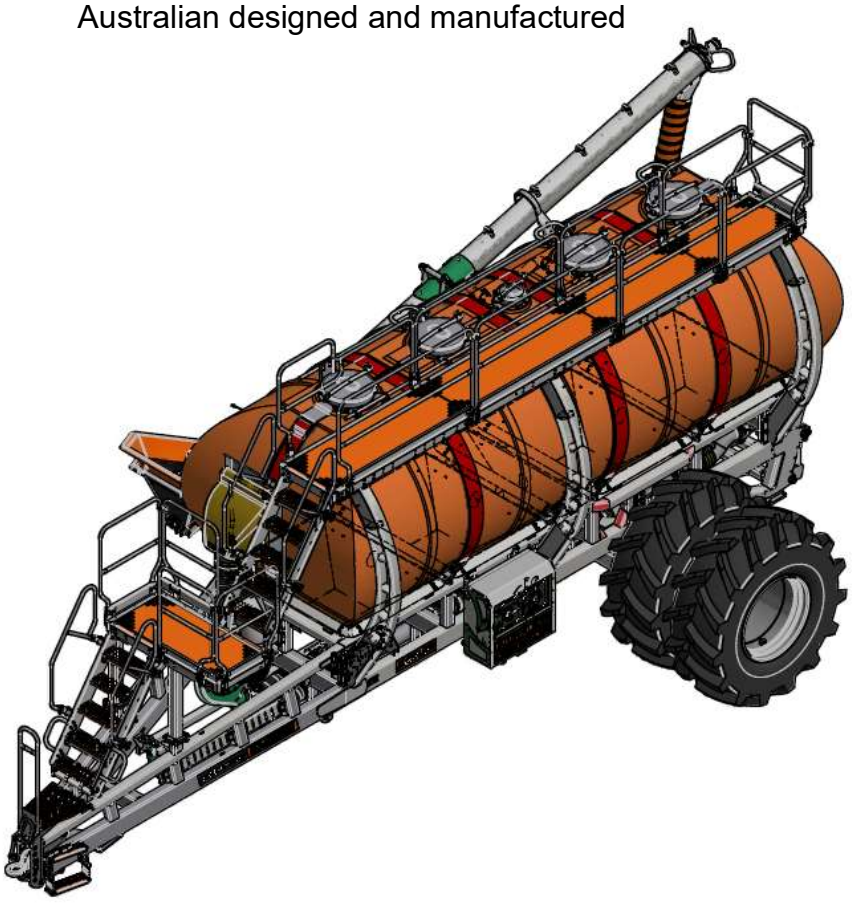
AUSPLOW

Australian designed and manufactured



MULTISTREAM Series II
OPERATORS MANUAL

VERSION 1.6

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Contents

Information

This Ausplow **Multistream Series II** Operators Manual is a guide for operators in the use and maintenance of the Ausplow Multistream product lines.

The Series II Multistreams were introduced in 2017 and incorporated major changes to the Auger, Axle, Walkway and Liquid systems.

The Multistream Series II is built in three configurations. They are:

- Drawbar Mount (DB) where the Multistream is mounted onto the drawbar of the Auseeder. These are limited to 6000 litres gross capacity.
- Tow Between (TBT) where the Multistream is connected between the tractor and Auseeder.
- Tow Behind (TBH) where the Multistream is towed behind the Auseeder.

Multistream's have three or more tanks. The front one is for seed; the remainder may be configured in a number of different combinations depending on the size of the tank and the application requirements. The liquid tank is generally fitted to the rear tank.

PLEASE NOTE THIS IS A GUIDE AND IS NOT INTENDED TO COVER EVERY OPERATIONAL FUNCTION OF THE MULTISTREAM.

PLEASE CONTACT AUSPLOW SERVICE SECTION FOR FURTHER OPERATIONAL INFORMATION AS REQUIRED.

AUSPLOW PROVIDES THIS INFORMATION IN GOOD FAITH BUT TAKES NO RESPONSIBILITY FOR ANY INACCURACY IN THE INFORMATION PROVIDED.

1.0 SAFETY

1.1 SAFETY WARNING SYMBOLS

WHERE YOU SEE THIS SYMBOL, IT MEANS PAY ATTENTION, AS YOUR SAFETY AND OTHERS SAFETY COULD BE PLACED AT RISK.

There are 3 levels of alert used in this manual. They are:

DANGER!

This denotes an intrinsic hazard that would probably result in death or irreparable injury if proper precautions are not taken.

WARNING!

This denotes a hazard that can result in injury or death if proper precautions are not taken.

CAUTION!

This denotes a reminder to follow safety practices or to draw attention to items that, if ignored, could result in personal injury or damage to equipment.

1.2 GENERAL SAFETY PRECAUTIONS

Do not operate the Multistream without first reading this manual and ensure that all operators are fully conversant with the safe operation of the equipment.

WARNING!

- Do not undertake maintenance or adjustments under an Ausplow Multistream without ensuring the tractor park brake is securely ‘ON’.
- Never adjust chains or couplings attached to hydraulic motors without first switching off the hydraulics and tractor.
- Do not stand on top of any Multistream tank.
- Take the proper precautions when using chemicals, fertilisers and chemically treated seeds as per the manufacturer’s instructions.
- Do not enter Multistream tanks without first taking the proper precautions. Always wear a mask and protective clothing. Ensure the lid is secured in the open position and that there is a suitable exit out of the tank. In addition, under no circumstances should anyone enter a tank without the assistance of a safety person who remains outside the tank, on the platform, to ensure a safe exit.
- Never disconnect a Multistream bin which contains product in any tank. Failure to do so could overload the implement jack or cause the bin to fall over backwards due to being back-heavy in some circumstances.
- Do not allow anyone to make any adjustments to, or ride on the Multistream whilst it is in motion.

CAUTION!

Ensure safety glasses and gloves are worn when handling liquid fertilisers at all times.

1.3 TRANSPORT SAFETY

WARNING!

Do not transport a Multistream without observing the following points:

- Ensure that all towing hitch pins are secured in position,
- Safety chains must be fitted before transporting,
- Always stow the jack,
- Do not transport any Multistream over 30 km/h,
- Always check compliance with local transport regulations before transporting implement.

CAUTION!

- The Multistream tanks must be emptied before transporting the unit more than 5 km or at more than 10km/h,
- Check that tyre inflation is suitable for the implement weight and speed that you wish to travel.

1.4 NOISE PROTECTION

CAUTION!

Always wear suitable hearing protection if subjected to prolonged exposure of loud or uncomfortable noises, such as the Multistream fan.

1.5 ASSEMBLY AND MAINTENANCE SAFETY

DANGER!

Mounting a tyre on a rim can produce an explosion unless the proper procedures are followed. Do not attempt to mount a tyre on a rim unless you have the proper experience and training for the job. Preferably, have your Ausplow dealer or a qualified tyre repair service centre carry out these repairs.

WARNING!

- Ensure tractor park brake is securely ‘ON’ when conducting maintenance on the machine when connected to a tractor. If the Multistream is not connected to a tractor, chock the Multistream wheels so that the machine remains stationary.
- Extreme care should be taken when fitting dual wheels to larger Multistream bins. The outer dual has an offset centre, mounted externally to the tyre and rim, causing the tyre to be very difficult to balance. When fitting, the outer tyre should be secured to a forklift, front end loader or tele-handler equipped with hay or pallet forks.
- With the inner wheel of the bin raised above the ground allowing it to rotate, the outer wheel can be ‘driven’ into position. Under no circumstances, should anyone position themselves between the inner tyre and the outer dual whilst fitting.

CAUTION!

Always replace any guards or safety shields removed for servicing, ensuring they are in good working order.

1.6 PRECAUTIONS WHEN SERVICING HYDRAULICS

WARNING!

Escaping hydraulic fluid under pressure can penetrate the skin causing serious internal injury. Always relieve hydraulic pressure before working on the hydraulic system. Ensure that connections are tight and hoses and pipes are in a serviceable condition before applying hydraulic pressure.

CAUTION!

- Do not use bare hands to search for suspected leaks.
- Always wear protective glasses when working on Multistream hydraulic equipment.

1.7 SAFE WORKING LIMITS

WARNING!

The Multistream operator's platform has been designed to carry safe working loads up to 300Kgs. Exceeding this weight could lead to serious personal injury.

1.8 RECOMMENDED TORQUE SETTINGS

Unless otherwise stated in the manual, the following tables outline the recommended torque settings for Bolts and U Bolts.

	Part Number #	Recommended Nm	Fitment
	**#34583** U Bolt Set M20x102x150mm SS	240 with Anti-Seize	SS Nyloc Nut, with Flat Washer
	**#03071** U Bolt Set M16x101x140mm ZP	100 with Anti-Seize	ZP Nut with Spring Washer
	**#05778** U Bolt Set M12x102x133mm ZP	70 without Anti-Seize	ZP Nut with Spring Washer

FASTENER TORQUE CHART (K=0.2; 65% PROOF LOAD)				
SIZE	TORQUE VALUE [Nm]			
	Gr 8.8	**Gr 10.9**	**Gr 12.9**	**A4-70**
M6	8	11	14	10
M8	20	28	33	12
M10	39	55	66	24
M12	68	96	116	42
M16	173	243	291	100
M20	337	474	569	197

2.0 WARRANTY

2.1 GENERAL OUTLINE

Ausplow Warranty Policy for purchased Ausplow products is as follows:

- Ausplow Farming System's ***Parts Warranty*** extends 90 days from the date of original retail sale.
- Ausplow Farming System's ***New Machine Warranty*** extends 12 months from the date of original retail sale delivery.
- Ausplow Farming Systems will repair and / or replace parts (except ground engaging components), found to be defective in factory materials or workmanship under normal use and operation within Australia.

2.2 EXCLUSIONS

The following wear parts are ordinarily not covered under Ausplow Warranty unless agreed to be an exception i.e. faulty workmanship:

- Digging blades,
- Closing tools,
- Coulter discs,
- Scrapers,
- Bent tines,
- Airseeder hose,
- Primary airseeder head rubber gaskets or caps,
- Liquid fertiliser tubes,
- Seal kits in Dosatron units,
- Seed and fertiliser boots, and
- Wear to tow hitches and pins.

2.3 POINT OF INSPECTION

Ausplow reserves the right of inspection before assessment and/or acceptance of any warranty claim, and all parts are to be returned to Ausplow's factory, Cockburn Central, Western Australia, freight pre-paid, unless otherwise arranged.

2.4 EXTERNAL SUPPLIER'S WARRANTIES

Bought in components may be subject to their supplier's warranty.

2.5 JURISDICTION

Ausplow Warranty does not apply outside Australia. Ausplow Warranty relates to the repair to, or replacement of, defective parts during the 90 days from the date of original retail sale for ***Parts Warranty*** and 12 months from the date of original retail sale delivery for ***New Machine Warranty*** and unless otherwise required by the laws of Australia and / or any applicable State or Territory thereof within Australia. Neither Ausplow, nor its authorised distributors, accept any responsibility whatsoever under Ausplow Warranty for any loss of use of equipment, loss of time, inconvenience, commercial loss, or any other direct or indirect loss, damage or injury, whatever nature.

2.6 PRODUCT MISUSE

Ausplow Warranty does not cover any injury or defect which arises out of, or is caused by, accident, fire or other casualty, misuse, overloading, exceeding the specified capacity or operating limitations, negligence, or use of parts not approved by Ausplow if such use adversely affects the performance, durability, stability, reliability or safety of the equipment or alteration or modification of any part of the equipment not approved by Ausplow.

2.7 PURCHASERS OBLIGATIONS

It is the responsibility of the purchaser to ensure that the equipment covered under Ausplow's Warranty is used and operated in the proper manner and maintained and serviced in accordance with the

recommended service and maintenance practices stated in the operator's manual, valid for the machine covered under Ausplow Warranty.

2.8 CONSEQUENTIAL LOSSES

This warranty does not extend to any consequential loss or damage howsoever caused or arising, including failure in operation or performance of the goods sold or repaired or replacement work, including replacement parts, or service performed thereon or thereto or any loss incurred for hire of unauthorised labour, supplies, substituted machinery or rented machinery or any loss or damage incurred because of a delay in seeding or for any event resulting in loss of crops, livestock or other losses. Nor shall Ausplow Farming System be liable for any injury or negligence howsoever caused.

2.9 PARTS WARRANTY

Ausplow Farming System's ***Parts Warranty*** extends 90 days from the date of original retail sale and Ausplow Farming Systems will repair and / or replace parts, except ground engaging components, found to be defective in factory materials or workmanship under normal use and operation within Australia.

3.0 MULTISTREAM HITCH CONNECTIONS

3.1 TOWING HITCH SAFETY PRECAUTIONS

CAUTION!

- If the Multistream is loaded, it is permissible to transport up to a maximum of 10 km/h, for 5 km. On completion of the journey, the operator should first check product metering to ensure the product has not settled, causing it to bridge.

    - Turn ‘OFF’ the Master Switch and open the Manual Over-ride Valves located on the hydraulic block on the left hand side of the machine.
    - When the operator has confirmed that the products in all granular tanks are flowing freely, ensure the Master Switch is turned to ‘ON’ (Green).

- For journeys greater than 5km, the tanks should be emptied. The Ausplow Multistream has a maximum allowable towing speed of 30 km/h when empty.
- Check tyre inflation pressure before transporting for any distance at high speed. Inflation pressure on all Multistream bins are initially set at 160Kpa (23psi). Check tyre loading label on left side of bin for the correct operating tyre pressure, see Section 12.

CAUTION!

If fitted with an auger and transporting for more than 5kms, check the auger is correctly stowed. If the road is particularly rough or there are tree branches at auger lever, the auger lock can be accidentally unlatched.

3.2 SAFETY CHAINS

All Ausplow Multistream bins are fitted with safety chains to protect the machine from accidental disconnection during road transport. Please note that the chain may need to be shortened.

CAUTION!

- The safety chain is only designed to protect the machine from accidental disconnection during road transport whilst empty. The safety chain is not sized to protect the machine from accidental disconnection whilst the Multistream is loaded or working in the paddock.
- Ensure that suitable mounting points are used on any machinery attached to the Multistream.

3.3 SAFETY CHAIN ATTACHING & SHORTENING

The following section outlines the procedures for attaching safety chains to all combinations of Multistreams.

3.3.1 Attaching Safety Chain

- Attach the first hammerlock and one shackle to one end of the chain as shown in Figure 3.3.1,
- Attach shackle to the correct point on the Multistream as indicated in this manual. See the following sections for drawings showing attachment of chains to various types of Multistreams,
- Identify suitable mounting points on the tractor or following bar (see appropriate manuals) and fit the shackle and second hammerlock without hammering in the locking collar,
- With both vehicles attached, measure the safety chain length in position, keeping it as short as possible, while ensuring that there is enough slack to allow the hitch to turn freely. Cut the chain to the correct length,

- Fit the second hammerlock to the free end of the chain ensuring that the shackle is threaded through the end of the hammerlock before locking the hammerlock pin in place in the same way as shown in Figure 3.3.1, and
- Fit and tighten shackle.

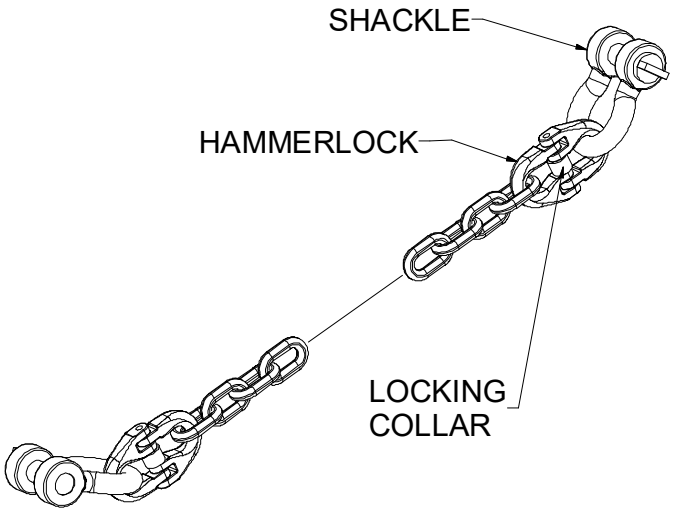


Figure 3.3.1: Safety chain showing chain and shackle attached to hammerlocks.

3.3.2 Tow Between - Front Hitch

Position the towing tongue on the Multistream front hitch with the 2 pins supplied, ensuring that the bin is level when connected to the tractor. Make sure pin ends are all secured with the correct lynch pins (11mm x 50mm).

Connect the Multistream to the tractor using a suitable tractor hitch pin that has a maximum diameter of 50mm (2”) on bins up to M18000. All M18000 and larger are fitted with Cat 5 hitches requiring 2 ¾” (70mm) pins.

Fit the safety chain to the Multistream in position as shown in Figure 3.3.2 and shorten using the procedure given in Section 3.3.1. Make sure the safety chain is securely attached to the tractor in a position indicated as suitable by the tractor manufacturer.

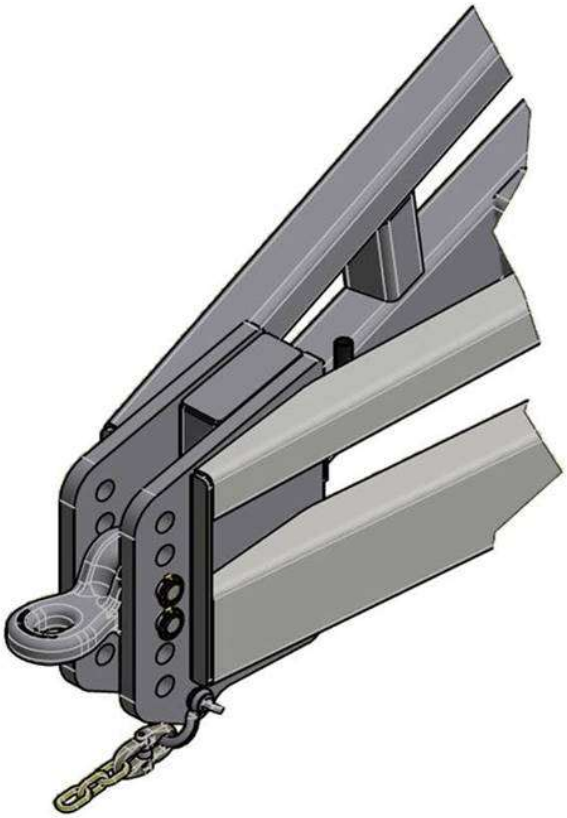


Figure 3.3.2: Front hitch of a Tow-between Multistream with the tongue and safety chain in place.

Figure 3.3.3: Rear hitch of the Tow Between Multistream with the safety chain in place through the lug.

3.3.3 Tow Between - Rear Hitch

Attach the implement to the rear of the Multistream using the 50mm (2”) pin with the head upper most, making sure that it is properly secured with a pin and lynch pin.

Fit the safety chain to the Multistream in position as shown in Figure 3.3.3 and shorten using the procedure in Section 3.3.1. Make sure the safety chain is securely attached to the towed implement in a position indicated as suitable by the implement manufacturer.

3.3.4 Tow Behind Hitch

Attach the Multistream hitch to the rear of the bar using the Auseeder tow hitch or a tow hitch from another manufacturer making sure that it is of the correct size and load rating. Also make sure that it has an attachment point for the safety chain which requires a hole of at least 26 mm diameter to fit the supplied shackle.

Fit the safety chain to the Multistream in position as shown in Figure 3.3.4 and shorten using the procedure in Section 3.3.1. Make sure there is adequate length in the chain to allow full articulation of the linkage while keeping it as short as practicable.

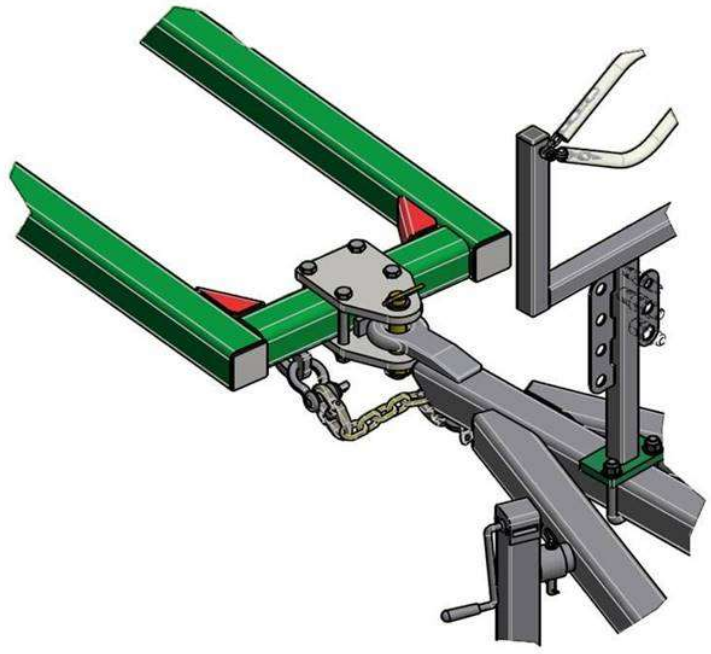


Figure 3.3.4: Multistream dolly connected to an Auseeder rear tow hitch with the safety chain in place.

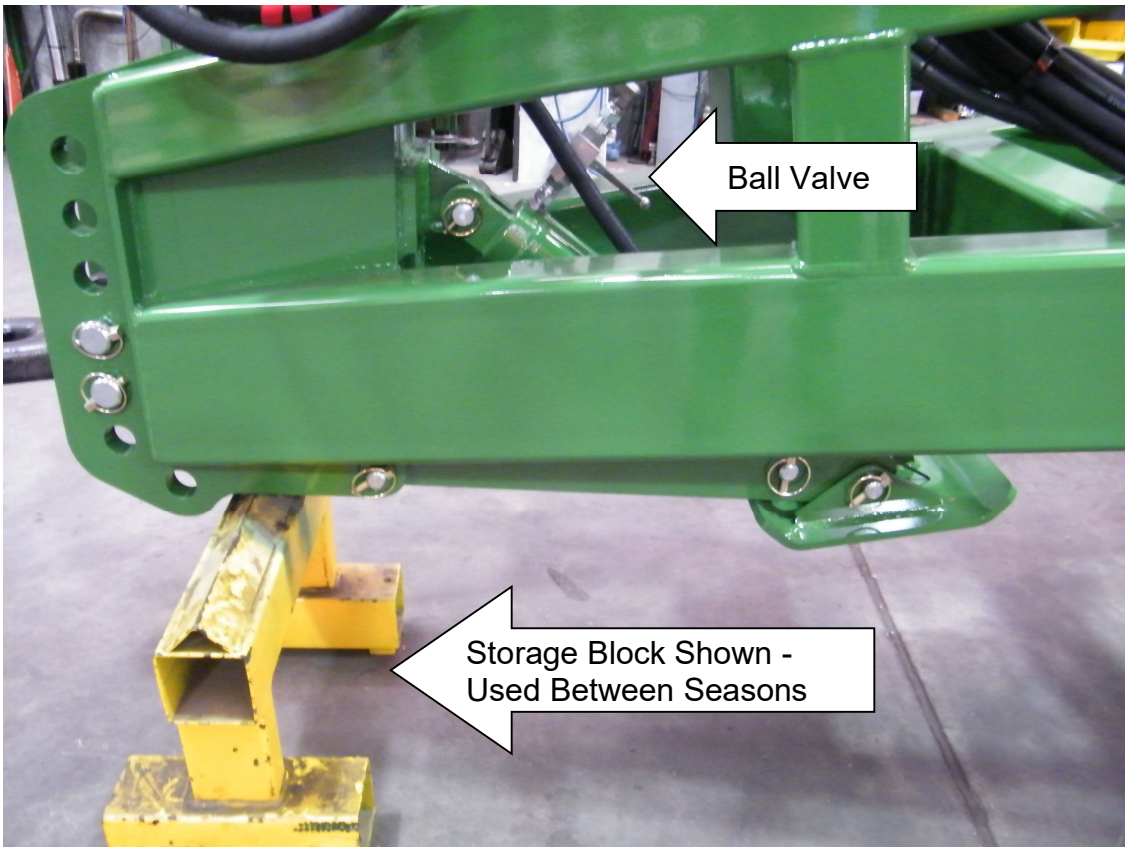
3.4 HYDRAULIC JACK

The Multistream/Airseeder hydraulic jack on Tow-between Multistreams can be used as a skid when bogged. Ensure that:

- The jack is stood on a hard surface such a piece of wood so that it cannot sink into the ground when disconnecting from a tractor, and
- The ball valve is fully closed.

CAUTION!

The jack should not be used to store the Multistream for a long period of time (between seasons) without placing a suitable block (shown) under the front tow hitch.



