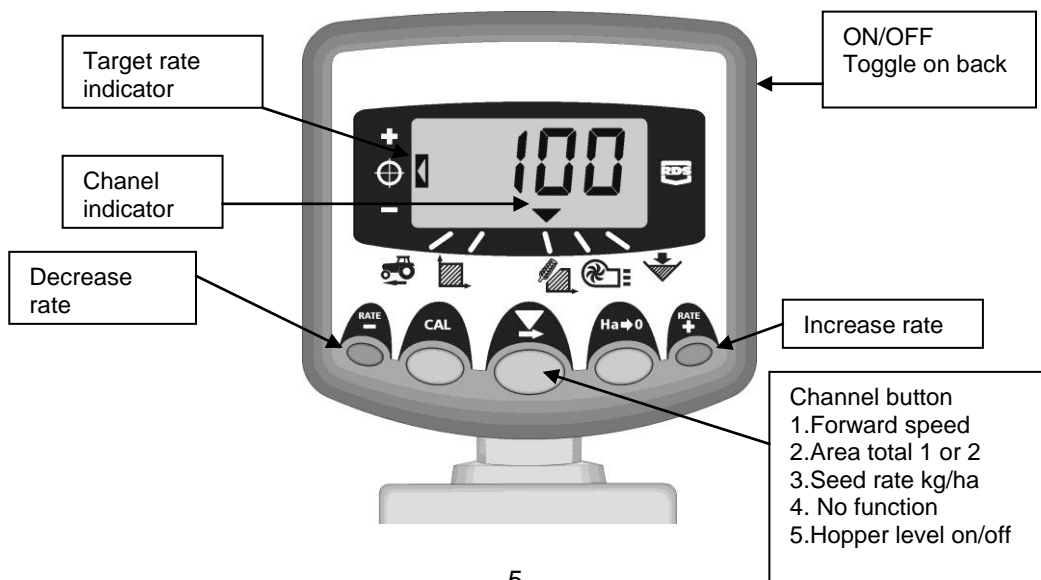
3.1. Changing Settings

Refer to section 3.3. (Programme Functions and Fault Diagnosis) for a guide to inputting to figures required.

There are 4 programming modes with various calibration factors and default settings. Access to the programming modes is required for some settings that may be changed as part of the normal operating procedure. Changing these settings is described with the operation instructions.

3.2. Normal Operating Mode

3.2.1. Head Unit Layout




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3.2.2. Power On/Off


Switch the head unit on via the toggle switch on the rear of the instrument.

This instrument should power up and display the software version installed (e.g. 'A.604' then 'E.001' then 'R.002'). It then enters its normal operating mode and displays the forward speed channel.

Select any other channel by pressing the  button once or more.

When the drill is out of work, the instrument will continue to display the selected channel.

3.2.3. Work Status Indicator

The  chevron indicator along the bottom of the screen is used to indicate the channel to which the information on the display relates.

It also shows the working status of the drill. If the cursor is flashing then the drill is out of work, if the cursor is on continuously then the drill is in work.

3.2.4. Starting and Stopping the Applicator

The Master on/off switch is used to manually switch the feed motor on and off when the applicator is in work.

The applicator can also be fitted with a Headland Cut-off Switch, to automatically stop the product when the machine implement is raised on the headland.

3.2.5. Pre-start function

In certain applications there can be a delay in the dispensing of product caused by the speed sensor not functioning accurately below 0.5 km/h. On commencing a bout, the product motor only starts as you begin moving off. However, it takes a short period for the product to traverse the pipe to the outlet. The result is an unapplied area at the beginning of a bout.

To counteract this there are two functions of Automatic Pre-start Function:

When Function is ON (Mode 2, Ch 4):

When the Master is switched ON, either on the master switch or by the headland cut-off activation, the rotors will turn for the Pre-Start Time at the "Motor Calibration Speed".

Pre-start Time (Mode 2, Ch 6)

This is the time that the metering will operate for at the "Motor Calibration Speed" when the pre-start is initiated. If after this time period the forward speed is greater than 0.5 km/h then normal motor control will resume. If the forward speed is below 0.5 km/h then motor operation will be inhibited and the low forward speed alarm will be triggered.

When Function is OFF (Mode 2, Ch 4):

Press and hold "RATE +" when the implement is stationary on the headland. As the vehicle moves off the rotor will begin to turn.

The pre-start function is timed to run the motor at the calibration speed for a number of seconds equal to the applicator width in metres (e.g. 4m drill = 4 seconds pre-start). After this time and when the applicator is moving forwards, the system reverts to normal proportional control for the seed rate set. However, if after this time the applicator is still stationary, the metering unit will automatically switch off.

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3.2.6. Cutout Alarm

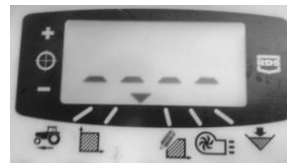
If the forward speed exceeds 2km/h with the machine 'out of work', the instrument will alarm by beeping and flashing 'C.out' every 5 seconds. The alarm will continue until the applicator is lowered into work.

3.2.7. Units (metric)

The units can be changed between metric and imperial. The four dashes at the top indicate metric, and at the bottom indicate Imperial.

(Mode 2, Ch 3)

See Section 3.4 – Units



3.2.8. Rate Selection

The display will show 'rAtE' indicating that the units are either Kg/Ha (metric) or lb/Acre (imperial). Using the chevron this can be changed to show 'PoP' indicating that the units are seed population i.e. seeds/m² (metric) or seeds/yard² (imperial)

(Mode 3, Ch 1)



3.2.9. Thousand Grain Weight

This value is the 'Thousand Grain Weight' (T.G.W) in grams, this being used to enable the instrument to show a seeding population (seeds/m² or seeds/yard² depending upon units).

If units are set to imperial, the weight is shown/ programmed in ounces.

(Mode 3, Ch 2)

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3.2.10. Forward Speed Display

View Forward Speed



The forward speed is derived from a GPS sensor fitted either to the applicator, or the tractor, depending on your particular installation.



Minimum Speed Alarm

As part of product calibration, based on the resulting calibration factor, the instrument automatically calculates the minimum forward speed below which the system cannot maintain the programmed application rate.

With the applicator in work, if the forward speed goes below this threshold the instrument display defaults to channel 1, flashes the actual speed and beeps continuously. The alarm will continue until speed is increased above the threshold. It may be cancelled temporarily by selecting another channel but will revert to channel 1 and repeat the alarm after 30 seconds until speed is increased.

NOTE: The application rate will not remain proportional below the minimum speed threshold. The feed motor cannot run below 3 rpm, resulting in over-application.


3.2.11. Area Display

View area totals



The area display is derived from the forward speed input and the programmed implement width.


There are two area registers. Each can be independently reset to zero.

Press  to toggle between the two area registers 'tot.1' and 'tot.2'.

The display then shows the area accumulated since that total was last reset.



Zero Area Total


1. Select the total 1 or total 2 and release.
2. HOLD  for 5 seconds.

The display flashes and the instrument sounds 5 beeps, before the total resets to zero.







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3.2.12. Set Implement Width

1. Select the Area Total channel (▨).
2. Press and hold the  button for 5 seconds. The display will flash "tot.1", then "tot.2" then show the programmed implement width.

Default width = 4 metres.

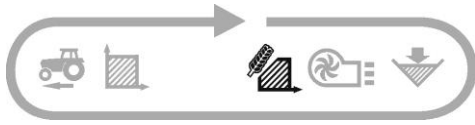
3. Continue holding the  button and
PRESS  to select the digit/decimal point to change.
4. HOLD  to change the digit (or move the decimal point). Releasing the button selects the next digit.
5. Release the  button to return to the normal display mode.



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3.2.13. Drilling Rate Functions

View Drilling Rate



This channel displays the current drilling rate in Kg/Ha only.