Picture 3.4.1 Multistream Tow-Between Front Jack

4.0 HYDRAULICS

4.1 INTRODUCTION

Multistreams are operated with electric over hydraulic control. The advantages of hydraulic operation are that low and high speeds can be achieved with no loss of torque, and liquid pumps drawing relatively high amounts of power can be operated.

The hydraulics are operated in a series circuit which requires:

- 1 x ¾" pressure and 1 x 1" return high flow circuits, and
- A separate ½" case-drain line.

4.2 HYDRAULIC CIRCUIT

In the series circuit, the supplied oil from the tractor turns the fan and the exhaust is then used to drive the metering units. In this circuit, the fan can also be bypassed during calibration. All oil is then returned to the tractor or oil reservoir via a heat exchanger.

Figures 4.2.1, 4.2.2 and 4.2.3 show the circuit schematics used in the Ausplow Multistreams.

4.3 FILTER ELEMENT

Multistreams are fitted with a high pressure, full flow filter element with service indicator. Under normal working conditions, this indicator should be green, see Picture 4.4.1.

It is permissible to indicate red while hydraulic oil is cold. If the indicator on the filter persistently shows red when the oil is hot, the element should be changed.

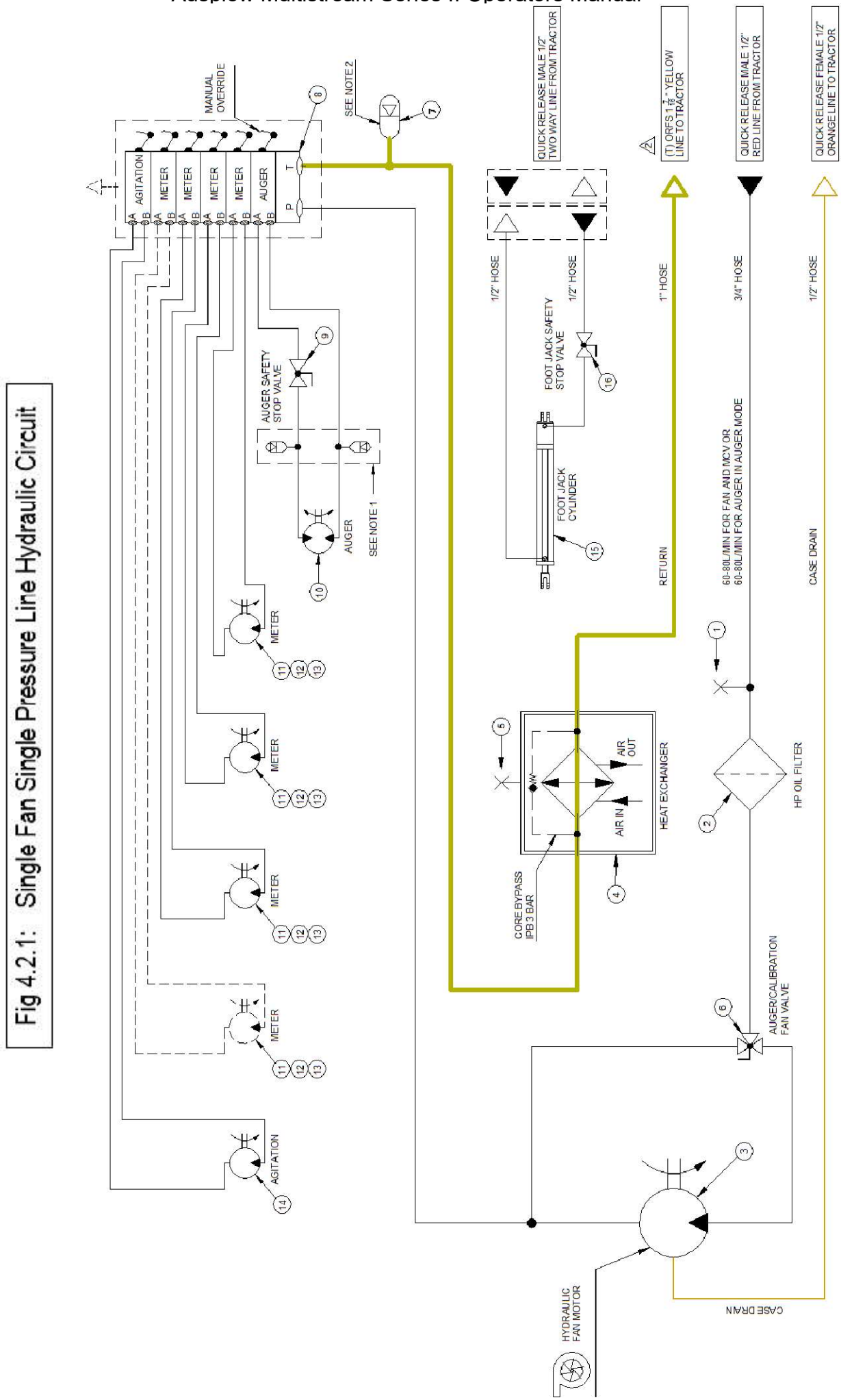


Fig 4.2.1: Single Fan Single Pressure Line Hydraulic Circuit

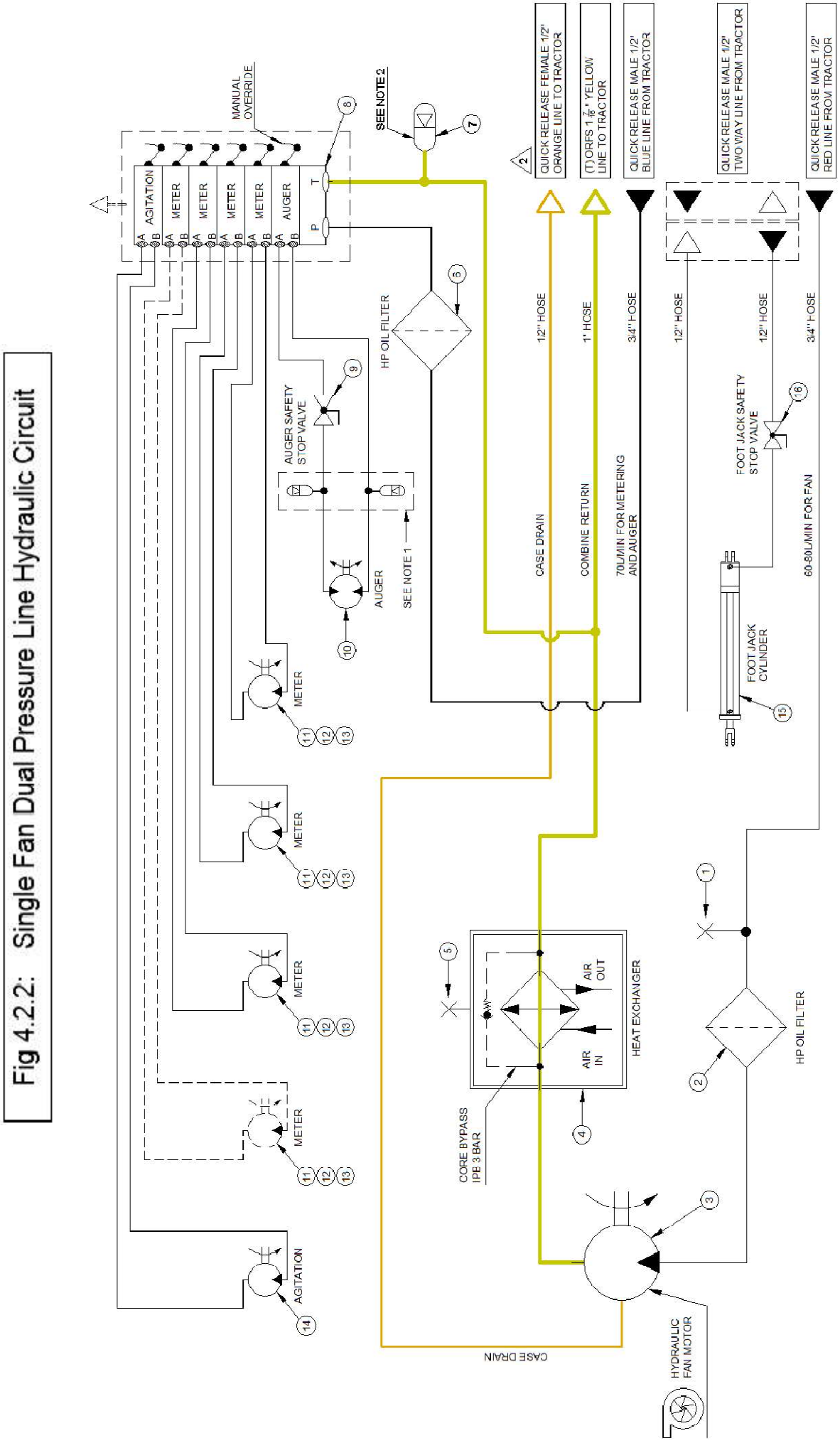
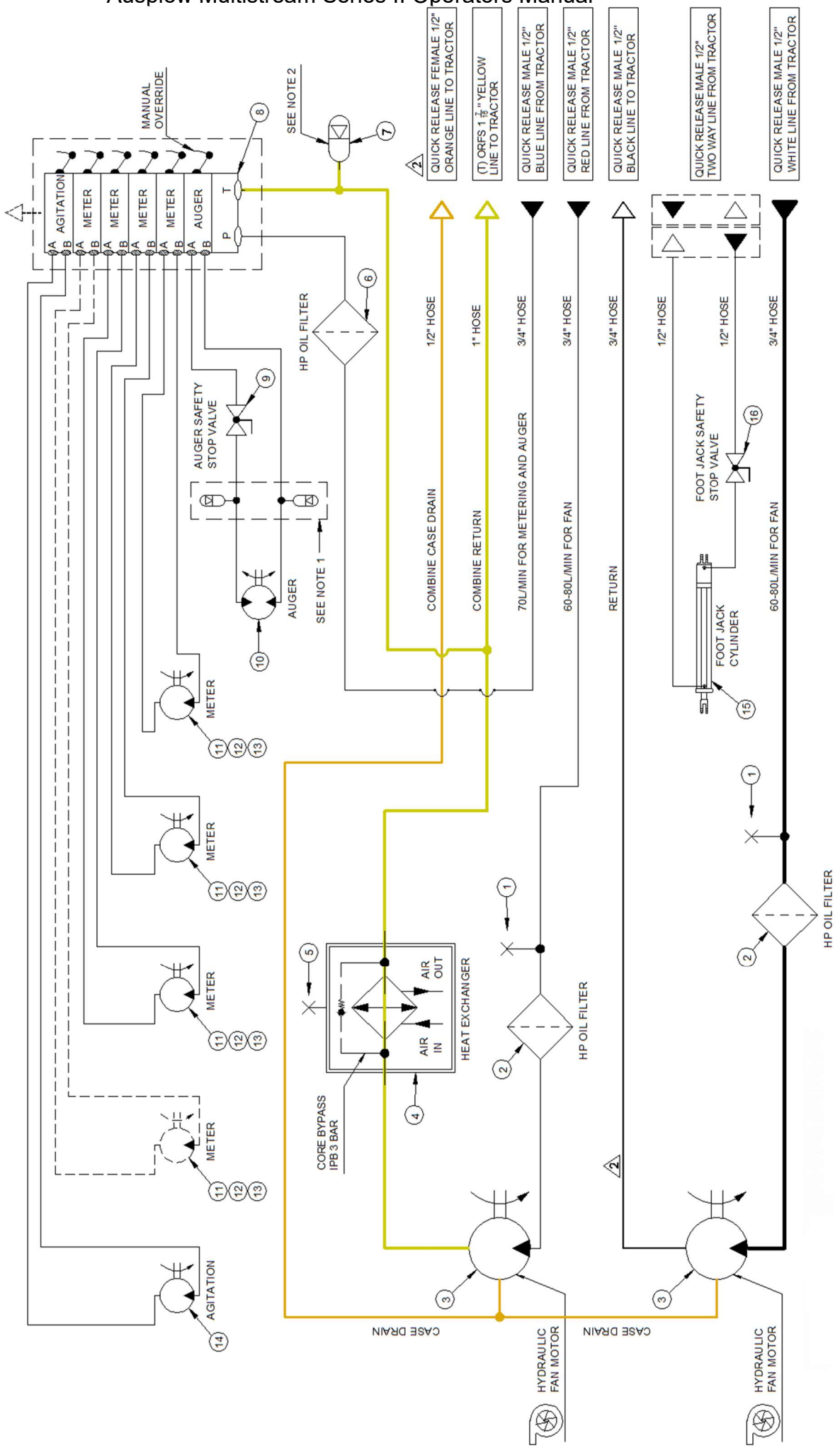


Fig 4.2.2: Single Fan Dual Pressure Line Hydraulic Circuit

Fig 4.2.3: Dual Fan Triple Pressure Line Hydraulic Circuit

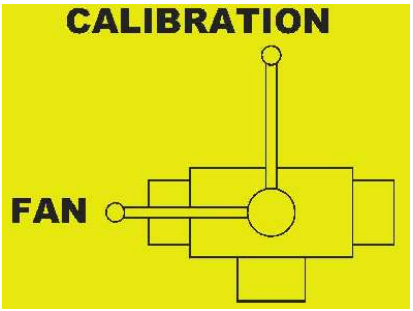


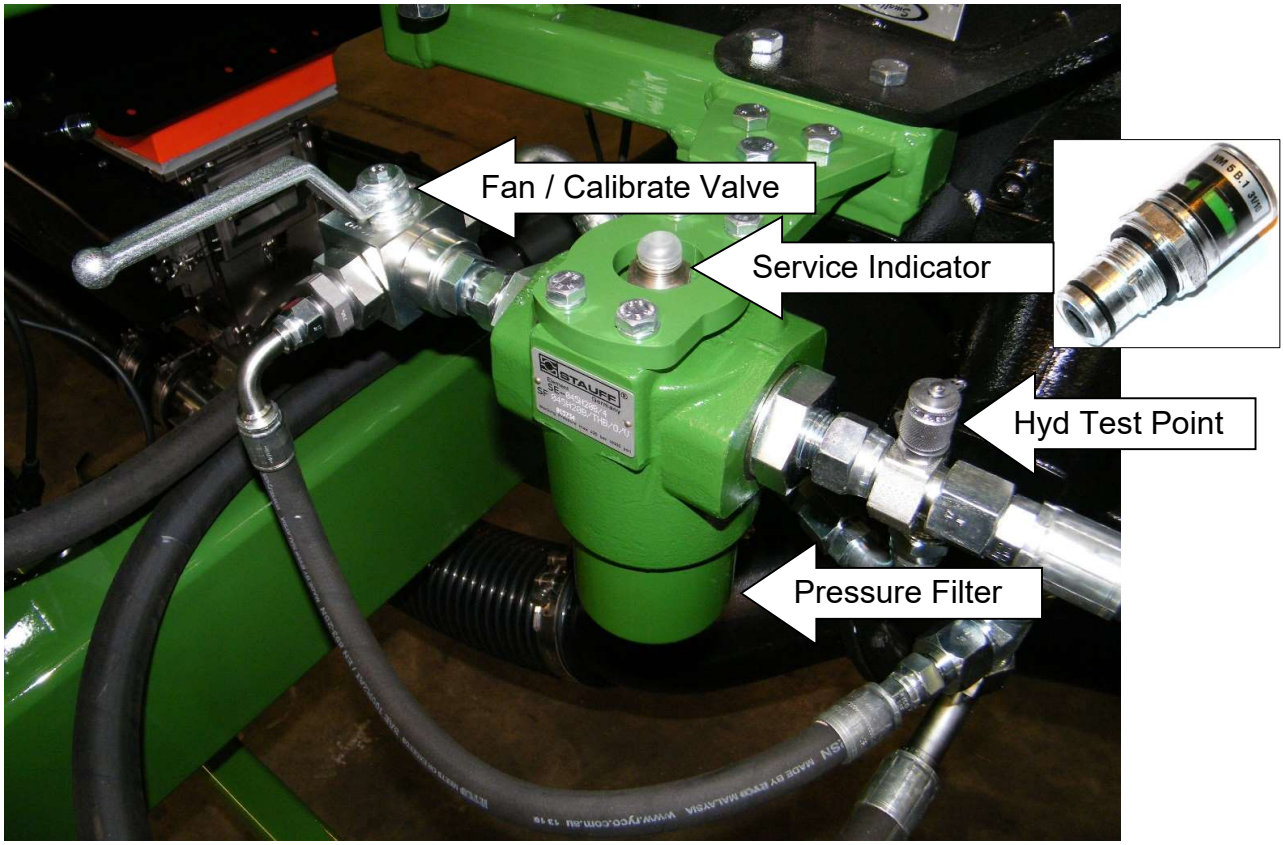
4.4 FAN / CALIBRATE VALVE

On single fan, single pressure systems, a ¾" ball valve is fitted after the pressure filter. It is used to change the oil flow from the FAN to the CALIBRATE circuit.

CAUTION!

Operate this valve slowly when changing.





Picture 4.4.1: Fan / Calibrate Valve and Filter

4.5 MAXIMUM SYSTEM OIL FLOW AND PRESSURE

Table 4.5.1 below shows the required maximum oil flow and return oil pressures. The actual maximum operating fan revs achievable will be affected by the tractor oil flow and pressures, bar size and configuration, the Multistream operating pressure and system return pressure.

OIL FLOW	80* litres / minute at Maximum 4000 fan RPM
RETURN PRESSURE	200 psi (14 bar) Maximum at 80 litres / min

Table 4.5.1: Maximum Oil Flow and Pressure

* Varies with set fan speed.

4.6 HYDRAULIC HOSE CONNECTIONS

The following areas need to be considered prior to connection of the Multistream hydraulic series circuit to the tractor.

CAUTION!

Most tractors, although fitted with larger return hydraulic couplers, are still too restrictive if oil is returned directly through the hydraulic remotes. This requires the fitting of an additional 1” high flow line either directly to the hydraulic reservoir tank or via the return oil hydraulic circuit. The exact fitting of the return line to the tractor hydraulics should be determined by your tractor dealer.

4.6.1 Pressure Line

Oil supplied from the tractor to drive the fan should be a priority flow via a standard ½” ISO coupling for all machines. This should also be the priority high flow connection.

Most modern tractors can be fitted with a dealer accessory kit that upgrades one remote valve section from ½” to ¾” remotes for improved flow.

Alternatively, additional flow can be achieved by teeing two ½” pressure lines into the ¾” pressure line to achieve the additional flow required.

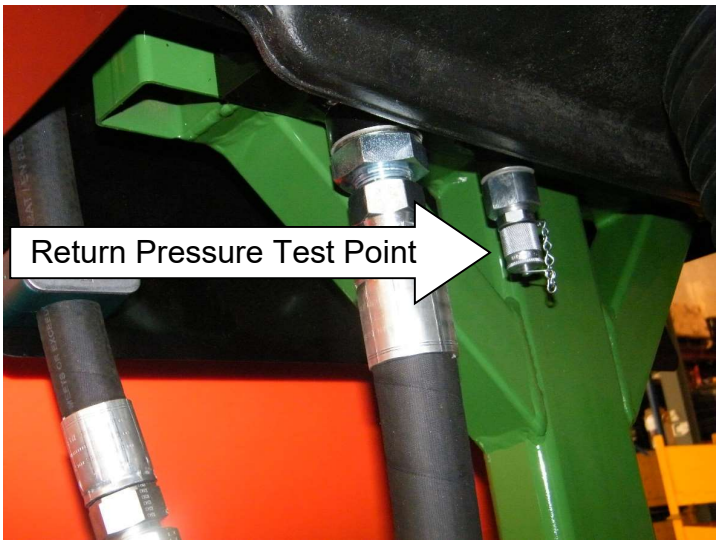
4.6.2 Return Line

Picture 4.6.1: Return Line Hard Coupled

CAUTION!

The return line is to be connected directly to the return oil system of the tractor, preferably a hard coupled, 1” hose. This is done to achieve the lowest possible return pressure, **which must be less than 200 psi (14 bar)**.

The return pressure must be measured using the test point at the base of the heat exchanger and should ideally not be more than 200 psi when hot.



Picture 4.6.2: Return Oil Pressure Test Point

If for any reason the pressure is more than 220psi, the return line may have been incorrectly fitted and the heat exchanger could fail prematurely.

Please note that it may be necessary to filter the return oil before it is returned to the tractor.

Return pressure may exceed 200psi (14 Bar) on cold mornings when the hydraulic oil is warming up but it is not desirable to run under these conditions or some damage may occur to the hydraulic heat exchanger core.

CAUTION!

Do not return oil through the remote valve itself on the main return line. Your tractor dealer representative will be able to advise you on the best method or place to return oil to the tractor.

4.6.3 Case Drain

CAUTION!

- The fan drive motor case drain line is to be connected directly to the tractor case drain return fitting.
- The fan motors are tested before leaving the factory. If for any reason the motor case drain has been emptied of oil, unscrew the hydraulic motor case drain fitting on top (1/2” hose) and fill with hydraulic oil before refitting the hose.
- If the case drain becomes disconnected and the motor is run, the shaft seal will fail and must be replaced. Internal damage may also occur to the fan motor. If refitting a motor, the case drain must be taken from the highest point or motor failure will occur.
- If a separate case drain port is not fitted to the tractor, the case drain flow must be returned to the tractor reservoir below the normal working oil level. Again, your tractor dealer representative will be the best person to advise you on this.

4.6.4 Additional Precautions When Operating Hydraulics

CAUTION!

- When engaging oil flow to the Multistream after connection to the tractor, adjust the oil flow to minimum flow until air is cleared, and then increase flow to achieve the desired fan RPM.
- Make sure that the motor case drain is connected before running the fan as the motor seal could fail and loss of hydraulic oil into the air system will result.
- Do not tee the return line into the case drain line as most tractor case drains are only designed for low flow rates of approximately 5 litres per minute.
- In the event of a problem with the remotes, high oil flow in the case drain line can result in high case oil pressure and cause motor seal failure and loss of hydraulic oil.
- Make sure that the return pressure is less than 200psi (14 Bar). Failure to this when the oil is hot may cause the heat exchanger to burst, which may result in:
  - Personal injury,
  - Total hydraulic oil loss,
  - Contamination of products in the bins, and
  - Oil entering the air system.

For further information, please consult your tractor manual, tractor dealer or local Ausplow dealer to determine the best method for fitting the 1” high flow return line.

4.6.5 Hydraulic Fittings

Hydraulic fittings and hoses found on all configurations of Multistreams, see tables below:

This table does not give all the hoses at the front of an Auseeder bar, only the hoses that are directly attributable to the Multistream.

FUNCTION	COLOUR	HOSE SIZE	FRONT AUSEEDER BAR	AIRSEEDER / MULTISTREAM FRONT
FAN 1 & MCV (if singlet hyd system) FAN 1 (if split hyd system) SUPPLY	RED-GREEN	¾"	Standard ½" ISO Male QR	Standard ½" ISO Male QR
TANK RETURN	YELLOW-GREEN	1"	1 5/8" JIC Female Swivel	1" BSP Male
CASE DRAIN	ORANGE-GREEN	½"	Standard ½" ISO Male or Female QR	Standard ½" ISO Female QR

Table 4.6.1: Tow Behind Hydraulic Hoses

FUNCTION	COLOUR	HOSE SIZE	AIRSEEDER / MULTISTREAM FRONT
FAN 1 & MCV (if singlet hyd system) FAN 1 (if split hyd system) SUPPLY	RED-GREEN	¾"	Standard ½" ISO Male QR
TANK RETURN	YELLOW-GREEN	1"	1 5/8" JIC Female Swivel
CASE DRAIN	ORANGE-GREEN	½"	Standard ½" ISO Female QR

Table 4.6.2: Drawbar Mount Hydraulic Hoses

FUNCTION	COLOUR	HOSE SIZE	AIRSEEDER / MULTISTREAM FRONT	AIRSEEDER / MULTISTREAM REAR
FAN 1 & MCV (if singlet hyd system) FAN 1 (if split hyd system) SUPPLY	RED-GREEN	¾"	Standard ½" ISO Male QR	N/A
MCV SUPPLY (if split hyd system)	BLUE-GREEN	¾"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
TANK RETURN	YELLOW-GREEN	1"	1 5/8 " JIC Female Swivel	N/A
FAN 2 SUPPLY	GREY-GREEN	¾"	Standard ½" ISO Male QR	N/A
CASE DRAIN	ORANGE-GREEN	½"	Standard ½" ISO Female QR	N/A
HOSE 1 Lift - Pressure	GREEN	½"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
HOSE 2 Lift - Return	BLUE	½"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
HOSE 3 Fold - Pressure	YELLOW	½"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
HOSE 4 Fold - Return	WHITE	½"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
HOSE 5 Accumulator	RED	½"	Standard ½" ISO Male QR	Standard ½" ISO Female QR
Hydraulic Jack	Bare (2)	½"	Standard ½" ISO Male QR	N/A

Table 4.6.3: Tow Between Hydraulic Hoses

Picture 4.6.3: Hydra Grip Hose connectors

MULTISTREAM HYDRAULIC HOSE CONNECTIONS			
Single Hyd System	Multiple (Split) Hyd System	PRIMARY	SECONDARY
FAN 1 & MCV SUPPLY	FAN 1 SUPPLY	RED	GREEN
	FAN 2 SUPPLY	GREY	GREEN
CASE DRAIN		ORANGE	GREEN
TANK RETURN		YELLOW	GREEN
	MCV SUPPLY	BLUE	GREEN

#029583

Picture 4.6.4: Hydraulic Hose Connection Decal

5.0 PRIMARY HOSES

5.1 TOW BETWEEN PRIMARY HOSE

Primary rubber hoses are attached to the Multistream air delivery pipes using Travis Couplings. When viewing the Tow Behind machine from the rear looking forward, the LHS air pipes are generally used for seed and the RHS used for fertiliser product.

Picture 5.1.1: Air Delivery Pipes – Tow Between Models

Picture 5.1.2: Air Hose joining to Auseeder – Tow Between Models

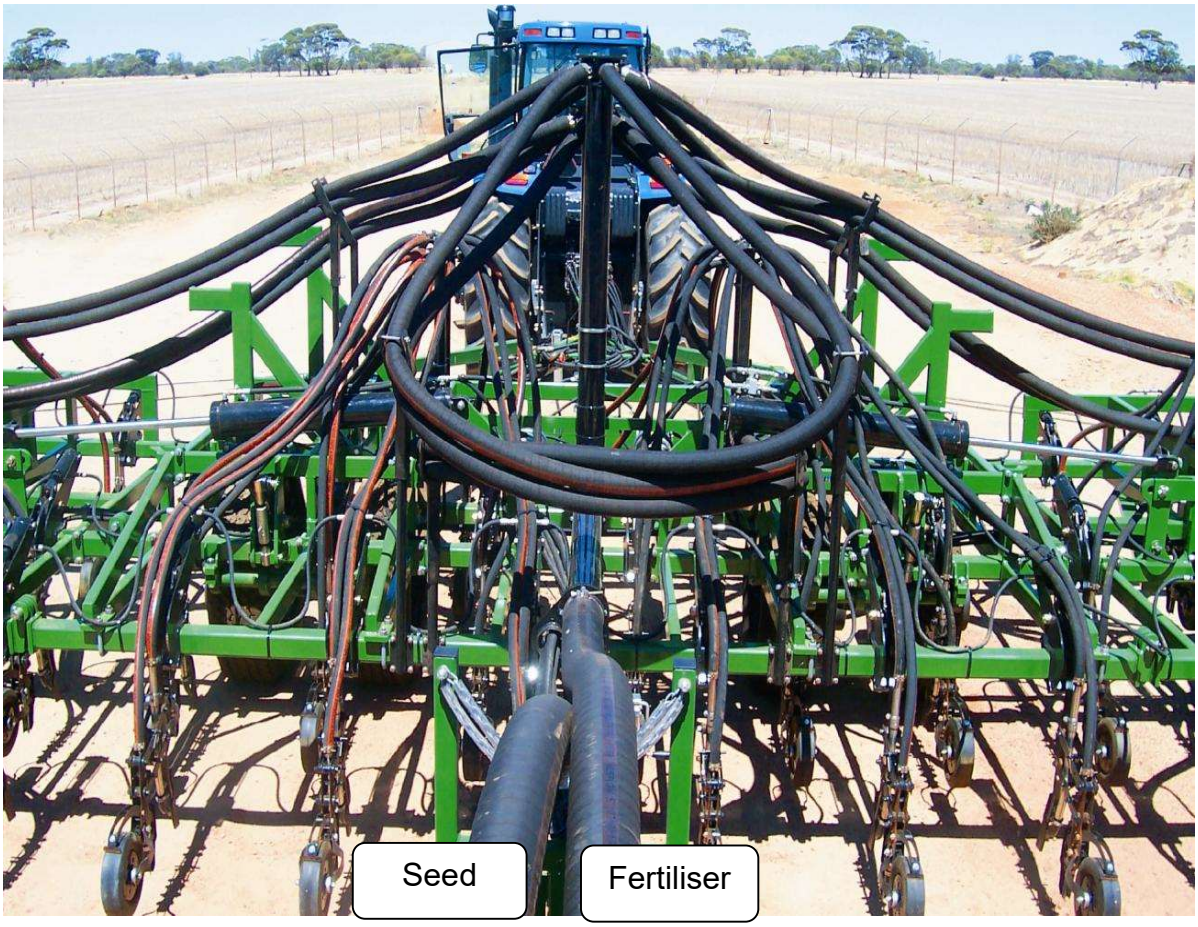
CAUTION!

- Allow primary hoses to be free hanging for at least 1.5 m from the pivot pin before mounting on the following implement taking care that hoses do not rub on any projecting parts.
- Hoses should be crossed to reduce strain on hoses during turning. Hoses should be kept as short and tight as practical.

5.2 TOW BEHIND PRIMARY HOSE

Picture 5.2.1: Side by Side Primary 5” Hose – Tow Behind

The primary hoses are attached either end to solidly mounted steel pipes. Double shoot systems can have Side by Side primary hose layouts or an Under and Over primary hose layout. For a Side by Side air kits, when standing at the front of the Tow-behind Multistream the LHS 127mm (5") rubber hose crosses over and is attached to the RHS primary standpipe. This should be used for seed and blended compound.



Picture 5.2.2: Under & Over Primary 5” Hose – Tow Behind

For Under & Over air kits, when standing at the front of the Tow-behind Multistream, the LHS 127mm (5") rubber hose is attached to the lower 5” steel pipe under the seeder. This should be used for seed and blended compound.

The rubber hosing should be carried in the chain harness located on the drawbar of the Multistream. This should be adjusted to achieve the straightest line for hoses when the DBS Auseeder is in the working position.

6.0 10” AUGER - Version 2

6.1 AUGER SAFETY PRECAUTIONS

WARNING!

- AUGER CONVEYORS ARE DANGEROUS. Failure to respect safety precautions can result in serious injury or death. Do not operate the auger until you are familiar with the contents of this manual.
- NEVER operate the auger without the safety screens fitted.
- STRICTLY NO work on the auger internal moving parts should be carried out unless the power source is first isolated:
    - For ‘tractor hydraulic’ models turn off tractor engine and disconnect hydraulic remote hoses. Attach a personal danger tag to the tractor key or hose.
    - Test the isolation by operating the auger controls.
- NEVER place any part of the body into the feed or discharge openings of the auger unless the above isolation procedure has been performed.

6.2 AUGER OPERATING INSTRUCTIONS

Version 2 Auger with hydraulic arm control has replaced the Version 1 hydraulic brake type.

To operate the auger the tractor hydraulics must be engaged to run the MCV and the seeding monitor must be powered up.

A hungry board is supplied for normal bin filling operations. This can remain attached to the hopper. Hungry board will need to be removed when auger is used to empty the machine or when transported on the back of a truck.

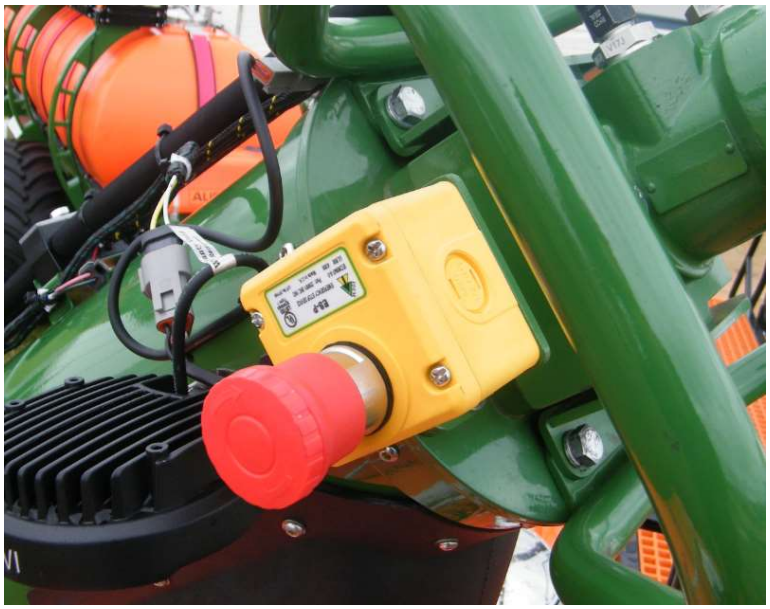
The auger can be operated via the remote control (see Picture 6.2.1) or using the control panel mounted to the machine (see Picture 6.2.2).

Picture 6.2.1 Auger Remote/Transmitter V2

Picture 6.2.2 Auger Control Panel/Receiver V2

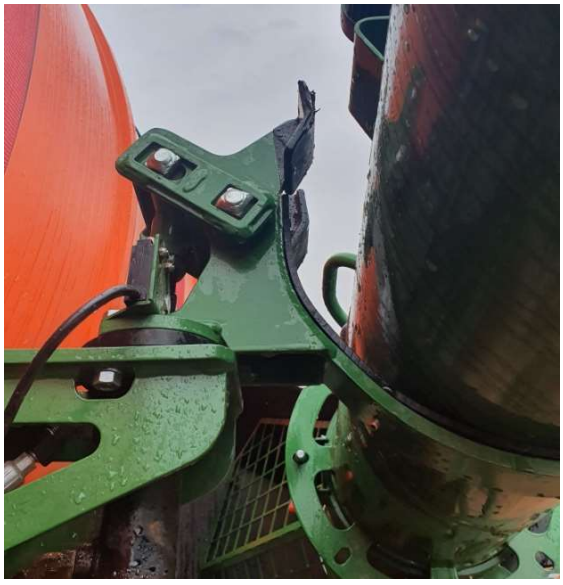
Panel Operation:

- The auger is equipped with 2 emergency stop buttons, one at the top of the auger (see Picture 6.2.3) and one down near the hopper. The auger will not power up if either of these has been depressed. Twist the red button anticlockwise to unlock the stop.



Picture 6.2.3 Auger Emergency Stop Buttons

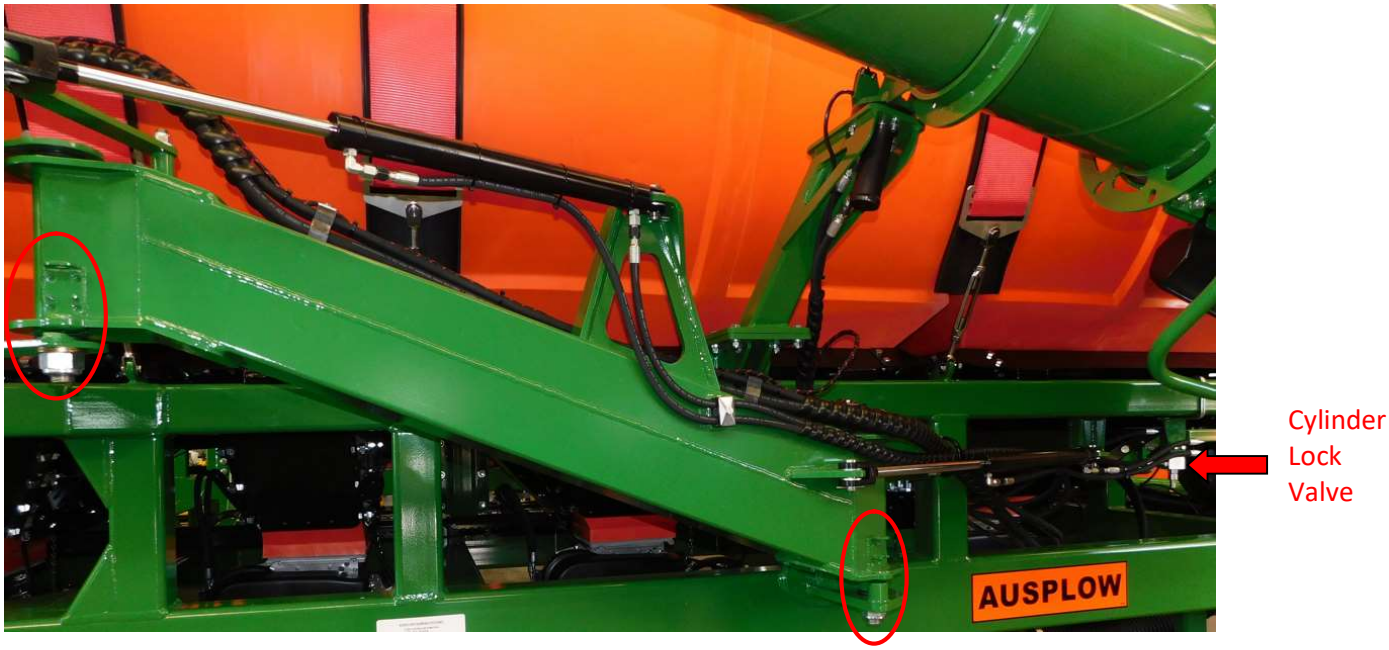
- Power up Auger Control Panel by pressing the Power button for 2 – 3 seconds. The Control Panel “ON” light will be on.
- The auger locking mechanism must be unlocked before the auger can be lowered. There is a safety switch in the cradle (see Picture 6.2.4) that ensures the auger lower function cannot be enabled until auger is unlocked.



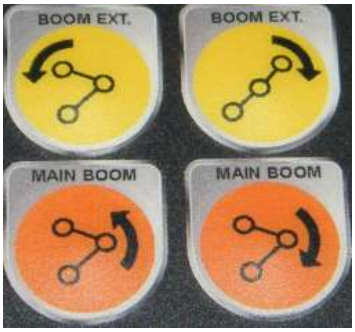
Picture 6.2.4 Rear Cradle with Safety Switch

- Stand clear of the auger, then press the raise button to lift the auger of both of its cradles.

- Locking Pins are no longer required to lock auger arms as a Cylinder Lock Valve is now used to lock them into stow position (see Picture 6.2.5).



Picture 6.2.5 Auger Arm Cylinder connected to Cylinder Lock Valve



- Operate the Main Boom to swing the arm and auger assembly into position.

- Operate the Boom Extension to swing the auger to the filling position.

- Release the hopper locking pin then rotate hopper to filling position (see picture 6.2.6).

- Engage the hopper lock pin to secure the hopper. Attach hungry board if required.

Picture 6.2.6 Auger Filling Position

Tank Filling

- Run auger and fill each tank as needed.
- When switching products or cleaning out, raise the auger, use a catch pan if necessary, rotate the hopper to allow for any product left in the hopper to fall into catch pan, run auger in reverse to clean out any product remaining in the barrel. Stop auger and rotate hopper back to filling position and lower to the ground.
- Once bin refilling is complete, auger can be stowed.

Auger Stowing

- Raise auger so it is high enough off the ground to rotate the hopper into the stowed position (see Picture 6.2.7).
- Ensure the hungry boards have been removed before stowing.
- Raise auger and guide it into the saddles.
- Engage the locking mechanism.
- Power down the auger by pressing the Power Button at the control panel. Control on light should now be off.

Picture 6.2.7 Auger & Hopper in Stowed Position

Operation using either the remote control or the local control panel is the same.

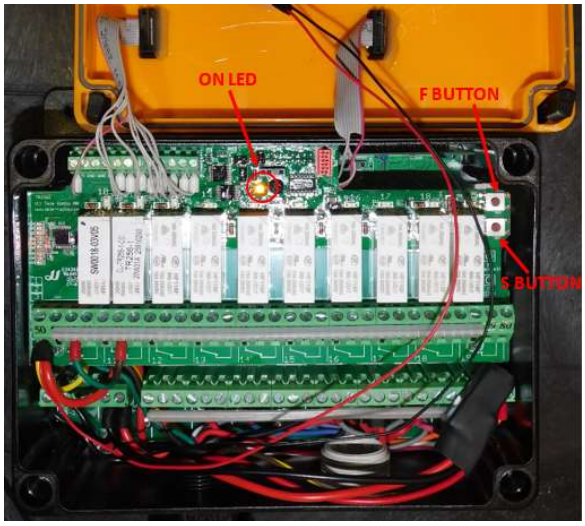
In case of emergency either emergency stop button can be hit to shut down all operations of the auger. Buttons must be reset to continue operation.

When using the auger to empty any of the tanks, the hungry board will need to be removed to allow clearance under the machine. Note, the auger will not reach any tanks located behind or above the rear axle.

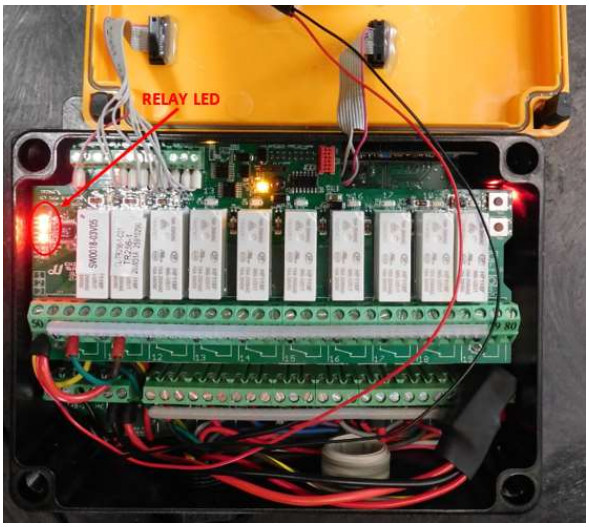
6.3 AUGER PAIRING INSTRUCTIONS – Series II

Before pairing the remote transmitter with the receiver, remove the rear cover make sure the receiver is powered on.

- On LED should be activated (see Pictures 6.3.1).
- If the LED's are identical to Picture 6.3.2, wait for 10 seconds until the LEDs become deactivated like Picture 6.3.1.



Picture 6.3.1 Receiver Rear (1)



Picture 6.3.2 Receiver Rear (2)

Make sure the transmitter is turned on.

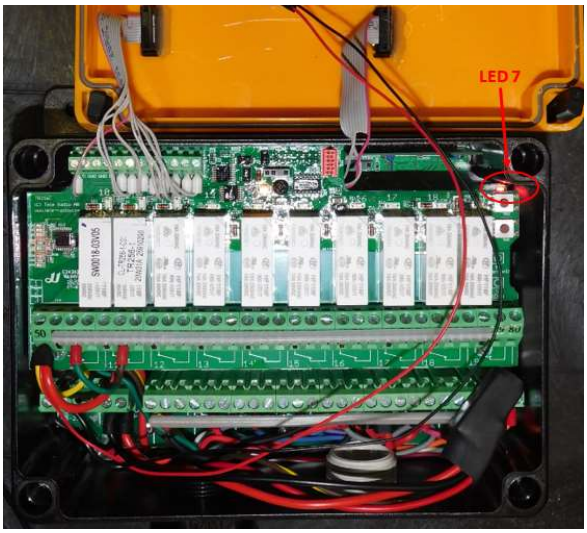
The LED at the top of the transmitter should activate when you press the top left button.

Picture 6.3.3 Transmitter

- If the transmitter is turned off, turn it on using the switch at the back of the transmitter.

Actual pairing procedure should be done within 10 seconds after conducting step 1.

- Step 1 - Press F button for 5 seconds (see Picture 6.3.1 for button location). LED 7 will activate (see Picture 6.3.4).



Picture 6.3.4 Receiver Rear (3)

- Then press S button (see Picture 6.3.1 for button location).
- All the relay LEDs will activate (see Picture 6.3.2).
- Press and hold the Raise and Forward buttons for 5 seconds.

Picture 6.3.5 Transmitter Buttons

- Relay LEDs will flash multiple times indicating that pairing is successful
- The Transmitter and Receiver are now paired.

7.0 MONITOR INSTRUCTIONS

7.1 INSTALLATION PROCEDURES

CAUTION!

The monitoring systems are voltage sensitive and require 12 volts to operate correctly otherwise the monitor will shut down automatically after powering up. Check the voltage of the battery supply prior to fitting the monitoring system.

7.1.1 Monitor Kit Installation

The dealer or Multistream end user may carry out the installation of the monitor kit. Detailed instructions are contained in the manufacturer's controller manual.

7.1.2 Basic System Components and Layout

The basic monitor system consists of:

- Console,
- Tractor Loom,
- Front Implement Harness
- Implement Extension Loom (Tow Behind Multistreams only),
- Apollo Harness Master ECU,
- Motor Drive Electronic Control Unit (MDECU) – Rate Controller,
- Tank Loom Harness
- Sensors, and
- Mounting hardware.

The Rate Controller is mounted on the seeder underneath between tanks 1 and 2 and contains the control circuitry to control the drives fitted to each tank. Drive looms connect the Rate Controller to each of the hydraulic valves of each tank.

- The Topcon X35/XD and John Deere Greenstar Rate Controllers can be configured for up to 4 granular or liquid products with one ECU and up to 8 bins with 2 ECUs.
- The Trimble Rate Controllers can be configured to control one granular or liquid product.

7.1.3 System Operation

The Console contains all the data for the operation of the system, such as metering roller calibration, encoder values, alarm points, tank volumes, application rates and other fixed data such as the seeder width and wheel circumference wheel factor. The Console also records area covered and operating time.

The MDECU/Rate Controller communicates to the Console via a communication link or loom. The data received by these processors applies the correct voltage to the hydraulic control valves on the MCV hydraulic block which is located on the left hand side of the Multistream, adjacent to metering system No 1.

These hydraulic drive solenoids are directly operated by the processors. The data returned to the console includes the status of the system, alarms and timing from the various sensors on the seeder.

- The Topcon X35/XD monitor system has been designed to operate up to 8 tanks, all of which can be calibrated independently, irrespective of the product in the tanks.
- Trimble FM1000 system can control up to 6 bins.
- Greenstar (JD) RC2000 monitor systems can control more than 8 bins but only 4 bins on Variable Rates.

7.1.4 Seeder Keypad

The Topcon monitor system is fitted with a Calibration & Control Keypad which enables the operator to turn the metering systems ‘ON’ and ‘OFF’ independently to the operation of the monitor system. This keypad is fitted on the Multistream chassis near the front metering units.

Picture 7.1.1: Seeder Keypad

Please note that this panel must be 'OFF' (no orange lights) before manually operating the hydraulic valves on the hydraulic valve block. This panel needs to be 'ON' before the calibration of metering units.

7.1.5 Wheel Speed

The speed of the seeder is determined from the wheel speed sensor on the left-hand main wheel using the wheel studs to activate the sensor. The signal is sent to the Console for display and calculation.

- For X35/XD systems, an alternative speed pickup connection is available on the 'TPA SEED RATE INTERFACE' on the plug marked 'TRACTOR RADAR'.
- For Trimble and John Deere systems, speed is calculated by GPS.

7.1.6 Sowing Width

The seeder width in the console should be the actual sowing width of the bar. This is determined by measuring the total width of the bar and then subtracting the average overlap. For example, if the total width of the bar is 12.0m and the average overlap is 0.5m, the actual sowing width is 11.5m.

If zero overlap in seeding is to be achieved by using auto-steer systems, the actual sowing width is the number of tines multiplied by the tine

spacing, not the distance from outside tine to outside tine. For example, on a D300-61 DBS bar, the outside tine to tine distance is 18.0m however the actual sowing width when using auto-steering systems is 61 tines multiplied by 300mm giving 18.3m.

7.1.7 Variable Sowing Rates

Temporary changes in application rate of any tank product can be achieved by a single button press while seeding. The rate increment of change is part of the initial product calibration. A manual operating speed needs to be entered into the console for correct operation and while manual mode may not be anticipated, this value is required for calibration of each of the products.

7.1.8 Sowing Rate Inaccuracies

The following factors may affect the overall anticipated sowing rate calculated prior to seeding operations:

- Variations in product densities (See Section 9),
- If the circumference of the tyre or actual sowing width is inaccurate, the area calculations will also be inaccurate as well as the application of the product,
- Use of variable rate functions on the seeder will also affect overall application rates, and
- Constant stopping and restarting during seeding or seeding small sections.

7.1.9 Product Specifications

The Console's power leads must be connected directly to the tractor's battery terminals. No attempt should be made to connect the system to a positive earth vehicle otherwise damage will result and Warranty will become void.

7.2 SENSOR SPECIFICATIONS

For the monitor to control the delivery of product accurately it is important that sensors are in good order and their operating gaps are maintained as shown in Table below.