The resolution for Kg/Ha units is:

| | |
|-------------|--------|
| 0 to 24.9 | 0.1 Kg |
| 25 to 250 | 1 Kg |
| 250 to 9995 | 5 Kg |



Adjusting the Drilling Rate

Press the **RATE -** button to decrease the drilling rate.

Press the **RATE +** button to increase the drilling rate.

The rate adjusts by the % step programmed in programme mode 3, i.e. 5%, 10%, 15%, 20% or 25% of the programmed target or base drilling rate.

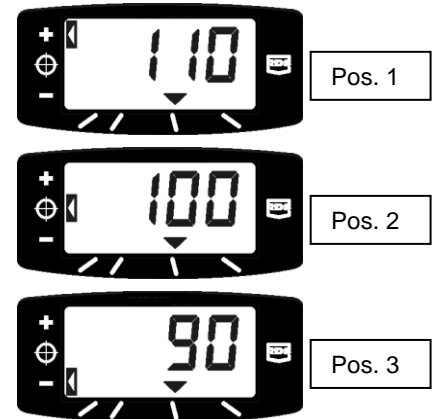
Drilling Rate Indicator

The left indicator is used to remind the operator of his drilling rate.

When the indicator is in position 2, then the drill is operating at the target rate.

If the indicator is in position 1 then the actual rate is increased from the target rate.

If the indicator is in position 3 then the actual rate is decreased from the target rate.



If within the operating mode the seeding rate is not at the target (left indicator is in either position 1 or 3), then after pressing and holding the 'CAL' switch the number displayed begins to flash (after 5 seconds). This number will now become the new target seeding rate (left indicator moves to position 2). On releasing the 'CAL' switch the instrument will revert to normal operating mode.

If in the operating mode the seeding rate is at the target (left indicator is in position 2), then after the 'CAL' switch is pressed and held for 5 seconds the number will flash (whilst the 'CAL' switch is pressed and held the instrument will indicate the currently selected units, as per section H.2.1). When the number is flashing, the 'CAL' switch can then be released. Whilst the number is flashing the '-' & '+' switch's can be used to change the value. The longer the switch is held, the faster the number is cycled. When the desired number is shown, press and hold the 'CAL' switch for 3 seconds to revert back to normal operating mode.

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3.2.14. Changing the Target Rate

If the drilling rate is currently at the target rate (the rate indicator at position 2), then:-

1. With the rate display selected, press and hold either the **RATE +** button or the **RATE -** button for 5 seconds, then release the button. The display will flash.
2. Press and hold either the **RATE +** button to increase the target rate, or the **RATE -** button to decrease the target rate. The longer the switch is held, the faster the number changes.
3. When the desired target rate is displayed, press and hold the **▼** button.

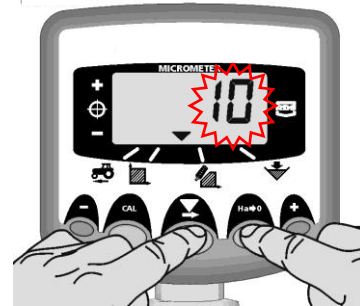
The instrument will beep 5 times and the display will alternate between the set rate and the calculated minimum forward speed for that rate. After 5 seconds the instrument will display 'done' after which the button can be released to return to normal operating mode.



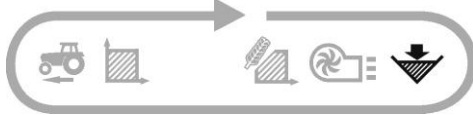
3.2.15. Set % Step for Rate Offset

This sets the amount by which the rate is adjusted away from the target rate when you press the **RATE +** or **RATE -** buttons.

1. Press and hold the **CH 3** button as you switch the instrument on. The instrument is then in programme mode 3 on channel 1.
2. Press **CH 3** to select channel 3. The display will show a number indicating the % step (5 - 25% in 5% increments).
3. PRESS **▼** to select the required % step.
4. Switch off and on again to resume normal operating mode.