Wheel & Fan Speed Sensors (15839 - NLA) Specifications	
Ground Speed, Fan and Shaft sensors	Hall effect type sensors, 3 pin Deutsch plug (Pin A, B and C)
Sensor to Magnet distance	2-3 mm
Supply Voltage	Supply 12 V from MDECU
Signal Voltage	4 -5- V sensor inactive < 1 V sensor activated by magnet
Motor Feedback Proximity Sensors Specifications	
Motor Feedback Sensors	Proximity Sensor 3 pin Deutsch (Pin A, B and C)
Sensor to Metal distance	2 mm
Supply Voltage	Supply 12 V from MDECU
Signal Voltage	4-5 V sensor inactive < 1 V sensor activated by metal
Fan Pressure Sensors Specifications	
Fan Pressure Sensors	Solid state aircraft altimeter type. Max. error 1%
Tank Level Sensors Specifications	
Tank Level Sensor	Solid state capacitive type. 3 pin Deutsch plug (Pin A,B and C) Triggered on flat end Sensitivity adjustable for light material e.g. Urea
Supply Voltage	Supply 12 V from MDECU
Auxiliary Lights Switchbox Specifications	
Aux. and Lights Switchbox	**Maximum of 50 Watts continuous for each plug.** Multi-meter across Pins ‘A’ and ‘B’; 12V DC when switches on the console are selected on.

7.3 MONITOR SETUP – GENERAL

Machines are initially set up with factory settings to enable operators or dealers to start the machine in a safe manner.
Please refer to the manufacturer's Console Operators Manual for detailed instructions on set up procedures.

Common input parameters and general settings are outlined below.

7.3.1 Fan Parameters

- Set 'HIGH RPM' for the fan to 200rpm above recommended fan RPM (See Table 8.4.2),
- Set 'LOW RPM' for the fan to 500rpm below recommended fan RPM, and
- Set 'HIGH PRESSURE' and 'LOW PRESSURE' alarm points as shown below in Table 7.3.1. Air pressures can be fine-tuned during initial operation.

Number of Outlets	Low Pressure (Kpa)	High Pressure (Kpa)
20 to 28	2.0	5.0
32 to 36	3.0	6.0
40 to 42	3.5	6.5
44 to 48	4.0	7.0
49 to 54	4.5	7.5
55 to 60	5.0	8.5
61 to 64	5.5	9.0
70	6	10

Table 7.3.1: Low and High Pressure Alarm Points

7.3.2 Implement Width

Enter 'WIDTH' as shown in Table 7.3.2.

AUSPLOW BAR MODEL	TINE SPACING (mm)	NUMBER OF TINES	CUT WIDTH (m)
D260-24	260	24	6.24
D260-28	260	28	7.28
D260-32	260	32	8.32
D260-36	260	36	9.36
D260-42	260	42	10.92
D260-48N	260	48	12.48
D260-48E	260	48	12.48
D260-54	260	54	14.04
D260-59	260	59	15.34
D260-60	260	60	15.60
D260-64	260	64	16.64
D260-70	260	70	18.20
D300-32	300	32	9.60
D300-36	300	36	10.80
D300-40	300	40	12.00
D300-44	300	44	13.20
D300-46	300	46	13.80
D300-47	300	47	14.10
D300-48	300	48	14.40
D300-49	300	49	14.70
D300-50	300	50	15.00
D300-51	300	51	15.30
D300-55	300	55	16.50
D300-60T	300	60	18.00
D300-61	300	61	18.30
D381-28	381	28	10.67
D381-32	381	32	12.19
D381-36	381	36	13.72
D381-40	381	40	15.24
D381-44	381	44	16.76
D381-48	381	48	18.29

Table 7.3.2: Cut Widths for Ausplow Seeder Bar Models

7.3.3 Manual Speed

Select ‘MANUAL SPEED’ and set:

- 8.0 for 260mm spacing, and
- 9.0 for 300mm spacing.

This value is the most typical speed in km/h that seeding will occur. This value can be fine-tuned once seeding has commenced.

7.3.4 Bin Setup

Select 'BIN 1', 'BIN 2', 'BIN 3', 'BIN 4', 'BIN 5' or 'BIN 6' and enter the following information for each bin:

- 'TANK CAPACITY'. Use working volume values, see Table 8.2.1.
- Select 'PRIMARY' and 'SECONDARY' rates,
- Select a 'PRODUCT', and
- 'CALIBRATE PRODUCT'.

7.4 MONITOR SETUP – TOPCON

Please refer to the manufacturer's Console Operators Manual for detailed instructions on set up procedures.

7.4.1 Wheel Factor Setup

- Select 'SETUP',
- If the wheel factor is not displayed, perform a wheel calibration.
- The initial wheel factor for all bins should be as follows:
    - All drawbar mounted bins 0.424
    - All 100 series axles (10 stud) 24.5x32 tyres 0.549
    - All 110 series axles (10 stud) 30.5x32 tyres 0.554
    - 150 series axles (12 stud) 24.5x32 tyres 0.457
    - 150 series axles (12 stud) 710/70R 38 tyres 0.428
    - 150 series axles (12 stud) 800/70R 38 tyres 0.402
    - 150 series axles (12 stud) 900/60R 32 tyres TBA

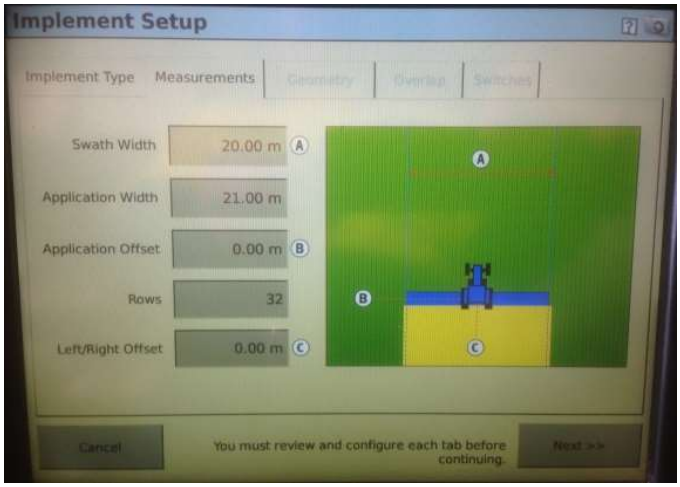
CAUTION!

- To ensure the most accurate value is used, mark out 100m with a tape measure and perform wheel calibration over this distance.
- The speed of the bin should match the speed of the tractor allowing for wheel slip corrections.

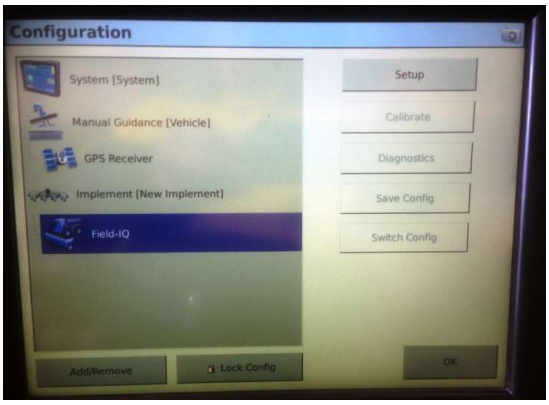
7.5 MONITOR SETUP – TRIMBLE

These are basic instructions for setting up the Trimble monitor system, refer to the manufactures hand book for detailed instructions.

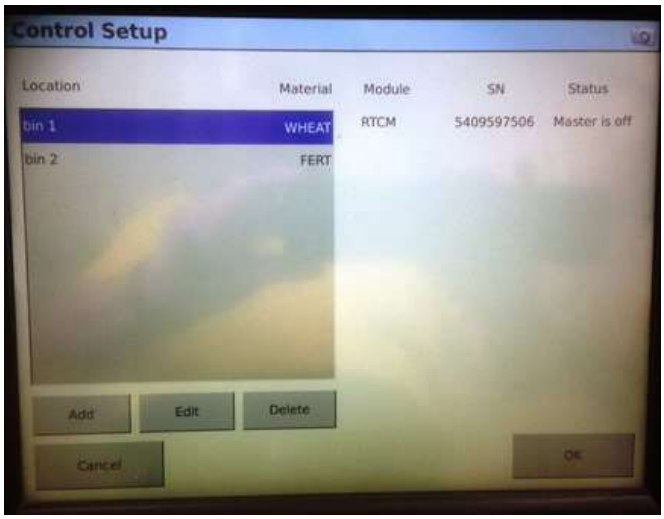
- On **Implement Setup** screen.



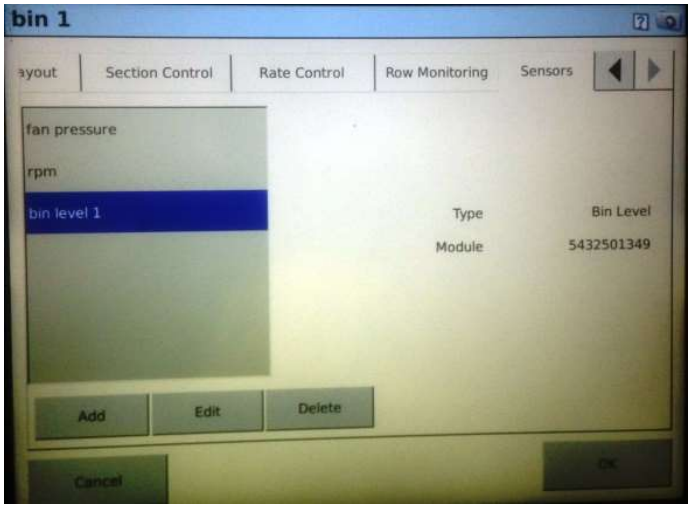
- In **Operations** select **Seeder** in the drop down box, press next.
- Set **Application width** according to bar size. Keep pressing next until you come to the last tab, then press ok. For more information on **Geometry, Overlap** and **Sections** refer to Trimble manual.



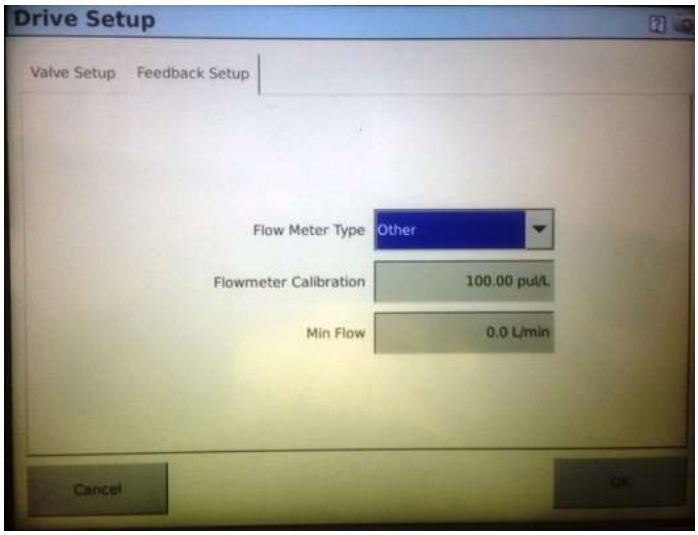
- On **Configuration** screen selects **Field-IQ** and press **Setup**, if you are locked out use password **2009.**
- On **Field-IQ** setup press **Control Setup**.
- **Control Setup** screen press **Add** button, named the bin you are programming (example bin1).
- Starting from **bin 1** press next, select what product which is allocated for that bin (example bin1 select wheat).
- On **Layout** screen enter bin number you are programming.
- **Press Bin/ tank setup** on status dropdown box select On.



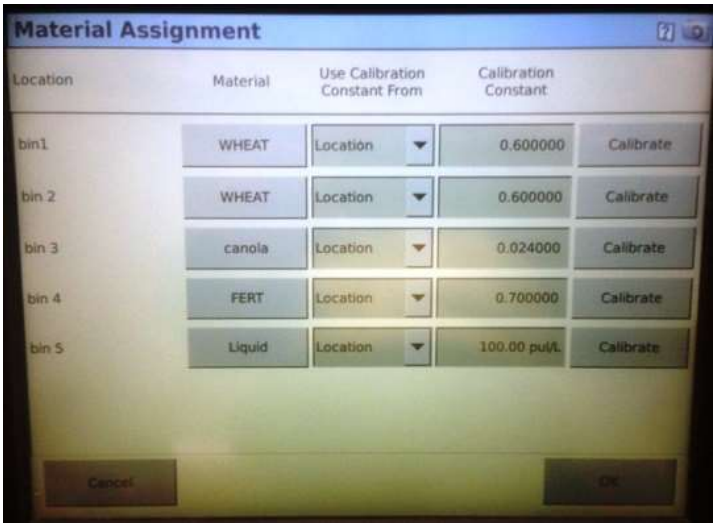
- **Capacity** unit leave as Default units. Bin Capacity enter the amount of kg for the bin. (eg: End bin 4700kg Mid bin 4400kg).
- Set **Warning level** to 100 kg. Press Ok then keep pressing next until you get to the **Rate Control** tab. For information on **Section Control** refer to Trimble manual.
- **Rate Control** tab, set rate control to **on** then press **Rate Control Module location** press Ok.
- On rate **Control Module Setup** screen enter **Number of Drives 1.**
- Enter the **Module** serial number, this number must match the number of the bin you are programming, press Ok.
- Press **Drive Setup** and on **Valve Type,** select PWM from drop down drop.
- Select **Feedback Setup** tab and enter **30** on the **Shaft Encoder Constant** field, press Ok. Keep pressing the next button until you get to the **Sensor** tab. Starting from bin 1, press add button, here you will add Bin level sensor, Fan Pressure and Fan speed.



- Press **Add** button and from the drop down box select **bin level** enter **Name** (example Bin Level 1).
- **Alarm** from drop down box enter **Enable** the press **Sensor Setup.**
- In **Field IQ Module** Select the module serial number which matches the bin you are programming.
- **Alarm when Changed to** select **High** in the drop down drop.
- **Alarm** enter (example Bin 1 Low).
- **Add** the next sensor type, eg. Fan RPM.
- From the drop down box select **RPM**.
- **Name** the sensor **RPM.**
- **Alarm** from the drop down box select **Enable**.
- **Warn if Below** enter **1000 rpm**.
- **Warn if Above** enter **5000 rpm**, press sensor setup.
- On the **Field IQ Module** select the serial number of the module from the drop down box which match the bin you are programming.
- On **Pusle per Revolution** enter 1 in field. Press Ok.
- **Add** sensor for Fan Pressure from drop down box select **Air Press**
- Name the sensor **Fan Pressure.**
- **Alarm** from the drop down box select **Enable.**
- **Warn if below** enter **1Kpa.**
- **Warn if Above** enter **5 Kpa.**
- Press **Sensor Setup** button.
- **Field IQ Module** select the serial number of the module from the drop down box which match the bin you are programming.
- **Input Location** select **Pressure 1, p**ress OK.
- A screen will come up to ask you if **setup is complete,** press **Another** and programme all remaining bins by adding **only** the bin level sensor. Note to allocate the correct Module serial to what bin you are programming.
- If the system has a liquid bin on it go to **Drive setup.**
- Press the **feedback setup** tab.
- **Flow Meter Type** select **Other** from the drop drop box.
- **Flowmeter Calibration** enter **100** in the field.
- **Min Flow** enter 1 in the field. Press Ok



- To add a **liquid Pressure Sensor.**
- From **Sensor Type** select **Liquid Pressure** from drop down box.
- **Name** enter **Liquid Pressure.**
- **Alarm** select **Enable** from the drop box. **Press setup** button.
- **On Field IQ Module** select the correct Module serial number which matches the liquid bin you are programming.
- On **Input Location** select **Press 1** from drop down box. Press Ok.
- From **Field IQ setup** screen Select **Material Assign**, press Ok.



- On the **Material assignment** screen allocate each bin with a material that you are using in that particular bin. For each material, assign a **Calibration Constant** (see CFR values in the **Trimble (FACTORY) CONTROLLER SETTINGS.**

<u>Calibrating</u>

- The first calibrating you must perform is setting the Low and High rpm limits of the meter. On the **Configuration** screen select **Field IQ** and then press the **Calibrate** button.

- On the **Field IQ Calibration** screen select **Drive Calibration** on bin 1, press next. Make sure the Hydraulics is running, on the monitor switch on the run switch. On this screen there is a progress bar showing the calibration, when it is complete keep on pressing the next button until you arrive at the accept button and accept the calibration: note you must perform this calibration on all drives.

Material Calibration

- On the **Material assignment** screen press the **Calibrate** button.
- On the next screen press **Calibrate** again.
- **Granular Calibration** screen enter in the field **Amount of Material to be Dispensed** (Example 20 Kg).
- **Target rate** enter (Example 80 kg/ha).
- **Target Speed** enter 8 kph then press **Start** button. Note you must have the hydraulics on and a bucket under the meter to catch the seed you dispense.
- Switch on the run switch on the monitor.
- On this screen there is a progress bar showing the calibration.
- When calibration is complete turn off the run switch and weigh the contents of the bucket.
- Enter the weight of the bucket on the next screen and accept that calibration. This calibration test will adjust your Cal. Factor. Material Calibration must be performed at least twice to make sure the Cal. Factor is accurate.

Liquid Setup

- If you are setting a bin for liquid go to **Drive Setup**.
- On the **Feedback Setup** screen select **Other** from the drop down box for **Flow Meter Type.**
- **Flow Meter Calibration** select **100 pul/L.**
- **Min Flow** select **1 L/min.** Press Ok
- Go to the **Add Sensor** screen and on the bin which has Liquid you must setup a liquid pressure sensor.

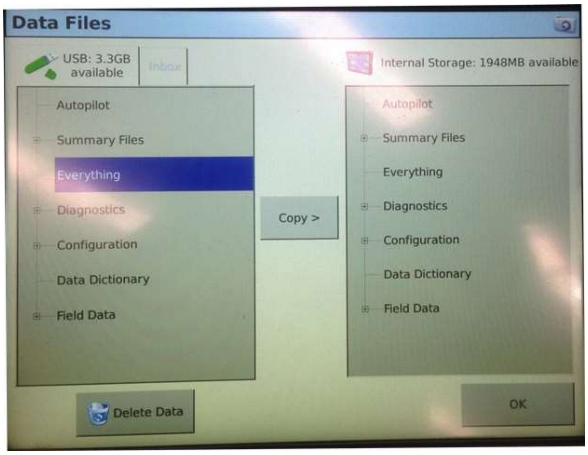
- On **Sensor Type** in the drop down box select **Liquid Pressure.**
- **Name** the sensor **Liquid Pressure**.
- **Alarm** select **Enable** from the drop down box.
- **Warn if Below** select **5 kpa.**
- **Warn if Above** select **30 kpa.** Press **Sensor Setup** button.
- On **Field IQ Module** select from the drop down box the module serial number which matches the liquid bin you are programming.
- On **Input Location** select **Presure 1** from the drop down box. Press Ok.

  - When calibrating liquid go through the same procedure as when you are calibrating granular bins.

Transfering information from thumb drive to Monitor

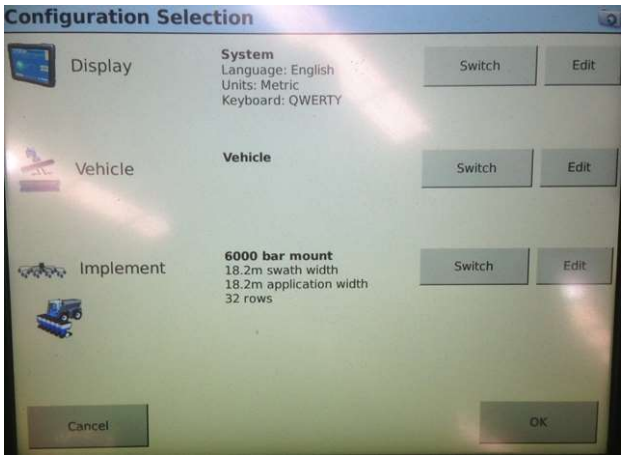
When the dealer receives the Multistream bin you will need to transfer information from the thumb drive (which will be supplied by Ausplow) to the Trimble Monitor. This will help with the partial setup of the bin.

- With the monitor on start-up screen,
- Insert thumb drive into back of monitor,
- Press the Data Files button.



- On this screen Highlight **Everything** on the left hand side.
- Then press **Copy** this will transfer all the information from the thumb drive to the Monitor.
- When copying is complete press **OK**
- Back on startup screen press the **tractor** button.
- On the configuration screen press **Switch** button on Implement.

- On this screen scroll through on the left hand side and look for the bin size and the serial number of the bin your working on, then highlight it then press **OK.**



TRIMBLE (FACTORY) CONTROLLER SETTINGS

SEED ROLLER STARTING SETTINGS

Meter Speed Calibration 30

SMALL SEED ROLLER

Meter Speed Calibration 30

FERT ROLLER

Meter Speed Calibration 30

LIQUID

Speed 100 Pulses/L

PRODUCT DENSITIES

Wheat	820 kg/m^3	UREA	767 kg/m^3
Barley	630 kg/m^3	DAP	928 kg/m^3
Canola	690 kg/m^3	MAP	950 kg/m^3
Lupin	770 kg/m^3		
Millet	630 kg/m^3		

CFR STARTING VALVES

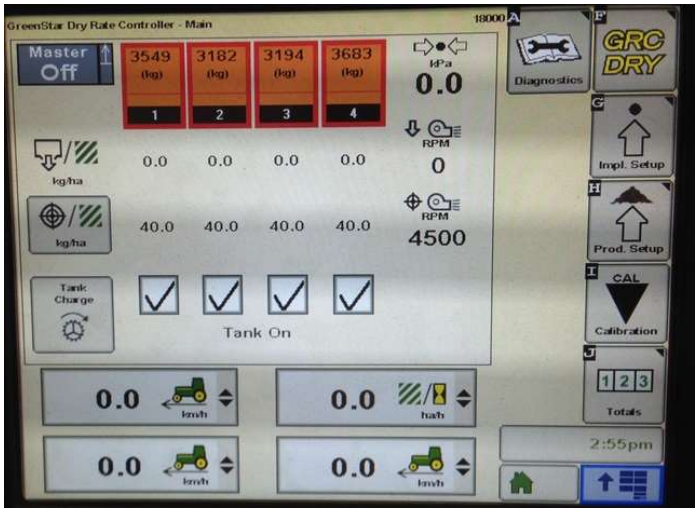
Wheat	0.6
Canola	0.025
UREA	0.7
Liquid	100 Pulses/L

7.6 MONITOR SETUP – JOHN DEERE

These are basic instructions for setting up the John Deere 2630 monitor system, refer to the manufactures hand book for detailed instructions.

Once on main screen press **Implement Setup**, on this screen you can input default values which will get the system up and running. Press:

- **Tank 1** system on this screen.
- **Meter control valve type -** set to PWM Close
- **Meter Speed Sensor Calibration -** number will varying according to the type of seed or fertilizer you are using example: Wheat & Barley 13, Canola 103, and Fertilizer 30. Please refer to default settings chart for other values.



- **Tank Capacity -** set the capacity in litres on each bin, End bins are 4700L, Mid bins are 4400L and small seed are 1500L.
- **Tank Level Switch Installed -** tick check box. When this is complete accept that setup.

You must go through that setup on all remaining bins. Press PWM settings on this screen then set:

- **Control Valve calibration** to 1211,
- **Coil Frequency** 122,
- **High** 120,
- **Low** 0, and accept those settings.

Fan speed sensor installed. Select **Fan setup,** tick box and **Fan Speed sensor Calibration** is 1.

On Implement screen, tick box on **Pressure Sensor. W**hen completed on Implement setup, go back to main screen and press **Product Setup**. On this screen enter:

- Product Name,
- Product Type, and
- Product Density, refer to default settings chart for this information.

When those values are completed press **Product Tank Setup.** Press **Tank 1 Setup,** enter the product name you're using for that particular bin and enter the CFR for that product. Refer to the default setting chart for that information. Tick box on **Assign product to that fan1**, then accept those values. Go through all bins until each bin has a Seed or Fertilizer allocated to it.

Press **Product Summary** and double check the information you have entered is correct, refer to default setting chart.

Calibration

Back to main screen and press Calibration button.

On this screen press **Other** tab and on the drop down box select **Calibrate PWM Limits**. You must do this calibration on all bins.

Switch on Master switch then press start. Press the **Plus** button until the meter start to turn. Now start pressing the **Minus** button until the meter is running as slow as possible at an even RPM.
Once this is achieved press the **Set Low Limits** button. Start pressing the **Plus** button again until maximum RPM is reached, then press **Set High Limits** button.

When PWM Calibration is complete on all bins press the **CFR** Tab. Select the bin you want to calibrate and Press **Calibrate CFR.** On this screen enter:

- **Test speed** 8,
- **Test Rate** (example 40 kg per hectare)
- **Desired Rate** (example 20 kg).

You must have a bucket to catch the product under the meter. Press to next screen, switch on master switch and press start. When Calibration is complete weigh the contents of the bucket and enter the **Actual amount Applied** in kgs. When complete accept those values. This test must be done at least twice to check you have the correct CFR values.

John Deere Liquid Setup

Main screen select Setup.