3.2.16. Hopper level Alarm



When the hopper level sensor is uncovered, the instrument defaults to the hopper level channel (**▼**), beeps 5 times and flashes 'ALAR' every 30 seconds.

The alarm can be cancelled temporarily by selecting another channel, but will revert to the hopper level display and repeat the alarm after 30 seconds until the hopper is refilled.

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3.3. Programme Functions and Fault Diagnosis

Programme (CAL) modes 1-4

Some settings do not need to be accessed during normal operation, unless the system is transferred to another implement. Those settings that need to be accessed during normal operation are explained in the operators' section (sections 2 - 6) of the manual.

| | Mode 1 | Mode 2 | Mode 3 (Product calibration) | Mode 4 |
|--------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------|
| Mode Entry | From normal display mode, select channel and hold CAL button continuously | Press and hold CAL button for 10 seconds while switching instrument on | Press and hold HA-0 button while switching instrument on | Press and hold RATE+ button for 10 seconds while switching instrument on |
| Channel selection | - | Press CAL button | Press HA-0 button | Press RATE+ button |
| Channel 1 | Speed Sensor Factor [7.69 mm/pulse] | Simulated Speed [10 km/h] | Rate selection (Rate – kg/ha) | Pulses/metering unit rev. 368 |
| Channel 2 | Implement Width [4.0 m] | Grand Total Area [ha] | Thousand Grain Weight (45.0 gms) | Response [300] |
| Channel 3 | ----- | Units (Metric – TOP) | Rate - % Step [5%] | Maximum Metering speed (70 RPM) |
| Channel 4 | Seed calibration factor [0.5 kg/rev] | Automatic Pre-start Function (OFF) | Expected Weight (0-9999 grams) Not Used | Motor Calibration Speed [35 rpm] |
| Channel 5 | Fan Low Speed Alarm [2700]** | Fan High Speed Alarm [4500] | Minimum Fwd speed | Fan PPR 0 |
| Channel 6 | Hopper Level Alarm On / Off [On] | Pre Start Time (4.0 sec) | Maximum Fwd speed | Minimum Metering Speed [3.500 rpm] |

* If while operating at low forward speeds and rates, the motor operates intermittently/stalls increase this figure to 500. If higher rates are used and the controller does not get to the desired rate quick enough, increase this figure to 1000.

nc – non-changeable

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3.4. Units

| Function | Channel | Mode | Metric | Imperial |
|--------------------------|---------|-----------|----------------------|-----------------------|
| Forward Speed | 1 | Operating | Km/h | Mph |
| Area | 2 | Operating | Hectares | Acres |
| Rate1 | 4 | Operating | Kg/Ha | lb/acre |
| Rate2 | 4 | Operating | Seeds/M ² | Seeds/yd ² |
| Speed Sensor Factor | 1 | 1 | mm/pulse | Inch/pulse |
| Width | 2 | 1 | Metres | Inches |
| Calibration Factor | 4 | 1 | Kg/Rev | lb/rev |
| Simulated Speed | 1 | 2 | Km/h | Mph |
| Thousand Grain Weight | 2 | 3 | Grammes | Ounces |
| Calibration Weight Entry | 4 | 3 | Grammes | Ounces |

3.5. Fault Diagnosis

| Condition | Possible reasons |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| When in work and moving the Instrument displays 'C.out' and beeps every 5 seconds | The forward speed is above 2km/h while the drill is out of work. The cut-out switch is not operating correctly when the drill is lifted or lowered. |
| When in work the instrument flashes 'ALAR' and beeps. | Hopper level is low. |
| When in work the instrument defaults to the rate channel, displays 'StAL' and beeps every 30 seconds. The metering roll does not turn. | The metering motor has stalled. It is automatically stopped to prevent further damage. Investigate the metering mechanism. |
| When in work the instrument defaults to the application rate channel, flashes a rate lower than the target and beeps continuously. | The application rate is low because the forward speed is too high and the target motor speed cannot be achieved. Reduce your speed or change the metering rotors and recalibrate. |
| When in work the instrument defaults to the forward speed channel, the speeds display flashes and beeps continuously. | Forward speed is too low. The metering unit is at its minimum possible rpm. Increase your speed, or if this would be too fast, change the metering and recalibrate. |
| | <i>If you find that the minimum forward speed is too high at low application rates you should change the feed roll to a lower volume roll and redo the product calibration.</i> |

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4. Fitting Instruction

4.1. Head Unit

The control head unit comes fitted with a suction cup to attach it to the offside window in the tractor cab. It must not restrict the view out of the cab, nor impede the use of the controls. The safe positioning of the unit is the responsibility of the operator, and can be fitted directly to a cab bracket if available. The head unit is fitted with a 1-metre length of loom fitted with an electrical connector that is connected to the extension loom when the machine is in use.

4.2. 'Autocal' Speed Calibration


Auto-calibrate in field conditions for maximum accuracy.

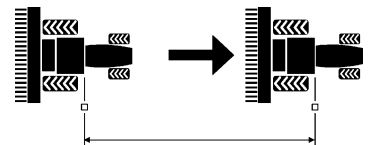
1. Place two markers 100 metres apart and position some reference point on the tractor (e.g. the cab step), opposite the first marker.
2. Select the forward speed channel.
3. Press and hold the  button until the cal factor appears on the display.
4. Continue holding the  button and press the  button.

The display will show "AUtO" ready to start the test run.

5. Drive up to the second marker and stop exactly opposite the marker. The instrument counts and displays the pulses received from the speed sensor over the measured distance.

NOTE: The instrument only displays up to 9999. Beyond this number of pulses it displays the first 4 digits of a five-digit number; however the pulses are still being counted internally.

6. Press the  button. The calibration factor is automatically calculated and stored in memory. The instrument then returns to the normal display mode.



4.3. Headland Cut-off Switch

A headland lift switch can be used to engage the applicator automatically when the implement is lifted/lowered on the field headland, without the operator having to use the product switch.

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4.4. Connecting the Power and Control Looms

4.4.1. Connecting the ProSeed power loom to the battery

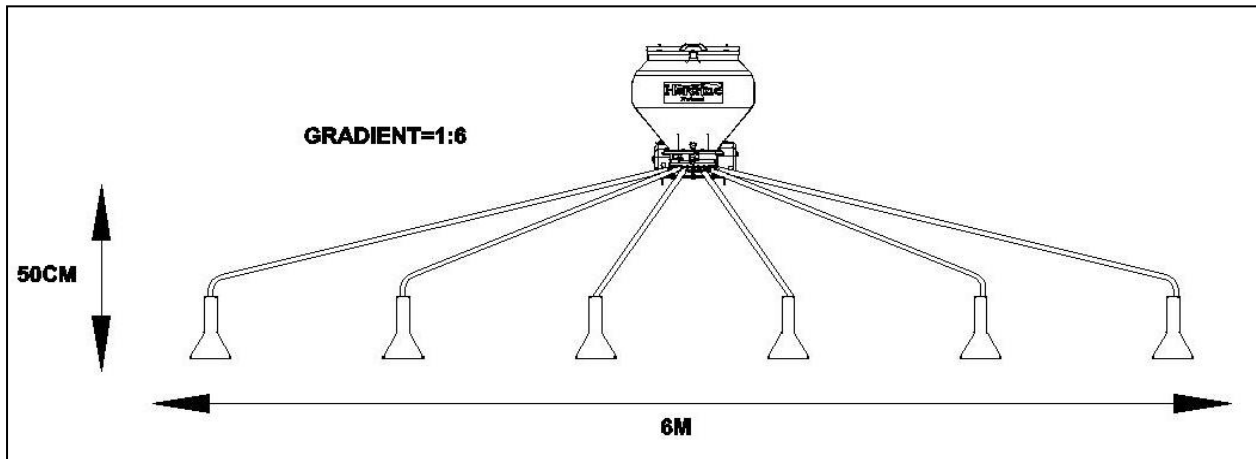
1. Route the power cable from the tractor battery directly to the ProSeed unit. If required use a power extension loom. Do not impede vision or use of the controls in any way. Avoid trapping cable underneath or behind moving or hot components.
2. Connect the terminals to the relevant terminals on the battery (red+/black-) and ensure they are secure.