On **Implement** screen select Liquid Fertiliser Tool and enter width of Bar. Press next tab **System**. On this screen select:

- **Section Valve Type** 3 Wire,
- **Control Valve Type** PWM Close,
- **Tank Capacity** (example 4700L),
- **Flow meter calibration** 100.

Tick box on **Pressure Sensor 1.** Press **PWM Setup and** select:

- **Control Valve Calibration** enter 6011,
- **Coil Frequency** 122,
- **High Limit** 120, **Low Limit** 0.

When these values are entered select **Calibration PWM Limits**. This procedure is the same as when you calibrate PWM limits on granular bins. When complete go back to **System** screen and select **Calibrate Flow meter**. If using the Cal. Station, on Calibration screen enter:

- **Number of Nozzles that will Spray** select 1,
- **Test Speed** 8,
- **Rate** (example 60 L /Ha),
- **Volume to Dispense per Nozzle in mls.** (eg 15000 mls).

  Go to next screen Switch on master and press start when this is complete, weigh the product which was dispensed and enter that amount into the box provided.

JOHN DEERE (Default) CONTROLLER SETTINGS

SEED ROLLER STARTING SETTINGS

Control Valve	1211
Speed	13

SMALL SEED ROLLER

PW M Setting Control Valve	5511
Meter Speed Calibration	103

FERT ROLLER

Control Valve	1211
Speed	30

LIQUID

Control Valve	6011
Speed	100

METER SPEED CALIBRATION

	Motor		Meter		
Large Seed	38	→	17	=	13
Small Seed	13	→	45	=	104
	17	→	38	=	68
	20	→	20	=	30

PRODUCT DENSITIES

Wheat	820 kg/m^3	UREA	767 kg/m^3
Barley	630 kg/m^3	DAP	928 kg/m^3
Canola	690 kg/m^3	MAP	950 kg/m^3
Lupin	770 kg/m^3		
Millet	630 kg/m^3		

CFR STARTING VALVES

Wheat	501
Canola	99
UREA	891
Liquid	1187

PRESSUE SENSOR

Voltage based
125 mv/Pa when fan is off

30 pulse per revolution
Gear ratio of seeder gears.
Multiply by 30

7.7 MULTISTREAM OPERATION – TOPCON

7.7.1 Fill a Bin

Each bin has to be electronically filled each time the bins are physically filled. The following outlines how to fill bins electronically:

- Ensure bins are filled,
- Ensure master switch is ‘OFF’,
- Select ‘BIN 1 ICON’,
- Select ‘FILL 1 BUTTON’, and
- Repeat for remaining bins.

7.7.2 Reset Current Sub-Area Number

- Select the ‘SUB-AREA’ or ‘WEIGHT’ readout. The ‘AREA’ window will appear,
- Select the ‘RESET AREA NUMBER’ button. A confirmation window will appear, and
- Select the ‘YES’ button. This will reset all area and weight values for the ‘AREA NUMBER’.

7.7.3 Reset the Total Area

- Select ‘SUB-AREA’ or ‘WEIGHT’ readout. ‘AREA’ will appear,
- Select ‘RESET’ button to reset the area for ‘TOTAL 1’, and
- Repeat for ‘TOTAL 2’ etc.

7.7.4 Select Primary or Secondary Rate, Increase / Decrease Buttons

- The Primary button (upper button between increase and decrease arrows) displays the primary rate. If pressed, this rate will appear in the live rate (above increase arrow) display;
- The Secondary button (lower button between increase and decrease arrows) displays the secondary rate. If pressed, this rate will appear in the live rate (above increase arrow) display;
- Select the ‘INCREASE’ button to increase the sowing rate by the increment set in the ‘BIN SETUP’ screen;
- The following combination of colours apply to the ‘LIVE RATE’ buttons:
    - Grey - The bin is not applying product,
    - Orange – The bin is applying the Primary rate correctly,
    - Flashing Orange / White:
        - Orange – Selected rate, and
        - White – Applied rate.
    - If Flashing Orange and White, rates are the same and the bin is applying a correct ‘ALTERNATE RATE’. If this occurs,

after a period of time, an alarm will appear ‘ALTERNATE RATE IN USE’.

7.7.5 Switching a Bin ‘ON’ or ‘OFF’

- Select the Bin Switch ‘ON’/’OFF’ icon (looks like a black propeller),
- If the bin is ‘ON’, the propeller will be highlighted and turning,
- If the bin is ‘OFF’, the propeller will be greyed out and stopped,
- If the master switch is ‘OFF’ but the bin switch is ‘ON’, the propeller will be highlighted but not turning.

7.7.6 Using the Preload Function

A characteristic of all air seeders is that there is a small delay from when you first drive off, to the seed and granular fertiliser or liquid fertiliser getting from the tanks to the ground. This is generally about 4 seconds but will depend on the exact hose configuration and the fan speed. This delay can be overcome using the ‘Preload’ function.
To engage the ‘PRELOAD’ function, follow the steps below:

- Engage the Multistream fan,
- Switch required bins and Switch Master Switch ‘ON’,
- The speed readout will be displayed on the Manual Speed display,
- The propeller icons on the bins switched ‘ON’ will start to turn and the metering wheels on the bins will also start to physically turn,
- The operator must drive off within the specified time set in the ‘PRELOAD TIME’ otherwise the ‘SPEED READOUT’ will grey out and the bin metering wheels will stop turning, and
- If the ‘PRELOAD TIME’ has been exceeded; to reset, switch the Master Switch to ‘OFF’ before turning ‘ON’ to resume seeding.

7.7.7 Begin Seeding

To begin seeding, ensure the following actions have been carried out:

- Select a ‘SUB-AREA’ number,
- Select the ‘PRODUCTS’ for each ‘SUB-AREA’,
- Electronically ‘FILL’ any bins if required,
- Ensure the bins that are required are switched ‘ON’. The corresponding bins will be highlighted in colour,
- Select the ‘PRIMARY RATE’ or ‘SECONDARY RATE’ for each bin,
- Engage the fan. The fan icon will turn ‘GREEN’ and the fan Rpm and pressure readouts will be displayed,

- Select ‘MASTER SWITCH’ selected Bin icons will start turning,
- Drive off within the ‘PRELOAD TIME’.

7.7.8 Fan Speed

Multistream bins are fitted with a high efficiency fan limited to a maximum of 4000 Rpm during operation, see Section 8 which outlines suggested fan speeds. Fan speed is shown on the monitor and the monitor incorporates an alarm for low and high speed. The fan alarms can be fine-tuned after seeding has commenced and the readings have ‘settled down’ to indicate possible system problems / failures, eg:

Reducing fan revs could indicate:
- Blocked Multistream pressure filter,
- Tractor hydraulics problem, and / or
- Air hoses have become disconnected.

Increasing fan revs could indicate:
- Blocked hoses in the air kit,
- Blocked heat exchanger core, and / or
- Increased hydraulic flow from tractor.

7.7.9 Air Pressure

The air system of the Multistream has a low operating pressure of 3 to 10kpa. The air pressure alarms can be fine-tuned once seeding has commenced to indicate potential problems. See Table 7.3.1 for suggested air pressure alarm settings. The air pressure alarms should be fine-tuned after seeding has commenced and the readings have ‘settled down’.

Reducing air pressure could indicate:
- Reducing fan revs,
- Product has ceased to be metered into the airstream (bridging),
- Blocked heat exchanger core, and / or
- Some air hoses have become disconnected.

Increasing air pressure could indicate:
- Blocked hoses in the air kit,
- Increased fan revs, and / or
- Increased product delivery rate.

7.8 MULTISTREAM OPERATION – Other Monitors

Refer to manufacturers handbook for detailed instructions.

8.0 OPERATING INSTRUCTIONS

8.1 SAFETY WARNINGS

WARNING!

- Do not stand or walk on top of the Multistream tanks.
- Do not enter the Multistream tanks without first taking the proper precautions. Always wear a mask and protective clothing. Ensure the lid is secured in the open position and that there is a suitable exit out of the tank. In addition, under no circumstances should anyone enter a tank without the assistance of a safety person who remains outside the tank, on the platform, to ensure a safe exit.
- Do not ride on the Multistream whilst moving.

CAUTION!

Do not operate the Multistream with the rear folding ladder in the down position. This is critical for the Tow-between models as it is possible that the ladder can hit the implement drawbar when turning.

8.2 MULTISTREAM TANKS

8.2.1 Multistream Tank Sizes

The Multistream uses a pressurised metering system and is supplied with airtight stainless-steel lids mounted on polyethylene tanks in 2000, 3000, 4400, and 4700L capacities.

8.2.2 Tank Volume Variations

Multistream tanks, due to their Poly-ethylene construction, can vary in volume for the following reasons:

- The physical size of the tank due to moulding temperature variations. This can vary by up to 5% of total volume,
- The order in which the tanks are filled,
- How complete the fill is. (i.e. whether the tank lid screens are removed (not recommended) and / or product is pushed fully into the tank corners), and
- Whether the product has been allowed to settle in the tank. This can occur when the tank is topped up instead of being filled from empty.

Total product weight in the tanks, whilst dependant on volume, can also vary due to:

- Product density. This may not always be the same as advertised generic values, and
- The application of seed and fertiliser treatments.

Finally, the total weight of product metered from a tank can also vary due to:

- An incorrect product calibration,
- Air leaks in the tank lids, metering glass window or metering unit,
- Flat batteries in the scales, or
- Incorrect scales calibration.

CAUTION!

- Ensure that the lids are properly sealed after filling, as the Multistream will not seed at the correct rate if air is allowed to escape from the lids or metering unit.
- It is strongly recommended that scales are checked using a known weight (i.e. a 10kg lead weight) at least once a season and preferably each time a new product is sown.
- To allow for tank volume and fill percentage variations, it is assumed that an average tank fill is 95% of the total advertised volume (working volume).

8.2.3 Working Volume vs. Advertised Volume

The 95% allowance for an effective working volume takes into consideration the following variations:

- The amount of remaining product left in the tank when empty,
- An allowance for the inability to achieve a total fill due to,
    - Tank corners,
    - Tank lids, and
    - Tank lid screens.
- Any variations in the moulding process causing variations in tank volumes.

The following table shows advertised and working volumes for Multistream tanks:

ADVERTISED VOLUME (L)	WORKING VOLUME (L)
2000	1900
3000	2850
4400	4180
4700	4465

Table 8.2.1: Multistream Tank Volumes

8.2.4 Tank Filling

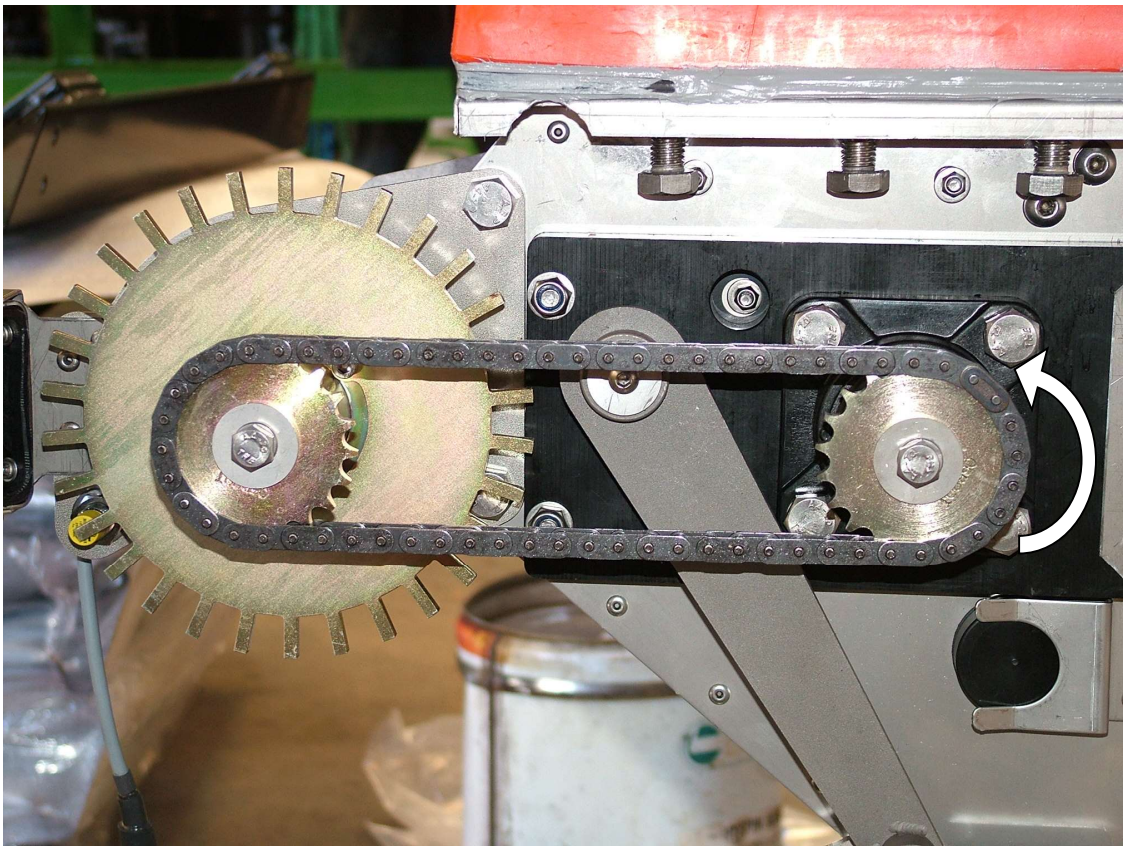
Prior to filling tanks, the metering flap position of each tank must be selected. See Section 8.3.4 for correct settings.

Use the Small seed Funnel when filling the 1500L small seed tanks.

8.3 METERING UNIT

8.3.1 Metering Unit Drive Ratios

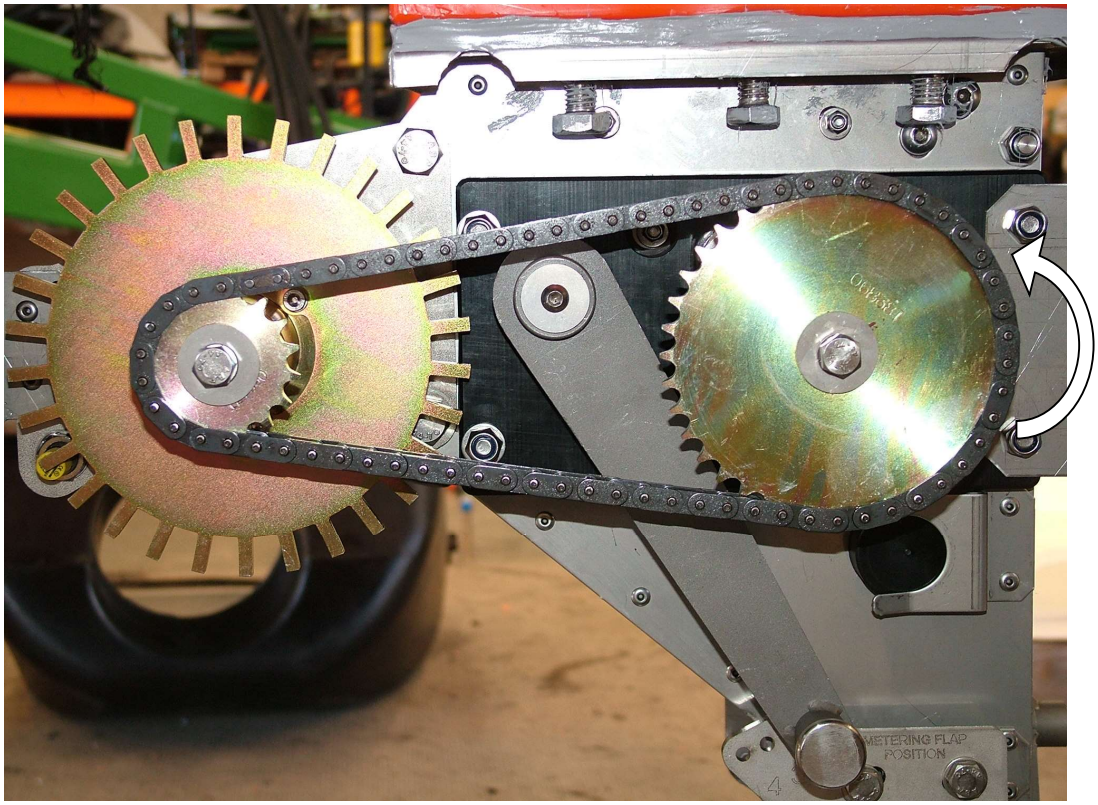
The Multistream metering units are constructed from stainless steel and have a staggered 3-metering wheel arrangement. The fertiliser units have a coarse toothed wheel driven though a 1:1 ratio sprocket and chain arrangement by a 100cc hydraulic motor.



Picture 8.3.1: Fertiliser 1:1 Drive Ratio

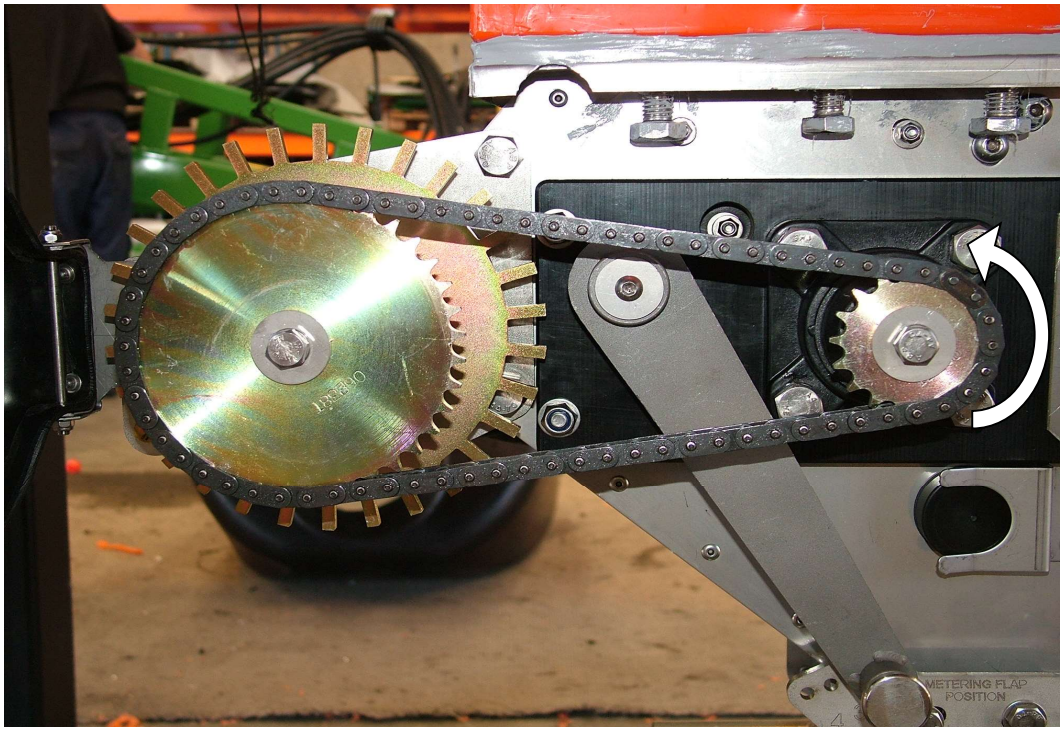
The seed units have a fine toothed wheel and are driven by a 200cc hydraulic motor. The fine toothed wheel and reduction sprocket allows low rates of small seeds to be sown. The seed units have low (5-15kg/ha) and high (more than 15kg/ha) ranges which can vary slightly depending on the seeder bar cut width.

If rates below 5kg/ha are required on machines less than 12m, a ‘slow speed reduction drive’ may be required. (Order Part # 08885). Low range is selected by placing the small sprocket on the motor and the large sprocket on the metering shaft as shown below in Picture 8.3.2.



Picture 8.3.2: Seed Metering Unit – Low Range

High range is selected by swapping the sprockets over, the large on the motor and the small on the metering shaft.



Picture 8.3.3: Seed Metering Unit – High Range

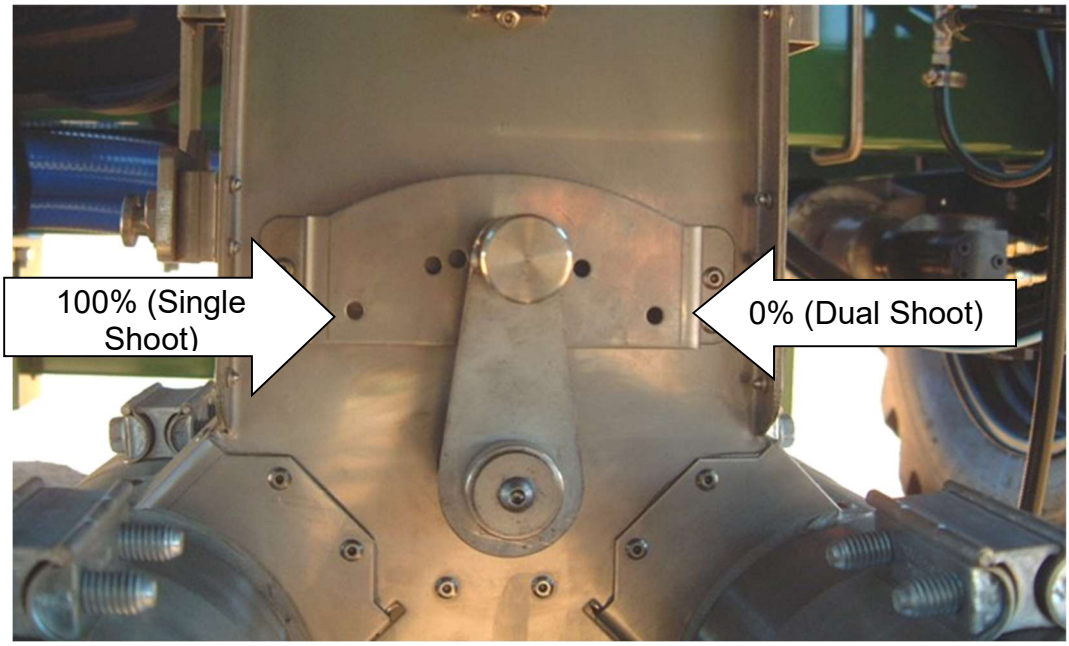
At the factory, it is assumed that the seed is placed in the front bin and fertiliser in the rear bins. Alternatively, 12,000, 18,000lt, 22,000lt and 27,000lt granular Multistreams can use two seed metering units combined at the front, and two combined fertiliser units at the rear. It is not necessary to change the metering wheels or sprockets if this configuration is used, however different calibration parameters to compensate for different metering wheels and drive ratios will be necessary.

If oats are applied at more than 90kg/ha on bars > 12.00m, it will be necessary to either use the fertiliser tank fitted with a course tooth wheel to deliver product or fit a course tooth wheel to the seed bin. (Order Part # 07994).

WARNING!

Please ensure that the tractor supplying the hydraulic oil supply is switched off before making any adjustments to the chain or sprockets as injury could result.

8.3.2 Dividing (Blending) Flap Position



Picture 8.3.4: Dividing (Blending) Flap – Metering Unit

The dividing (blending) flap has a handle and spring pin on the front of the metering unit under the inspection window. This flap is used to switch the product delivery from one product delivery tube to the other.

This allows blending of fertilisers by moving the flap and engaging the holes which give the ratios 0%, 25%, 33%, 50%, 66%, 75% and 100%.

The dividing flap is also used to divert product out of the left door during calibration and right door during cleanout. Ensure the flap is reset to the correct position when seeding is resumed. Often it has proved useful to write with a permanent marker S (Seed) and F (Fertiliser) on the sides of the metering unit that deliver these products to the seeder bar.

8.3.3 Fertiliser Toxicity

The increase in risk of fertiliser toxicity generally increases with the following conditions and / or factors:

LOWER RISK	MEDIUM RISK	HIGHER RISK
Heavy / Clay Soil	Medium Soil	Sandy / Light Soil
Large Seeds (ie: Peas & Lupins)	Cereals (ie: Barley, Wheat & Oats)	Small Seeds (ie: Canola & Clover)
Wet Soil	Dry Soil	Marginal Moisture
Low Fertiliser Rates	Moderate Fertiliser Rates	High Fertiliser Rates
Low Operating Speed	Average Operating Speed	High Operating Speed

Table: 8.3.1: Toxicity Risk Factors

CAUTION!

When a Multistream bin is coupled to a DBS Auseeder seeding bar, extra care should be taken when blending granular fertiliser with certain seed varieties, in particular soil types and moisture conditions. This is due to the inherent accuracy, and therefore concentration of starter granular fertiliser placement with the DBS.

Independent tests have consistently shown that whilst competitive machines placement of seed and starter granular fertiliser can vary by up to 20mm (3/4”), the variation in seed and starter granular fertiliser

depth with the DBS will generally vary by no more than 6mm (1/4”). This in turn has the effect of concentrating starter granular fertiliser placed with the seed.

CAUTION!

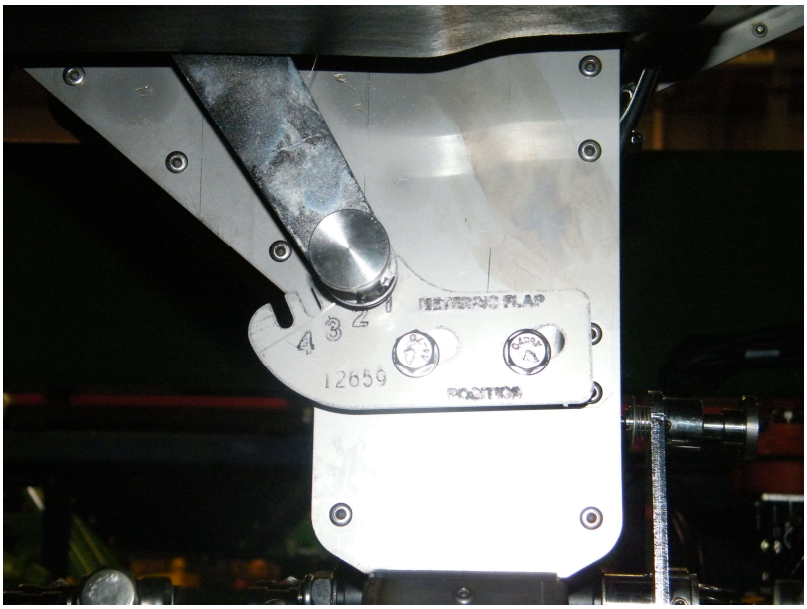
Always seek professional agronomic advice regarding your specific rates and placement of granular and liquid fertiliser. Your local Agronomist will be in the best position to assess the factors listed below so you can choose the most suitable machine settings for your individual circumstances.

- seeding conditions,
- seed types,
- seed and fertiliser rates, and
- Placement and suitable fertiliser types.

8.3.4 Metering Flap Position

The metering flap is a device which allows the clearance of the flap under the metering wheels to be adjusted to suit seeds of various sizes. It is located below the chain guard.

When this flap is lowered fully, the Multistream tank can be emptied. The metering flap is locked in place by pulling the spring pin and locating it in the desired hole position from 1 to 4.

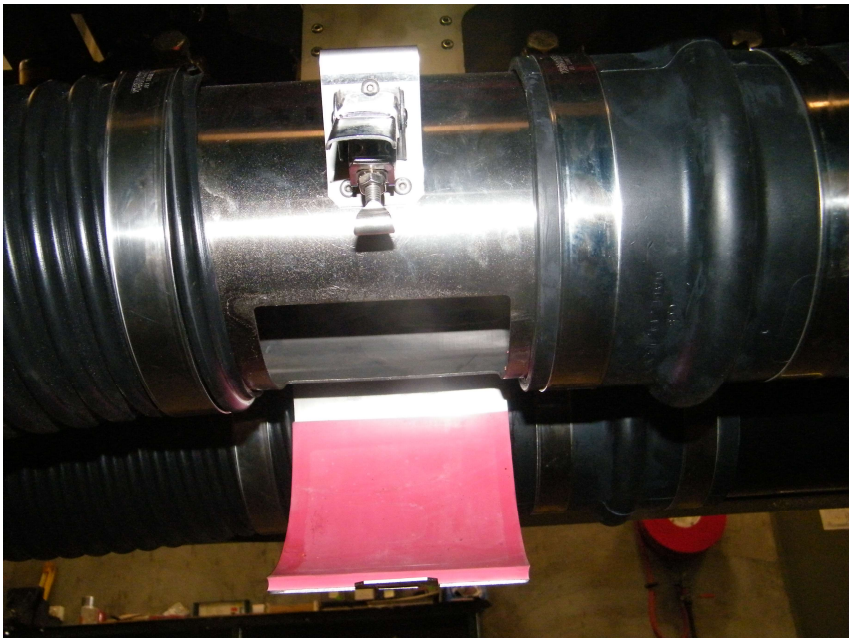


Picture 8.3.5: Metering Flap

Metering Flap Position	Product Seed Type
1	Small (Canola, Cadiz, Clover, Mustard)
2	Medium (Cereals, Wheat, Barley, Urea, Compound Fertiliser applied < 100kg/ha)
3	Large (Legumes, Oats, Compound Fertilisers applied >100kg/ha)
4	Extra Large (Beans)
Clean out	Remove product from tank

Table: 8.3.2: Metering Flap Position

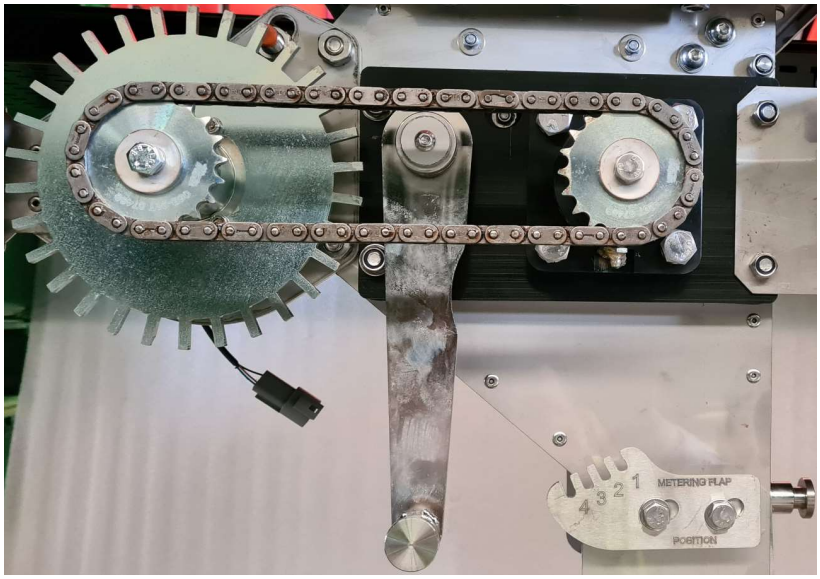
Ensure the cleanout doors on the base of the unit are opened to allow the product to drain from the tank and metering unit.



Picture 8.3.6: Cleanout Doors

8.3.5 Tank Cleanout

The tanks may be emptied completely by dropping the metering flap on the side of the metering unit. Please note that for sticky seed or fertiliser, the metering unit may be run manually to help the product empty faster.



Picture 8.3.7: Granular Tank Cleanout

It is permissible to clean the tanks out with water as long as the doors on the bottom of the metering unit are open and the flap is dropped. However, some mechanical cleaning will probably still be necessary. Please ensure that the metering units and tanks are dry before re-filling with product.
In the event that product bridging occurs, the simplest way to get the product flowing is by tapping the plastic tank with a rubber mallet between the metering unit and the lower edge of the steel support cone.

CAUTION!

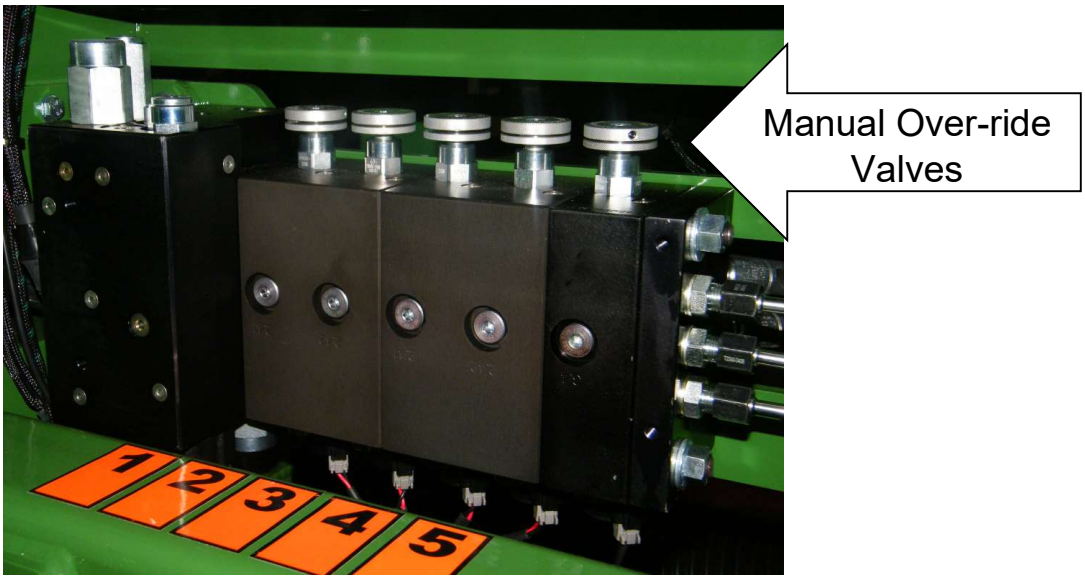
The tank level sensor is not designed to support an individual's weight or undue external forces. Take care when entering the tank.

CAUTION!

Ensure after cleanout, the metering flap is placed in the correct position for the next product prior to filling. If this doesn't occur, the metering flap can be reset using the following procedure:

- Turn the Master Switch to 'OFF',
- Ensure the safety guard on the metering unit drive chain is closed,
- Open the cleanout door(s) below the metering unit,
- Divert the dividing flap (if required) to assist with collecting product,

- Divert the Calibrate / Fan lever to ‘CALIBRATE’,
- Engage the tractor hydraulics,
- Engage the metering unit hydraulic drive by un-screwing the manual over-ride valve until the metering unit turns at approximately 20rpm,
- While the metering unit is slowly turning, lift the metering unit flap handle to the desired gate setting,
- Stop tractor hydraulics,
- Close the clean out door(s),
- Divert the Calibrate / Fan lever to ‘FAN’, and
- Turn the Master Switch to ‘ON’.



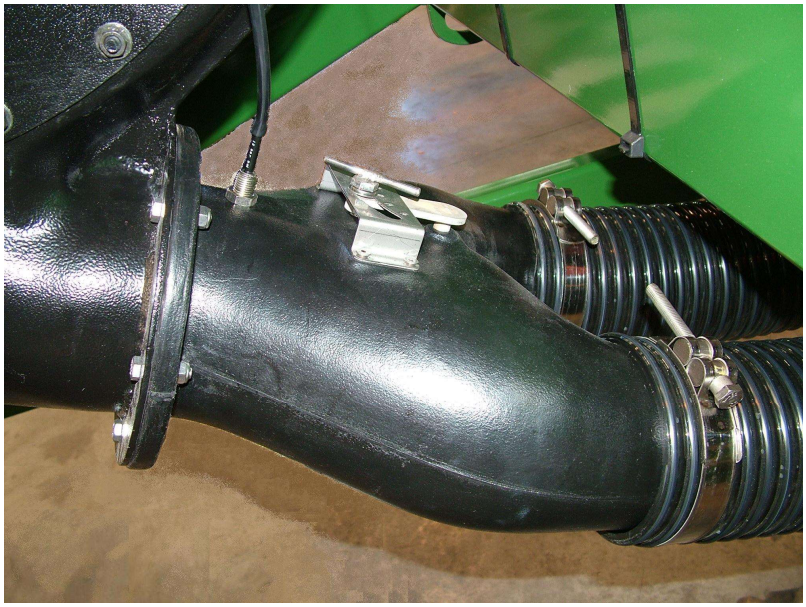
Picture 8.3.8: Manual Over-ride Valves on Hydraulic Block

Please note that foreign matter can damage the metering wheels and flap. If minor damage occurs, the metering flap can be bent slightly which will alter the calibration factors recorded previously, necessitating re-calibration of products.

8.4 AIR DIVIDER

8.4.1 Air Dividing Flap

Multistreams are fitted with an air dividing flap on the fan outlet for adjusting the bias of air flow. The percentage adjustments allow up to 80% bias in air flow when delivering different rates of seed and fertiliser.

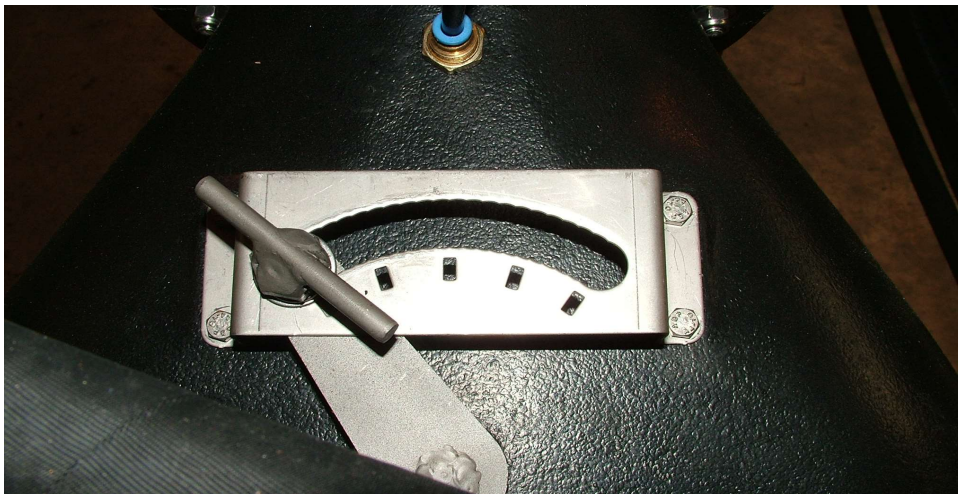


Picture 8.4.1: Air Dividing Flap

Typically, if the ratio of product delivered in the left and right 127mm pipes is less than 2:1, the air dividing flap should not require adjustment. Most air seeder fans exhibit a bias in air flow of approximately 60% out of the pipe on the inlet side of the fan. This can affect the seeding bar air flow. If this occurs, the air dividing flap can be adjusted to compensate.

If one product line blocks and the other is flowing, then the air dividing flap needs to be adjusted so that more air is diverted into the pipe carrying the product that blocks. Do not adjust the air divider flap if the blockages in one product are caused by a build-up of product (typically fertiliser) in the seeder bar air kit.

The following pictures illustrate typical air dividing flap adjustments:



Picture 8.4.2: Air Flap Position 1 - Full Flow to Fertiliser Side (TBT)
- Full Flow to Fertiliser Side (DB)
- Full Flow to Seed Side (TBH)
- Calibration – Engine Drive

Position 1 shown in Picture 8.4.2 would generally be used for:

- Sowing small seeds on Tow-between (TBT) and drawbar mounted (DB) Multistream bins where higher relative rates of fertiliser were applied, (for example Canola),
- For single shoot seeding on Tow-behind (TBH) Multistream bins.

Picture 8.4.3: Air Flap Position 3 – Equal Airflow to Both Air Pipes (All)

Picture 8.4.4: Air Flap Position 5 - Full Flow to Seed Side (TBT & DB)
- Full Flow to Fertiliser Side (TBH)

Position 3 shown in Picture 8.4.3 would be used for most seeding operations for all bin configurations where the total weight of product applied for deep banding is similar to the combined product weight placed down the seed tube.

Position 5 shown in Picture 8.4.4 would generally be used for:

- Sowing small seeds on Tow-behind (TBH) Multistream bins where higher relative rates of fertiliser were applied, for example Canola, and
- For single shoot seeding on Tow-between (TBT) Multistream bins.

Setting the air flap to either position 1 or 5 will not completely block all air flow to the restricted side. The maximum percentage bias will be approximately 80% / 20%.

Ensure the tension screw is tight after adjusting air flow settings otherwise the air flow will force the flap to either position 1 or 5, causing almost immediate hose blocking on the bin and air kit.

Seed (Fine) (Kg)	Seed (Course) (Kg)	Fertiliser (Kg)	Flap Position	
			TBT & DB	TBH
< 10		< 50	1.5	4.5
10 - 50		< 50	2	4
< 10		50 - 150	1	5
	< 50	< 50	2.5	3.5
	50 - 100	50 - 100	2.5	3.5
	50 - 100	100 - 150	2	4
	50 - 100	< 50	3.5	2.5

Table 8.4.1 Suggested Air Flap Positions

8.4.2 Start-up Procedure

On start-up, first thing in the morning, it will be necessary to warm the tractor oil with the hydraulics. This can be done by engaging the fan for 10 minutes at idle.

During this time, heat exchange will start to warm the system air and reduce the moisture build-up in the tanks caused by product ‘sweating’. Ideally, run the fan for 10 minutes, 5 minutes with the lids open (to clear the moisture from the tanks), and 5 minutes with the lids closed (to dispel moisture from the air kit).

CAUTION!
Ensure tank lids are properly sealed before seeding is commenced.

8.4.3 Recommended Fan Speeds

Table 8.4.2 outlines suggested fan speeds to be used during operation. These fan speeds are for seeding rates up to 100kg/ha of seed, 100kg/ha fertiliser and 60kg/ha of nitrogen @ 8 - 9km/h.

Combined seeding rates above 200kg/ha may require an increase in fan speed of between 100 – 200 fan Rpm. Conversely, combined rates below 100kg/ha may allow a reduction in fan speed of 100 – 200 fan Rpm.

CAUTION!

- Excessive fan Rpm may lead to an increase in seed damage and hose wear.
- Insufficient fan Rpm may lead to air seeder hose blockages and uneven seed and fertiliser distribution. Check that fan Rpm doesn't fall below suggested levels when turning or operating bar lift hydraulic circuits.

Number of Outlets	Tow Between	Tow Behind
20 to 28	3000	3200
32 to 36	3100	3300
40 to 42	3200	3400
44 to 48	3300	3500
49 to 54	3400	3600
55 to 60	3500	3700
61 to 64	3600	3800
70	3700	3900

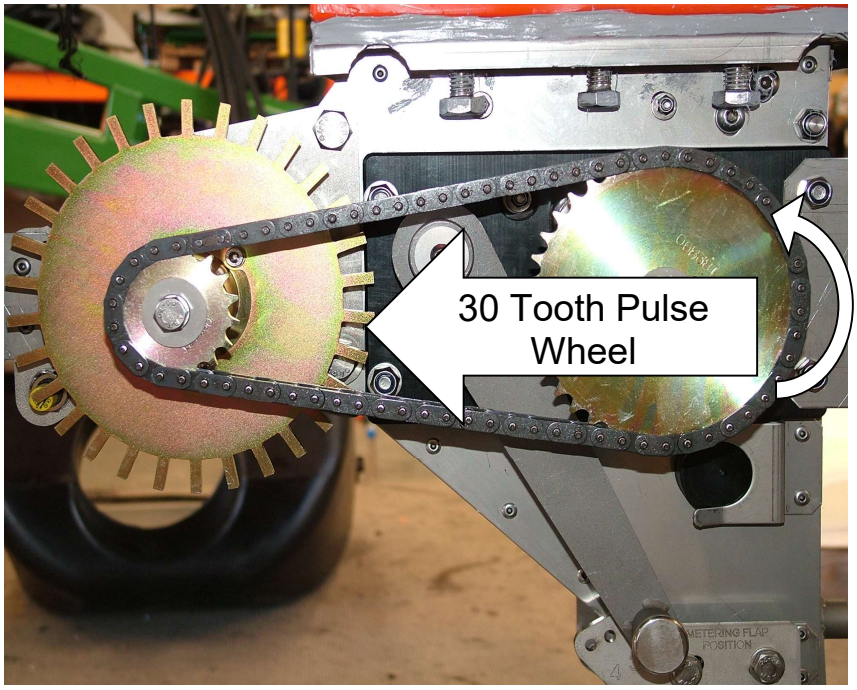
Table: 8.4.2 Recommended Fan Speeds

9.0 CALIBRATION & DENSITY FACTORS

9.1 CALIBRATION

9.1.1 Setting Metering Unit for Calibration

The Multistream meters the correct amount of product to be delivered into the air stream by counting the number of rotations of the hydraulic motor using a 30 toothed pulse wheel.

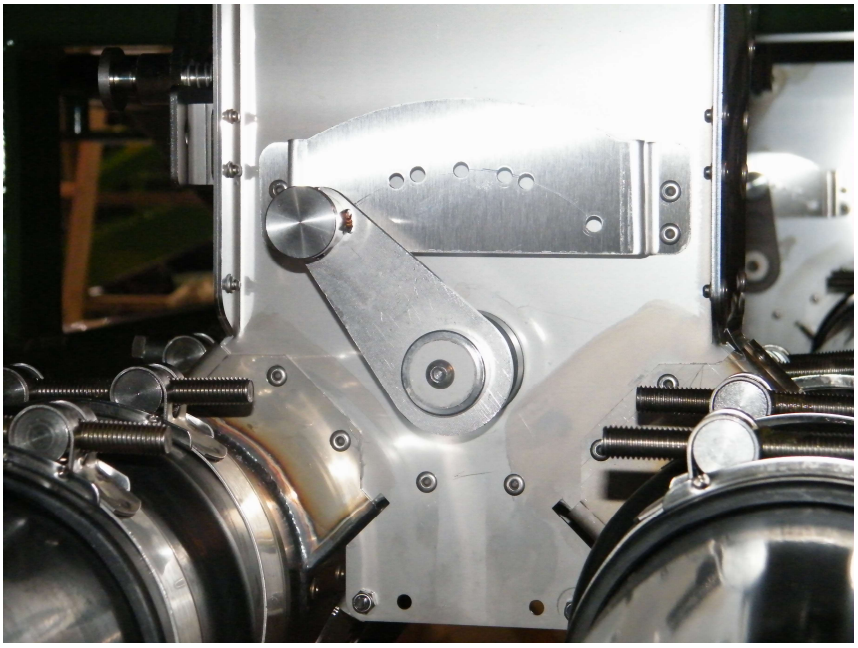


Picture 9.1.1: 30 Tooth Pulse Wheel

To ensure that the metering unit delivers the correct amount of product, it must first be accurately calibrated.

- Adjust the metering flap to the position suitable for the product being metered, see Section 8.

- Fill the bin with product to be calibrated. For each product to be calibrated, switch the dividing flap (See Figure 9.1.2) fully to the left when viewed from the front, so that all the product can be caught from the machines left clean out door. This enables easy access to the Run/Stop switch and the calibration bucket.



Picture 9.1.2: Dividing Flap to the left when viewed from front

- Ensure that the tractor oil supply is on and the 'Calibrate / Fan lever' is set to 'Calibrate' if fitted, see Section 4.4.
- Prime the metering unit by opening the Manual Over-ride Valve (unscrew anti clockwise) on the hydraulic block next to the front metering unit on the left hand chassis rail. (See Picture 8.3.8)

CAUTION!

The Run / Hold switch in the tractor cab must be 'OFF' to prime the metering wheels because the levers cannot be depressed without considerable force. If a lever is depressed without switching off the Run / Hold switch, the valve will need to be reset before it will control electrically. This is simply accomplished by switching the Run / Hold switch to 'OFF' and then back to 'ON'.

9.1.2 Calibration of Products

Refer to the Monitor's Operating Manual.

9.1.3 Calibration Notes – All Products

- Electronic scales must be removed from the box and levelled before use,
- The calibration sample size for small seeds such as Canola and Cadiz should be at least 10 kg,

- Typical calibration sample sizes should be 15 - 20kg,
- If a different variety of the same product is used, then the Multistream should be recalibrated,
- The materials used in the manufacture of the metering unit are robust, but precautions must still be taken to ensure that no large stones or similar objects can enter the metering unit,
- If the metering flap or wheels are accidentally damaged, the metering unit is often able to meter correctly after re-calibration. The design of the metering unit is such that wheel damage rate variances are shown across the whole seeder bar and not one secondary outlet. Obviously, the damage should be rectified as soon as practical,
- Advertised tank volumes are for 100% fill and are approximate only. Due to manufacturing irregularities in poly-ethylene tanks due to shrinkage, owners should not base calibration figures on advertised volumes, and
- Base estimates on a 95% effective working volume.

9.2 DENSITY CORRECTION TABLES

Variations in product density caused by product compaction adversely affect the desired application rates of seed and fertiliser. The following factors contribute to product compaction and therefore changes in applied rates:

- Product type,
- Product condition,
- Relative humidity,
- Metering flap position,
- Paddock slope and undulations (roughness), and
- Individual tank size.

9.2.1 Product Type

The type of applied product has the greatest effect on compaction. Products which cannot be compressed (ie: liquids) will not change density and therefore their calibration factor. Applied liquid rates are very accurate, with variations typically less than 1%.

Products with relatively uniform seed or particle size (ie:. graded canola, urea or good quality compound fertilisers) show some variation of applied rate to calibrated or desired rate in the vicinity of 1-4%.

Products with a large variance in particle size such as whiskered barley, blended fertiliser or super phosphate can exhibit significant variations between calibrated rate and applied rate in the range of 5-7%.

9.2.2 Product Condition

Certified seed or seed that has been meticulously graded will show smaller variations between the calibrated rate and applied rate, as will fertiliser that has been carefully handled and has not been 'powdered' through excessive handling.