4.4.2. Connecting the control loom to the unit

1. Route the control cable out of the cab from the switch box without impeding vision or use of the controls in any way. Avoid trapping cable underneath or behind other items in the cab. Use control cable extensions where required.
2. If unit is mounted on another piece of machinery, ensure that the cable is routed safely and cannot catch or snag on any moving parts.
3. Connect the electric plug to the opposite end on the unit and make sure that it has been inserted fully and correctly.

4.5. Routing of the Outlets

1. Attach hose and Jubilee clip (provided) to desired outlet.
2. Route hose to desired position and cut to length. Ensure that the hose is always on a downward gradient (we recommend a minimum of 1:6, see fig. 8 below) away from the unit. Failing to do so may result in failure to achieve target drilling rate.
3. Ensure that the ends of the outlet do not sit so low that they can be damaged by clods of dirt or other debris thrown up by the cultivator.








**BE CAREFUL TO OBSERVE THAT THE
ROUTE OF THE HOSES DOES NOT
CAUSE THEM TO SNAG OR CATCH ON
THE GROUND OR ANY MOVING PARTS
OF MACHINERY**

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5. Calibration

1. Ensure the rotors in the cassette assembly are appropriate for the intended product type, application rate and forward speed range for application
2. Ensure your desired application rate is entered into the controller
3. Remove the slider above the calibration tray by removing the R clip and pulling the slider out. **Do not remove this slider if collecting at the outlet**
4. The master on/off switch should be in the off position. On pneumatic applicators the following instructions apply:
Collecting product at the outlet – ensure the fan is switched ON
Collecting product underneath the metering unit – ensure the fan is switch OFF
5. To start the calibration process press and hold the calibration button. This button is located on either the main machine electric box, or provided separately on a loom
6. The control instrument automatically switches to the programme mode, and the display will count up the theoretical weight (in grams) of product, based on the calibration factor. The rotors will turn at the motor calibration speed (see section 3.3)
7. Once you have dispensed sufficient product, release the calibration button and weigh the product metered out from all the outlets. The theoretical weight will remain flashing on the display

NOTE: If the calibration switch is held for long enough to exceed 9999 grams then the instrument will simply show 'HiGh'. The procedure should be started again.

8. Adjust the displayed weight to match the measured weight using the  and  buttons
1. Press the  button once to display the calculated Minimum Forward speed (see note)
2. Press the  button once to display the calculated Maximum Forward speed (see note)
3. Press the  button again to save the new calibration factor. The instrument displays 'done' to indicate the new factor is now stored. After 3 seconds the instrument reverts back to the normal operating mode

NOTE: If you find that you cannot achieve your desired field speed, firstly check you entered the correct application rate. If so then you will be required to re-configure the rotors so you can achieve the desired application rate at that speed; e.g. if the maximum speed is too low, you will require higher capacity rotors, and vice-versa.

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5.1. Calibration Record

| | | | |
|---------------------------------------|-------------------------|---------------------|----------------------------------|
| Drill Make/Model | | | |
| Instrument Serial No. | | | |
| Speed Sensor Factor [mm/pulse] | | | |
| Implement Width [m] | | | |
| Units [kg/ha] | | | |
| Seed Type | Application Rate | No. of rolls | Seed Cal. Factor [kg/rev] |
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6. Operation

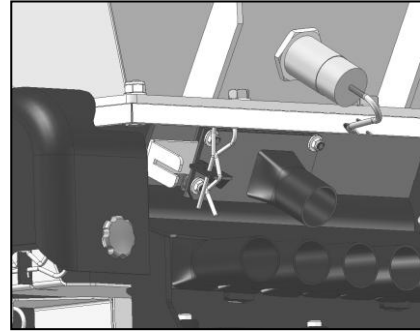
6.1. *Filling and Emptying the Hopper*

6.1.1. Filling

To fill the hopper, open the lid and pour seed inside. It is important to always use the mesh sieve fitted inside the hopper to filter out any foreign objects. Failure to do so could cause damage to the rotor mechanism.

6.1.2. Emptying

Empty the hopper using the discharge port located above the machine outlets. Open the shutter on the side of the hopper by removing the R clip and sliding out the shutter plate. Be sure to have a container ready as seed will begin to fall out as soon as the shutter plate is removed. To replace, simply slide the shutter plate back into position and replace the R clip. Brush any remaining seed out of the hopper.



**PLEASE WEAR APPROPRIATE
PERSONAL PROTECTIVE EQUIPMENT
WHEN HANDLING SEED. CONSULT
SEED SUPPLIER FOR INFORMATION
REGARDING SEED SAFETY**

6.2. *Starting and Stopping the Applicator*

To begin, lower the unit to desired operating height and ensure that the fans are switched on.



**N.B. THE APPLICATOR WILL NOT
BEGIN WORK UNLESS THE FANS
ARE SWITCHED ON**

Turn the master ON/OFF switch to ON. The motor will then turn in correspondence with the signal from the speed sensor or at motor calibration speed for a time set by the Pre-Start Function (if enabled).

Switch the master ON/OFF switch to OFF to stop application. If the fans are left on then application can be resumed at any time. If the operation is complete then switch both the master ON/OFF and fan switch to OFF.

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6.3. *The Pre-Start Function*

The controller contains a pre-start function to enable initial start up of the ProSeed at low speeds or when moving off from a stand still. Refer to the Pre-Start Function section (3.2.5).

Ensure that the Pre-Start Function is ON, the pneumatic fans are ON and unit is at operating height to dis-engage the Headland Cut-off switch.

Remain stationary on the headland and turn the master switch ON. The motor will then turn at motor calibration speed for a set time (set during controller set up). Proceed to move away and accelerate to target speed. When the speed sensor acknowledges a signal equivalent to 2Kph or more, normal speed related motor control will take over.

6.4. *Headland Cut-off switch*

Ensure that the Headland Cut-off switch is plugged in and mounted in a position to detect accurately the raising and lowering of the unit.

6.5. *Hopper Level Sensor*

The ProSeed comes fitted as standard with a hopper level sensor, which emits a warning when the seed level in the hopper is running low. Refer to section 3.2.16 for information on calibrating and operating the hopper level sensor.

ProSeed Applicator

7. Maintenance

Ideally, dismantle the unit from other machinery before attempting any maintenance. Ensure that all power to the unit is disconnected before attempting any maintenance. No liability will be accepted for any personal injury or machinery damage caused by insufficient maintenance or any maintenance carried out in breach of guidelines set out in this manual. For further maintenance advice contact your approved service engineer.

7.1. Routine Maintenance

1. After operating drain excess seed out of the hopper using the discharge port. Brush the remaining seed out of the hopper.
2. After operating brush around the machine to remove any build up of dust / dirt or excess seed etc. Remove any coverings if necessary, paying particular attention to the underside and around any moving parts. Ensure coverings are replaced properly and securely after cleaning.



N.B. AVOID CLEANING THE MACHINE WITH WATER AS MOISTURE DEPOSITS CAN CAUSE RUST AND SEIZURE OF MOVING PARTS

7.2. At the End of the Season

1. Drain the hopper thoroughly using the discharge port. Remove rotor and clean with a brush and/or compressed air.
2. After operating, brush around the machine to remove any dirt or excess seed etc., removing any coverings if necessary, paying particular attention to the underside and around any moving parts. Ensure coverings are replaced properly and securely after cleaning.



N.B. AVOID CLEANING THE MACHINE WITH WATER AS MOISTURE DEPOSITS CAN CAUSE RUST AND SEIZURE OF MOVING PARTS

3. Store in a dry place.



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