9.2.3 Humidity

Changes in relative humidity affect the 'flow-ability' and relative density of products, particularly fertiliser. In periods of high humidity, fertiliser becomes 'stickier', making it less likely to flow. Alternatively, dry fertiliser adopts the flow characteristics similar to sand, increasing applied rate over calibrated rate.

9.2.4 Metering Flap Position

As the flap position is increased to handle higher rates or larger seed sizes, the action of the metering wheel incrementally changes from 'metering a precise volume of product' to 'dragging product across the metering flap'. Because of this, the accuracy of the metering system will decrease slightly as the flap position is increased.

9.2.5 Ground Conditions

Density of products can change due to two external factors, differing particle size and movement. Undulating country and rough paddocks 'shake' the bin, allowing greater product compaction, leading to an increase in product density.

9.2.6 Tank Size

To increase Ausplow tank sizes, the design has led to an increase in dimension, predominately height. As the height of the tank increases, so does the 'head pressure' exerted by smaller particles moving through

the larger particles. This in turn increases the rate of compaction as tank size increases.

9.2.7 Product Density Corrections

Variations in product density can be 'factored out' by one of the two following methods:

Calculation

The following correction values apply to this method:

- Product type:
  - Liquid - All 0
  - Canola, Lucerne 1
  - Lupins, Wheat, Peas 2
  - Barley, Oats 3
  - Compound Fertilisers 4
  - Whiskered Barley 5
  - Blended Fertilisers 6
  - Super Phosphate 7
- Product Condition (Granular products only):
  - Clean, uniform size, no coating / liquids 0
  - Some ad-mixture or coatings, uneven size 1
  - Pickle applied, irregular size 2
- Humidity (Granular fertiliser only):
  - Rain recent or imminent 0
  - Moist ground, no rain expected 1
  - Ground dry, no rain expected 2
- Metering Flap Position (Granular products only):
  - Position 1 0
  - Position 2 1
  - Position 3 2
  - Position 4 3
- Paddock Conditions (Granular products only):
  - Flat, sandy, smooth 0
  - Corrugated, occasional rocks 1
  - Rocky, hilly 2
  - Very hilly, rough 3
- Tank size (Granular products only):
  - 2000lt series 0
  - 3000lt series 1
  - 4400lt series 2

Step 1: Add applicable numerical value in each section to give a correction value.
Step 2: Carry out standard calibration.
Step 3: Change the calibration factor by the correction value.
Consider the following example:

- MAP (Compound fertiliser) 4
- Some product damage (Fine particles evident) 1
- Recent rain 0
- Flap position 3 2
- Flat sand plain 0
- 4700lt fertiliser tank 2
- The total summation is 9
- For Topcon,
  - Initial calibration factor 0.500
  - Add 9% (Add 9% to Cal Factor) 0.045 therefore
  - New Calibration factor 0.545

½ Tank Calibration

Alternatively, fill the tank, conduct an initial calibration and then calibrate again when the product in the tank is ½ full. This ½ tank calibration will provide an average tank calibration that will take into account the variable factors due to changes in product density mentioned above.

9.3 ACRES SOWN PER BOX FULL (GUIDE ONLY)

The following tables outline approximate hectares that an operator should expect to achieve at the seeding rates shown for a given product density. It is assumed that only 95% of the total capacity of the tanks is useable.
A course metering wheel or slow speed reduction drive may be required to achieve some rates. Some rates shown on some machines may not be achievable due to bar widths.

CAUTION!

These charts act as a guide only, and actual product densities should be checked to achieve more accurate results.
If rates are varied on-the-go during seeding, these charts should not be relied on.

PRODUCT DENSITY 0.62

Barley, Millet

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	118	177	259	277
20 Kg/ha	59	88	130	138
30 Kg/ha	39	59	86	92
40 Kg/ha	29	44	65	69
50 Kg/ha	24	35	52	55
60 Kg/ha	20	29	43	46
70 Kg/ha	17	25	37	40
80 Kg/ha	15	22	32	35
90 Kg/ha	13	20	29	31
100 Kg/ha	12	18	26	28
110 Kg/ha	11	16	24	25
120 Kg/ha	10	15	22	23
130 Kg/ha	9	14	20	21
140 Kg/ha	8	13	19	20
150 Kg/ha	8	12	17	18
160 Kg/ha	7	11	16	17
170 Kg/ha	7	10	15	16
180 Kg/ha	7	10	14	15
190 Kg/ha	6	9	14	15
200 Kg/ha	6	9	13	14

PRODUCT DENSITY 0.5

Oats

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	95	143	209	223
20 Kg/ha	48	71	105	112
30 Kg/ha	32	48	70	74
40 Kg/ha	24	36	52	56
50 Kg/ha	19	29	42	45
60 Kg/ha	16	24	35	37
70 Kg/ha	14	20	30	32
80 Kg/ha	12	18	26	28
90 Kg/ha	11	16	23	25
100 Kg/ha	10	14	21	22
110 Kg/ha	9	13	19	20
120 Kg/ha	8	12	17	19
130 Kg/ha	7	11	16	17
140 Kg/ha	7	10	15	16
150 Kg/ha	6	10	14	15
160 Kg/ha	6	9	13	14
170 Kg/ha	6	8	12	13
180 Kg/ha	5	8	12	12
190 Kg/ha	5	8	11	12
200 Kg/ha	5	7	10	11

PRODUCT DENSITY 0.75

Wheat, Chickpeas, Faba Beans, Field Peas, Sorghum, Lupins, Mung Beans, Soybeans, Vetch

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	143	214	314	335
20 Kg/ha	71	107	157	167
30 Kg/ha	48	71	105	112
40 Kg/ha	36	53	78	84
50 Kg/ha	29	43	63	67
60 Kg/ha	24	36	52	56
70 Kg/ha	20	31	45	48
80 Kg/ha	18	27	39	42
90 Kg/ha	16	24	35	37
100 Kg/ha	14	21	31	33
110 Kg/ha	13	19	29	30
120 Kg/ha	12	18	26	28
130 Kg/ha	11	16	24	26
140 Kg/ha	10	15	22	24
150 Kg/ha	10	14	21	22
160 Kg/ha	9	13	20	21
170 Kg/ha	8	13	18	20
180 Kg/ha	8	12	17	19
190 Kg/ha	8	11	17	18
200 Kg/ha	7	11	16	17

PRODUCT DENSITY 0.7

Canola, Canary Seed, Linseed, Maize, Urea

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	133	200	293	313
20 Kg/ha	67	100	146	156
30 Kg/ha	44	67	98	104
40 Kg/ha	33	50	73	78
50 Kg/ha	27	40	59	63
60 Kg/ha	22	33	49	52
70 Kg/ha	19	29	42	45
80 Kg/ha	17	25	37	39
90 Kg/ha	15	22	33	35
100 Kg/ha	13	20	29	31
110 Kg/ha	12	18	27	28
120 Kg/ha	11	17	24	26
130 Kg/ha	10	15	23	24
140 Kg/ha	10	14	21	22
150 Kg/ha	9	13	20	21
160 Kg/ha	8	12	18	20
170 Kg/ha	8	12	17	18
180 Kg/ha	7	11	16	17
190 Kg/ha	7	11	15	16
200 Kg/ha	7	10	15	16

PRODUCT DENSITY 1.00

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	190	285	418	447
20 Kg/ha	95	143	209	223
30 Kg/ha	63	95	139	149
40 Kg/ha	48	71	105	112
50 Kg/ha	38	57	84	89
60 Kg/ha	32	48	70	74
70 Kg/ha	27	41	60	64
80 Kg/ha	24	36	52	56
90 Kg/ha	21	32	46	50
100 Kg/ha	19	29	42	45
110 Kg/ha	17	26	38	41
120 Kg/ha	16	24	35	37
130 Kg/ha	15	22	32	34
140 Kg/ha	14	20	30	32
150 Kg/ha	13	19	28	30
160 Kg/ha	12	18	26	28
170 Kg/ha	11	17	25	26
180 Kg/ha	11	16	23	25
190 Kg/ha	10	15	22	24
200 Kg/ha	10	14	21	22

PRODUCT DENSITY 0.95

MAP, DAP

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	181	271	397	424
20 Kg/ha	90	135	199	212
30 Kg/ha	60	90	132	141
40 Kg/ha	45	68	99	106
50 Kg/ha	36	54	79	85
60 Kg/ha	30	45	66	71
70 Kg/ha	26	39	57	61
80 Kg/ha	23	34	50	53
90 Kg/ha	20	30	44	47
100 Kg/ha	18	27	40	42
110 Kg/ha	16	25	36	39
120 Kg/ha	15	23	33	35
130 Kg/ha	14	21	31	33
140 Kg/ha	13	19	28	30
150 Kg/ha	12	18	26	28
160 Kg/ha	11	17	25	27
170 Kg/ha	11	16	23	25
180 Kg/ha	10	15	22	24
190 Kg/ha	10	14	21	22
200 Kg/ha	9	14	20	21

PRODUCT DENSITY 1.32 (LIQUID)

Flexi-N or UAN

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Lt/ha	190	285	418	447
20 Lt/ha	95	143	209	223
30 Lt/ha	63	95	139	149
40 Lt/ha	48	71	105	112
50 Lt/ha	38	57	84	89
60 Lt/ha	32	48	70	74
70 Lt/ha	27	41	60	64
80 Lt/ha	24	36	52	56
90 Lt/ha	21	32	46	50
100 Lt/ha	19	29	42	45
110 Lt/ha	17	26	38	41
120 Lt/ha	16	24	35	37
130 Lt/ha	15	22	32	34
140 Lt/ha	14	20	30	32
150 Lt/ha	13	19	28	30
160 Lt/ha	12	18	26	28
170 Lt/ha	11	17	25	26
180 Lt/ha	11	16	23	25
190 Lt/ha	10	15	22	24
200 Lt/ha	10	14	21	22

PRODUCT DENSITY 1.08

Super Phosphate

Tank Size	2000	3000	4400	4700
Rate Sown	Hectares Per Tank Full			
10 Kg/ha	205	308	451	482
20 Kg/ha	103	154	226	241
30 Kg/ha	68	103	150	161
40 Kg/ha	51	77	113	121
50 Kg/ha	41	62	90	96
60 Kg/ha	34	51	75	80
70 Kg/ha	29	44	64	69
80 Kg/ha	26	38	56	60
90 Kg/ha	23	34	50	54
100 Kg/ha	21	31	45	48
110 Kg/ha	19	28	41	44
120 Kg/ha	17	26	38	40
130 Kg/ha	16	24	35	37
140 Kg/ha	15	22	32	34
150 Kg/ha	14	21	30	32
160 Kg/ha	13	19	28	30
170 Kg/ha	12	18	27	28
180 Kg/ha	11	17	25	27
190 Kg/ha	11	16	24	25
200 Kg/ha	10	15	23	24

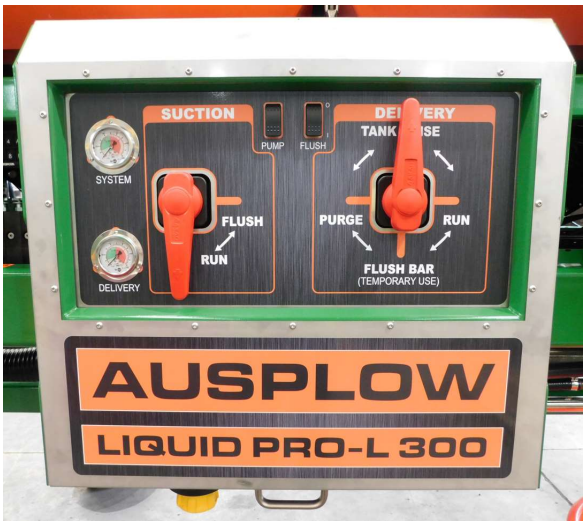
10.0 LIQUID SYSTEMS

10.1 LIQUID SYSTEM FEATURES

The Ausplow precision liquid delivery system uses a constant speed hydraulically driven centrifugal pump. The flow rate delivered to the bar is measured with a flow meter and the control valve maintains the required application rate of product, see Picture 10.1.1.

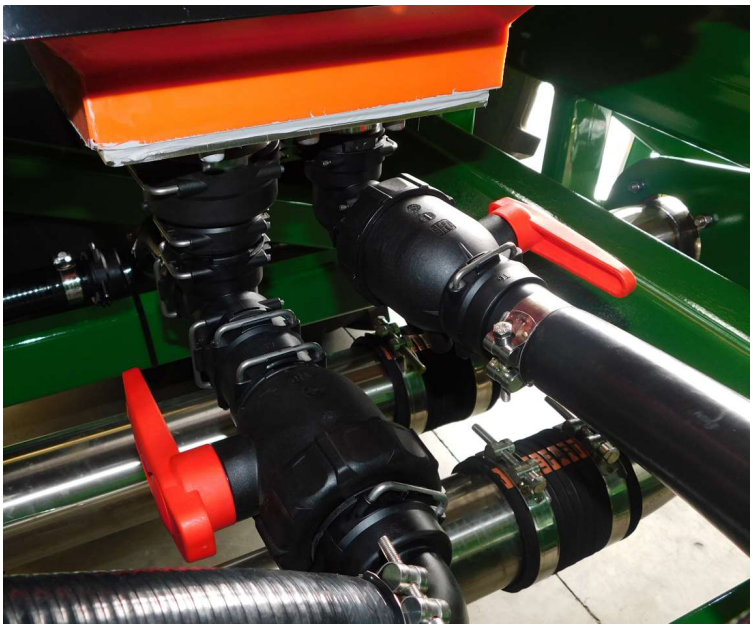
- The fill / drain line uses a 3” diameter male cam lock coupling,
- The flush system from an external tank uses a 1½” diameter male cam lock coupling,
- Liquid Control Panel with large capacity suction filter (2”) with 50mesh stainless steel filter element.
- HYPRO pump Max Press 6.4 Bar with Max flow rate 435L/min,
- Over pressure protection of pump set to 4.5 Bar,
- Calibration is automatically controlled at 1200 pulses/litre,
- Two spray nozzles inside the tank for tank flushing,
- Constant agitation applied to tanks when system is not delivering product,
- Simple bar manifold design for improved low-pressure operation,
- Products such as Fungicides and Trace Elements can be mixed and delivered using optional dosing pumps (Dosatrons).

Picture 10.1.1:
Liquid Control Panel



10.2 INITIAL SETUP

- When filling MS tanks, a high capacity transfer filter should be used,
- Open both shut off valves at the bottom of the tank for all operations of the liquid system. These valves only need to be closed if any repairs are undertaken on the Liquid Pro-L 300, see Picture 10.2.1.



Picture 10.2.1: Tank Isolation Valves – Liquid Tank

- Do not adjust the system pressure relief valve above 4.5 Bar otherwise the pump could be damaged due to surging. Valve is adjusted by removing the red plastic lock clip and screw in to increase and unscrew to reduce pressure, see Picture 10.2.2. Check correct pressure using the System Pressure Gauge on the Control Panel.

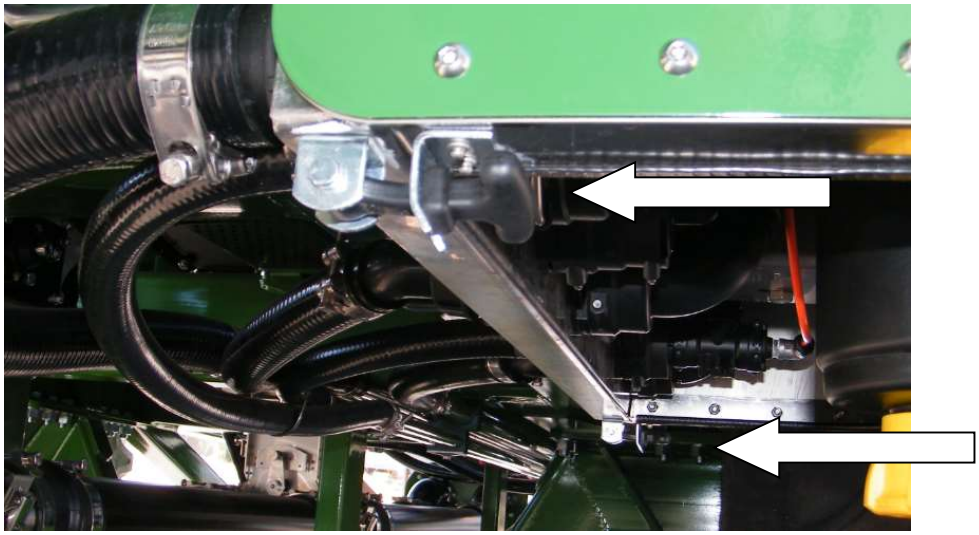
Picture 10.2.2: System Pressure Relief Valve

- Flushing and checking the system can be achieved by operating the manual valve on the Multistream hydraulic valve block.
- Any operations of the Liquid Pro-L 300, the tractor must be running and hydraulics to the MCV must be engaged.

- **Pump operation with Topcon system –** With tractor running and MCV engaged, button A on the keypad in the cab will turn the pump on. There is also a switch located on the control panel of the Liquid Pro-L 300 that can be used to switch the pump off and back on again as needed.

- **Pump operation with John Deere and Trimble systems –** With tractor running and MCV engaged, the pump can be turned on at either the tractor cab or the Liquid Pro-L 300 via the pump switches.

- When access is required to the Liquid Control Panel components, the Stainless steel lid can be lifted by first releasing the two rubber tie straps on the bottom of the Panel and the lid can then be raised, see Picture 10.2.3. The lid is hinged and supported by two over centered struts.



Picture 10.2.3: Control Panel Lid Hold Down Straps

10.3 FILLING & DRAINING OF TANKS

- Connect transfer pump hose to the 3” male cam lock fitting on the fill connection located on the right side of the Multistream,

- Open the Fill/Drain valve and start the transfer pump. Please note the Multistream is not fitted with a one way valve and liquid can siphon back into the transfer tank,

- Check the tank level using the sight tube on the RHS of the Bin,

Picture 10.3.1: Tank Fill/Drain Connection – Closed Position

- If the tank is over-filled, the liquid will flow onto the ground from the top tank through the over flow hose. **If this occurs, open and close the lid to ensure the liquid does not siphon onto the ground**,
- Close the 3” valve and replace the cam lock cover, and
- The tank can be drained from the same fitting back into the transfer tank.

Picture 10.3.2: Tank Level Sight Tube

10.4 SYSTEM PRIMING

- **<u>The pump must be primed before use.</u>**
- **<u>Both Suction circuits must be primed before use.</u>**

RUN CIRCUIT PRIMING

- Open the Liquid Outlet valve to the bar, see Picture 10.4.2. Ensure that the Suction valve is set to RUN and Delivery valve is set to FLUSH BAR, this will prime the pump on run circuit only.

The Flush circuit will also need priming. This can be done once the Run circuit is primed.

Picture 10.4.1: Run Circuit Priming

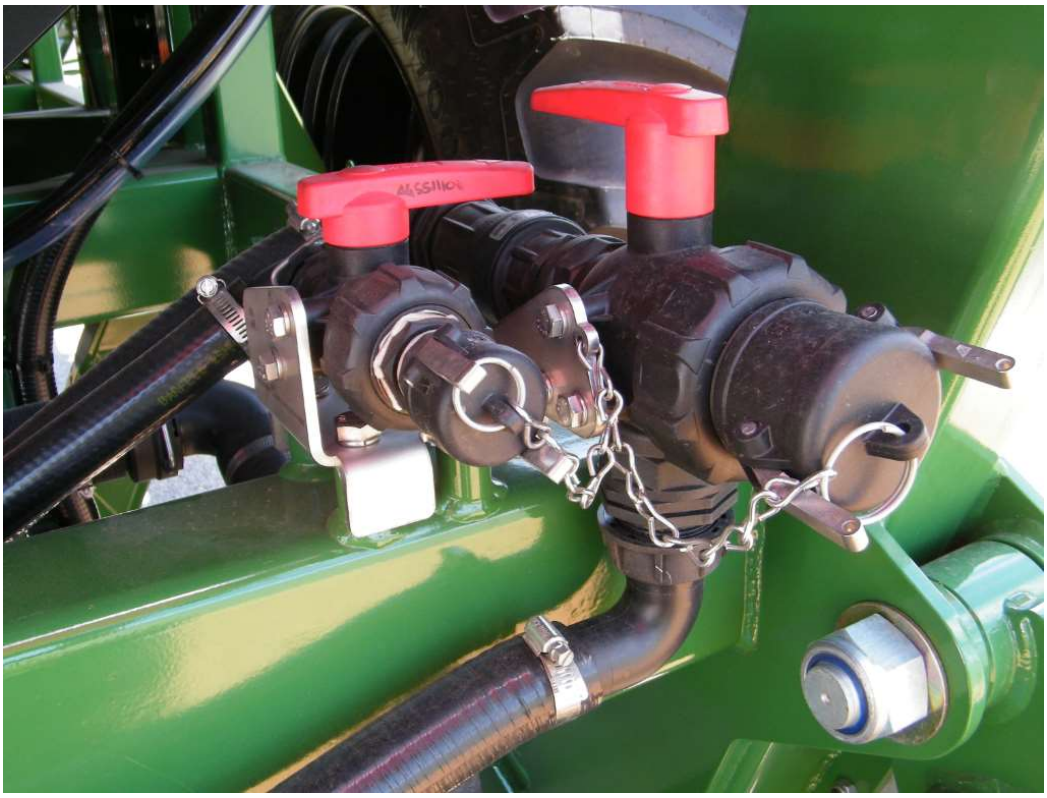
- Turn the Flush switch on, then turn the pump on for no more than 10 seconds. Repeat turning the pump on for 10s and off until the pressure reading on the System gauge is between 3.5 and 4.5 Bar pressure. There is a bleed line on the top of the pump where the air will purge out of. It may take some time to prime the pump especially if it has been run dry.

Note: **Do not run pump dry for any longer than 30sec, damage can occur inside the Hypro pump.**

FLUSH CIRCUIT PRIMING WITH FLUSH TANK

- Fill flush tank with clean water. Turn 3 way Flush tank valve to point to the front of the machine, see Picture 10.4.2. Turn the Suction valve to FLUSH and the Delivery valve to FLUSH BAR.
- Turn the Flush switch on, then turn the pump on for no more than 10 seconds. Repeat turning the pump on for 10s and off until the pressure reading on the System gauge is between 3.5 and 4.5 Bar pressure. There is a bleed line on the top of the pump where the air will purge out of. It may take some time to prime the pump especially if it has been run dry.

Note: **Do not run pump dry for any longer than 30sec, damage can occur inside the Hypro pump.**



Picture 10.4.2: Flush Tank Valve Open, Delivery Valve Shut.

- Once a stable pressure is achieved, the Flush switch can be turned off and liquid system is ready for use.

FLUSH CIRCUIT PRIMING WITHOUT FLUSH TANK

- Connect a clean supply of water to the Flush valve at the rear, see Picture 10.4.2. The supply should have either good head pressure or a pump. There is a one way check valve in the suction line to the liquid cabinet, the water supply must push past this to help prime the Hypro pump.

- Turn the Suction valve to FLUSH and the Delivery valve to FLUSH BAR, see Picture 10.4.3. Turn the Flush switch on, then turn the pump on for no more than 10 seconds. Repeat turning the pump on for 10s and off until the pressure reading on the upper gauge is between 3.5 and 4.5 Bar pressure. There is a bleed line on the top of the pump where the air will purge out of. It may take some time to prime the pump especially if it has been run dry.

Note: **Do not run pump dry for any longer than 30sec, damage can occur inside the Hypro pump.**

Picture 10.4.3: Prime with Flush Tank.

- Once a stable pressure is achieved, the Flush switch can be turned off and liquid system is ready for use.

10.5 RUNNING THE LIQUID SYSTEM

Make sure the valves on the Liquid Pro-L 300 are set to Run, see Picture 10.1.1. Turn on the pump switch at the cabinet. Make sure the Flush switch is off. Liquid system is ready to go.

10.6 FLUSHING THE BAR

- If any work needs to be carried out on the liquid system on the bar, the system may need to be flushed with fresh water. Ensure that the pump is primed. See instructions above.

- Turn Suction valve to FLUSH and Deliver valve to FLUSH BAR. Arm pump from Cab. Turn Flush switch on and turn pump on. The pump will push approximately 12–15 LPM to the bar, Bar flush only needs to be run for a minute or 2 before sufficient water has been run through the system.

  Note: When running the bar flush, a small amount of clean water will enter the main tank via the bleed line on the pump. This amount is approximately 0.5-1 LPM.

- Once bar system has been flushed, shut off the pump and the flush switch. Turn Suction and Delivery valves back to run.

10.7 FLUSHING THE TANK

- Each main liquid tank is fitted with sprinklers inside the top of each liquid tank. At the end of each season or if changing over products and the tank needs to be rinsed by carrying out the following:

- Set Suction valve to FLUSH and the Delivery valve to RUN, see Picture 10.7.1. Turn pump on and pull in 200-250L of clean water from the either the rinse tank mounted to the machine or from a clean water source with adequate head pressure.

Note: **<u>Do not let Pump run out of water. This will keep the Flush line full and always primed for future flushing.</u>**

Picture 10.7.1: Flushing the Tank.

- Set Suction valve back to RUN, turn the pump on. Run in this position for a couple of minutes. Turn Delivery valve to FLUSH BAR for a minute then back to RUN.

- Shut pump off and turn Delivery valve to TANK RINSE, see Picture 10.7.2. Turn pump on, this will run the water through the sprinklers rinsing the tank. Drain tank from 3” fill line. These steps can be repeated until tank is clean enough to switch products or put machine away for the year.

Picture 10.7.2: Liquid Control Panel

Picture 10.7.3: Tank Sprinklers

10.8 LIQUID AGITATION

Ausplow Multistreams Liquid Panel allows agitation to automatically occur when the Bin has hydraulic pressure and the system is not delivering product.

Agitation is achieved by a series of nozzles in the tank that keep product in suspension, see Picture 10.8.1.

The same pump that delivers product to the bar also provides the agitation pressure.

Picture 10.8.1:
Agitation Nozzles inside the Tank.

10.9 LIQUID DELIVERY FLOW RATES

10.9.1 Liquid Safety Precautions

CAUTION!

- Always follow the manufacturers' safety recommendations and wear the appropriate safety equipment when working with chemicals and fertilisers.
- Liquid products can drip from the liquid tubes when the bar wings are folded. Flush the liquid system with water before transporting.
- Do not transport liquid tanks when full at more than 10km/h.

10.9.2 Liquid Delivery – Friction Flow

Liquid products are delivered using Friction Flow tubing fed from liquid manifolds attached to the secondary stand pipes, see Picture 10.9.1.

Picture 10.9.1: Liquid Manifold on Secondary Riser

Liquid can be delivered to the Blade, Closing Tool or to the back of the Press Wheel see Picture 10.9.2.

Picture 10.9.2: V4 Tine with Friction Flow Liquid Tube

10.9.3 Liquid Fertilizer Application Flow Rates

Calculation of Liquid Fertilizer Required Flow Rate.

TOTAL FLOW RATE

Required Coverage x Tractor Speed x Bar Width / 600 = Total Flow Rate
(l/ha) (kph) (m) (l/min)

Example D300-61:

- A fluid coverage of 50 l/ha is required;
- Tractor speed is expected to be 9 kph;
- Total Bar width is 18.30m;
- The bar contains 61 tines.

50 Required Coverage (l/ha)	X	9 Tractor Speed (kph)	X	18.30 Bar Width (m)	/ 600 =	13.73 Total Flow Rate (l/min)

TOTAL RATE PER TINE

Total Flow Rate / No of Tines x 1000 = Flow Rate per Tine
(l/min) (ml/min/tine)

Example:

13.73 Total Flow rate (l/min)	/	61 No of Tines	X	1000	=	225 Flow Rate/Tine (ml/min)

The formulas are used to calculate the application rates for the following machine setups.

260mm (10”) spacing are based on a working speed of **8.0km/h**.

300mm (12”) spacing are based on a working speed of **9.0km/h**.

381mm (15”) spacing are based on a working speed of **10.0km/h**.

Bar widths for each model can be found in Table 7.3.2.

10.9.4 Friction Flow Tubing Vs Flow Rates

D260 Based on 25L min Reg Valve

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 2mm ID		**Water**				**Flexi-N**			
Models	**Metres**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**
D260-70	2 (straight)	N/A	N/A	N/A	N/A	74	100	18	24
	3	103	118	25	28	45	81	11	20
	4	84	110	20	26	35	70	8	17
	5	72	103	17	25	29	62	7	15
	6	63	97	15	23	24	55	6	13
D260-64	2 (straight)	N/A	N/A	N/A	N/A	74	107	16	24
	3	104	125	23	27	45	85	10	18
	4	84	116	19	25	35	72	8	16
	5	72	108	16	24	29	63	7	14
	6	63	101	14	23	25	57	6	12
D260-59	2 (straight)	137	145	28	30	74	113	15	23
	3	104	132	21	27	45	88	9	18
	4	85	121	18	24	35	75	7	15
	5	72	113	15	23	29	65	6	13
	6	63	105	13	21	25	58	5	11
D260-54	2 (straight)	137	153	26	29	74	120	14	23
	3	103	139	19	26	45	91	8	17
	4	84	127	15	23	35	77	6	14
	5	72	117	13	21	29	66	5	12
	6	63	108	11	20	24	59	4	11
D260-48	2 (straight)	137	165	23	27	74	130	12	22
	3	104	148	18	24	46	96	7	16
	4	85	134	14	22	35	79	6	13
	5	72	123	12	20	29	68	5	11
	6	63	113	11	18	25	60	4	10
D260-46	2 (straight)	137	169	22	27	74	133	12	21
	3	104	151	17	24	46	97	7	15
	4	85	136	14	21	35	80	6	12
	5	72	125	12	19	29	68	5	11
	6	63	115	10	18	25	60	4	9
D260-42	2 (straight)	137	178	20	26	74	141	11	20
	3	103	158	15	23	45	100	6	14
	4	84	142	12	20	35	82	5	11
	5	72	129	10	18	29	70	4	10
	6	63	118	9	17	24	61	3	8

D260-36	2 (straight)	137	192	17	24	74	154	9	19
	3	103	168	12	21	45	105	5	13
	4	84	149	10	18	35	84	4	10
	5	72	134	9	16	29	71	3	8
	6	63	122	7	15	24	62	3	7
D260-32	2 (straight)	137	202	15	22	74	164	8	18
	3	103	175	11	19	45	107	5	11
	4	84	155	9	17	35	86	3	9
	5	72	138	8	15	29	72	3	8
	6	63	125	6	13	24	62	2	6
D260-24	2 (straight)	137	223	11	19	74	186	6	15
	3	104	191	9	16	45	114	4	9
	4	85	165	7	14	35	89	3	7
	5	72	146	6	12	30	74	3	6
	6	63	131	5	11	30	64	3	5

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 1.5mm ID		**Water**				**Flexi-N**			
Models	Length (m)	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min
D260-70	2 (straight)	57	81	14	20	20	48	5	12
	4	33	57	8	14	11	26	3	6
D260-64	2 (straight)	57	83	13	18	20	49	4	11
	4	33	58	7	13	11	26	3	6
D260-59	2 (straight)	57	85	12	17	20	49	4	10
	4	33	59	7	12	12	26	3	5
D260-54	2 (straight)	57	87	11	16	20	50	4	9
	4	33	59	6	11	13	26	3	5
D260-48	2 (straight)	57	89	9	14	20	51	3	8
	4	33	60	6	10	15	26	3	4
D260-46	2 (straight)	57	89	9	14	20	51	3	8
	4	33	60	5	10	16	26	3	4
D260-42	2 (straight)	57	90	8	13	20	52	3	8
	4	33	61	5	9	17	26	3	4
D260-36	2 (straight)	57	92	7	11	20	53	3	7
	4	33	61	4	8	20	26	3	3
D260-32	2 (straight)	57	93	6	10	23	53	3	6
	4	33	62	4	7	23	26	3	3
D260-24	2 (straight)	57	95	5	8	30	54	3	4
	4	33	62	3	5	N/A	N/A	N/A	N/A

D300

Based on 25L min Reg Valve

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 2mm ID		**Water**				**Flexi-N**			
Model	**Metres**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**
D300-61	2 (straight)	119	122	29	30	64	96	16	23
	3	90	112	22	27	40	75	10	18
	4	73	103	18	25	31	64	8	15
	5	63	96	16	23	26	56	6	13
	6	55	89	14	21	22	49	5	12
D300-60T	2 (straight)	119	124	29	30	64	97	15	23
	3	90	112	22	27	40	75	10	18
	4	73	103	18	25	31	64	8	15
	5	63	96	16	23	26	56	6	13
	6	55	89	14	21	22	49	5	12
D300-55	2 (straight)	119	131	26	29	64	103	14	23
	3	90	119	20	26	40	79	9	17
	4	74	109	16	24	30	66	7	14
	5	63	100	14	22	26	57	6	12
	6	55	93	12	20	22	51	5	11
D300-51	2 (straight)	119	138	24	28	64	108	13	22
	3	90	124	19	25	40	81	8	16
	4	74	113	15	23	30	68	6	13
	5	63	104	13	21	25	58	5	11
	6	55	96	11	19	22	51	4	10
D300-50	2 (straight)	119	140	24	28	64	110	13	22
	3	90	126	18	25	39	82	8	16
	4	73	114	14	23	30	68	6	14
	5	62	105	12	21	25	59	5	12
	6	55	97	11	19	22	52	4	10
D300-49	2 (straight)	119	141	23	28	64	111	13	22
	3	89	127	17	24	39	82	7	16
	4	73	115	14	22	30	68	5	13
	5	62	105	12	20	25	59	4	11
	6	54	97	10	19	21	52	4	10
D300-46	2 (straight)	119	147	22	27	64	116	12	21
	3	89	131	16	24	39	84	7	15
	4	73	118	13	21	30	69	5	12
	5	62	108	11	19	25	59	4	11
	6	54	99	10	18	21	52	3	9

D300-44	2 (straight)	119	150	21	26	64	119	11	21
	3	90	134	16	24	39	86	7	15
	4	73	121	13	21	30	71	5	12
	5	62	110	11	19	25	60	4	11
	6	55	101	10	18	22	53	4	9
D300-40	2 (straight)	119	158	19	25	64	126	10	20
	3	90	140	14	22	40	88	7	14
	4	74	125	12	20	30	72	6	11
	5	63	113	10	18	25	61	5	9
	6	55	103	9	16	22	53	4	8
D300-36	2 (straight)	119	166	17	24	64	133	9	19
	3	89	146	12	21	39	91	5	13
	4	73	129	10	18	30	73	4	10
	5	62	116	9	16	25	62	3	8
	6	54	106	7	15	21	54	3	7
D300-32	2 (straight)	119	175	15	22	64	142	8	18
	3	89	152	11	19	39	93	5	11
	4	73	134	9	17	30	74	3	9
	5	62	120	8	15	25	62	3	8
	6	54	109	6	13	21	54	2	6

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 1.5mm ID		**Water**				**Flexi-N**			
Model	**Metres**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**	**Min L/Ha**	**Max L/Ha**	**Min L/Min**	**Max L/Min**
D300-61	2 (straight)	49	73	12	18	17	43	4	10
	4	29	51	7	12	10	22	3	5
D300-60T	2 (straight)	49	73	12	18	17	43	4	10
	4	29	51	7	12	10	22	3	5
D300-55	2 (straight)	49	75	11	16	17	43	4	10
	4	29	51	6	11	11	23	3	5
D300-51	2 (straight)	49	76	10	15	17	44	3	9
	4	29	52	6	11	12	23	3	5
D300-50	2 (straight)	49	76	10	15	17	44	3	9
	4	29	52	6	10	12	23	3	5
D300-49	2 (straight)	49	76	10	15	17	44	3	9
	4	29	52	6	10	13	23	3	4
D300-46	2 (straight)	49	77	9	14	17	45	3	8
	4	29	52	5	10	14	23	3	4
D300-44	2 (straight)	49	78	9	14	17	45	3	8
	4	29	52	5	9	14	23	3	4

D300-40	2 (straight)	49	79	8	13	17	45	3	7
	4	29	53	5	8	16	23	3	4
D300-36	2 (straight)	49	80	7	12	17	46	3	7
	4	29	53	4	8	17	23	3	3
D300-32	2 (straight)	49	81	6	10	20	46	3	6
	4	29	53	4	7	20	23	3	3

D381

Based on 25L min Reg Valve

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 2mm ID		**Water**				**Flexi-N**			
Model	Metres	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min
D381-48	2 (straight)	94	113	23	27	50	89	12	22
	3	70	101	17	24	30	65	7	16
	4	57	91	14	22	23	54	5	13
	5	49	84	11	20	19	46	4	11
	6	43	77	10	18	17	41	4	10
D381-44	2 (straight)	94	118	21	26	50	94	11	21
	3	70	105	15	23	30	67	6	15
	4	57	95	12	21	23	55	5	12
	5	49	86	10	19	19	47	4	10
	6	43	79	9	17	17	41	3	9
D381-40	2 (straight)	94	125	19	25	50	99	10	20
	3	70	110	14	22	30	69	6	14
	4	57	98	11	20	23	56	4	11
	5	49	89	10	18	19	48	4	9
	6	43	81	8	16	17	42	3	8
D381-36	2 (straight)	94	131	17	24	50	105	9	19
	3	70	115	12	21	30	71	5	13
	4	57	102	10	18	23	57	4	10
	5	49	92	9	16	19	48	3	8
	6	43	83	7	15	17	42	3	7
D381-32	2 (straight)	94	138	15	22	50	112	8	18
	3	70	120	11	19	30	73	5	11
	4	57	105	9	17	23	58	3	9
	5	49	94	8	15	19	49	3	8
	6	43	85	7	13	17	42	2	6

D381-28	2 (straight)	94	145	13	21	50	119	7	17
	3	70	125	10	17	30	75	4	10
	4	57	109	8	15	23	59	3	8
	5	49	97	7	13	19	50	2	7
	6	43	87	6	12	17	43	2	6

Tractor speed: 8km/h and using Ausplow Liquid Delivery System using the Hypro HM4C pump									
Friction Flow 1.5mm ID		**Water**				**Flexi-N**			
Model	Metres	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min	Min L/Ha	Max L/Ha	Min L/Min	Max L/Min
D381-48	2 (straight)	39	60	9	15	13	35	3	9
	4	23	41	6	10	10	18	3	4
D381-44	2 (straight)	39	61	9	14	13	35	3	8
	4	23	41	5	9	11	18	3	4
D381-40	2 (straight)	39	62	8	13	13	36	3	7
	4	23	42	5	8	12	18	3	4
D381-36	2 (straight)	39	63	7	12	14	36	3	7
	4	23	42	4	8	14	18	3	3
D381-32	2 (straight)	39	64	6	10	15	36	3	6
	4	23	42	4	7	15	18	3	3
D381-28	2 (straight)	39	64	6	9	18	37	3	5
	4	23	42	3	6	18	18	3	3

10.9.5 PH Concentration of Liquid Products

The PH concentration and associated corrosive effect of liquid products varies according to:

- The product being used,
- The concentration or dilution factor of the liquid product, and
- The temperature of the product when it is being applied.

CAUTION!

- The Ausplow liquid system is designed to operate with products in their diluted state with a PH range of 3 to 9. Using liquid products with a PH outside these ranges could cause irreparable damage to liquid pumps, valves, flow meters, nozzle bodies and / or liquid lines.

- Liquid products with a PH below 6 or above 8 should not be allowed to remain static in the liquid system for more than 2 hours without flushing liquid lines.

WARNING!

- Liquid products with a PH below 5 should not be allowed to remain static in the liquid system for more than 1 hour without flushing liquid lines.

- When using liquid phosphoric acid, **do not operate the liquid system above 2.5 Bar pressure as freezing of the liquid at higher pressures can cause irreparable damage to the liquid and / or agitation pump(s).**

10.9.6 Procedures When Not Using Liquid System

When the liquid system is not used for a period of time, but the seeder is still in use, dirt can block the liquid tubes. It is recommended to flush water through the system during this time to keep the system clean.

11.0 DOSATRON

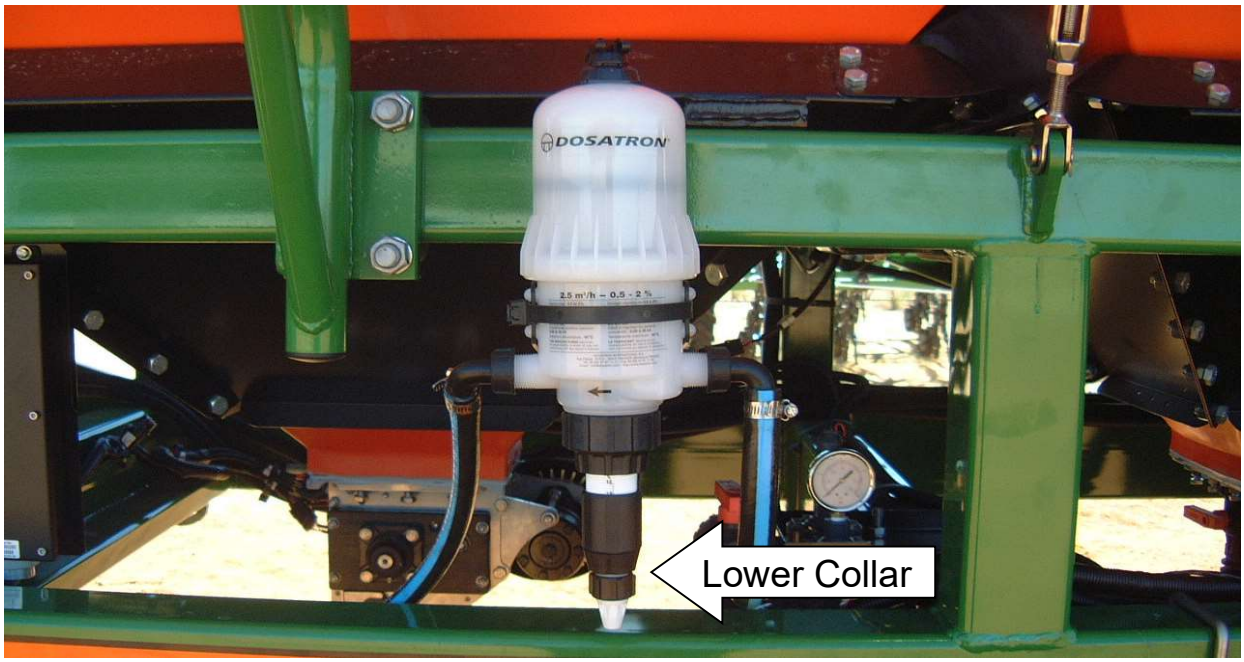
11.1 DOSATRON OPERATION

When the Dosatron is installed directly in the 'Primary' water or liquid fertiliser supply line, the Dosatron Injector operates using this 'Primary' flow as the power source.

The 'Primary' product flow drives the Dosatron piston up and down injecting the required percentage of active ingredient (concentrate). Inside the Dosatron, the chemical is mixed and pressure forces the solution downstream. The dose of concentrate will be directly proportional to the volume of 'Primary' liquid entering the Dosatron regardless of variations in flow or pressure.

11.2 DOSATRON PUMP RATES

All dosing pumps are available in an adjustable percentage range of the main flow. Therefore, if the required chemical rate is 1lt/ha and the main rate is 50 L/ha then the required delivery is 2%. Models include:



Picture 11.2.1: Dosatron Fitted to Multistream

- Model D3RE2 – Delivery Percentage 0.2 - 2% of main liquid rate
- Model D3RE5 – Delivery Percentage 0.5 - 5% of main liquid rate
- Model D3RE10 – Delivery Percentage 1 - 10% of main liquid rate

If a selection of percentage rates is required outside the range of a single pump, an additional pump will be required. However, it may be possible to dilute the chemical or trace element to cover all rates with a single model of dosing pump.

Adjustment of secondary flow rates is achieved by screwing the lower collar on the Dosatron up or down to achieve the desired rate. Model outputs are shown below in tables below.

CAUTION!

The maximum number of Dosatron pumps that can be fitted to one ‘Primary’ product line is three if the concentrate on all three Dosatrons are below 200cSt. If one concentrate applied through the secondary line has a viscosity above 200cSt, only two Dosatrons can be fitted to the one ‘Primary’ product line.

11.2.1 Dosatron % Rates Tables

% Setting	Primary Flow (L)							
Secondary Flow (ml)	**25L**	**30L**	**35L**	**40L**	**45L**	**50L**	**55L**	**60L**
100ml	0.40	0.33	0.29	0.25	0.22	0.20	0.18	0.17
150ml	0.60	0.50	0.43	0.38	0.33	0.30	0.27	0.25
200ml	0.80	0.67	0.57	0.50	0.44	0.40	0.36	0.33
250ml	1.00	0.83	0.71	0.63	0.56	0.50	0.45	0.42
300ml	1.20	1.00	0.86	0.75	0.67	0.60	0.55	0.50
350ml	1.40	1.17	1.00	0.88	0.78	0.70	0.64	0.58
400ml	1.60	1.33	1.14	1.00	0.89	0.80	0.73	0.67
450ml	1.80	1.50	1.29	1.13	1.00	0.90	0.82	0.75
500ml	2.00	1.67	1.43	1.25	1.11	1.00	0.91	0.83
550ml	2.20	1.83	1.57	1.38	1.22	1.10	1.00	0.92
600ml	2.40	2.00	1.71	1.50	1.33	1.20	1.09	1.00
650ml	2.60	2.17	1.86	1.63	1.44	1.30	1.18	1.08
700ml	2.80	2.33	2.00	1.75	1.56	1.40	1.27	1.17
750ml	3.00	2.50	2.14	1.88	1.67	1.50	1.36	1.25
800ml	3.20	2.67	2.29	2.00	1.78	1.60	1.45	1.33
850ml	3.40	2.83	2.43	2.13	1.89	1.70	1.55	1.42
900ml	3.60	3.00	2.57	2.25	2.00	1.80	1.64	1.50
950ml	3.80	3.17	2.71	2.38	2.11	1.90	1.73	1.58
1000ml	4.00	3.33	2.86	2.50	2.22	2.00	1.82	1.67

Table 11.2.1 Dosatron Primary / Secondary Flow Rates

% Setting	Primary Flow (L) (Con't)							
Secondary Flow (ml)	**65L**	**70L**	**75L**	**80L**	**85L**	**90L**	**95L**	**100L**
100ml	0.15	0.14	0.13	0.13	0.12	0.11	0.11	0.10
150ml	0.23	0.21	0.20	0.19	0.18	0.17	0.16	0.15
200ml	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.20
250ml	0.38	0.36	0.33	0.31	0.29	0.28	0.26	0.25
300ml	0.46	0.43	0.40	0.38	0.35	0.33	0.32	0.30
350ml	0.54	0.50	0.47	0.44	0.41	0.39	0.37	0.35
400ml	0.62	0.57	0.53	0.50	0.47	0.44	0.42	0.40
450ml	0.69	0.64	0.60	0.56	0.53	0.50	0.47	0.45
500ml	0.77	0.71	0.67	0.63	0.59	0.56	0.53	0.50
550ml	0.85	0.79	0.73	0.69	0.65	0.61	0.58	0.55
600ml	0.92	0.86	0.80	0.75	0.71	0.67	0.63	0.60
650ml	1.00	0.93	0.87	0.81	0.76	0.72	0.68	0.65
700ml	1.08	1.00	0.93	0.88	0.82	0.78	0.74	0.70
750ml	1.15	1.07	1.00	0.94	0.88	0.83	0.79	0.75
800ml	1.23	1.14	1.07	1.00	0.94	0.89	0.84	0.80
850ml	1.31	1.21	1.13	1.06	1.00	0.94	0.89	0.85
900ml	1.38	1.29	1.20	1.13	1.06	1.00	0.95	0.90
950ml	1.46	1.36	1.27	1.19	1.12	1.06	1.00	0.95
1000ml	1.54	1.43	1.33	1.25	1.18	1.11	1.05	1.00

Table 11.2.1 Dosatron Primary / Secondary Flow Rates (Con't)

11.3 COMPATIBILITY OF PRODUCTS

The performance of the Dosatron will be affected by the viscosity of the secondary product. Products with a similar viscosity to water or milk will not compromise the performance of the Dosatron, however thicker products or products that contain undissolved particles will compromise application rates and cause internal damage to the Dosatron unit.

CAUTION!

- Individual Dosatron pumps (standard configuration) can inject secondary (concentrate) products with a viscosity rating from 0 - 200cSt.
- Secondary products can be used with a viscosity rating of up to 400cSt if a viscous kit (Part # 04638) is fitted to the Dosatron.
- Secondary Products which contain undissolved particles will cause internal damage to the Dosatron. The filter attached to the secondary hose should never be removed during operation. If this filter is continually blocking, the concentrate should be reconstituted or replaced with a suitable alternative.
- The standard Dosatron Secondary line is 1.7m long and 6mm in diameter. The viscous kit Secondary line is only 1.2m long but is 12mm in diameter. The length of the viscous kit secondary line should not be lengthened as this may compromise the Dosatron performance. If the viscous line will not reach the bottom of the secondary container, it may be necessary to:
    - Relocate the Dosatron unit itself,
    - Dilute the concentrate so a standard kit can be used, or
    - Transfer the concentrate to an alternate secondary container.

12.0 MAINTENANCE

12.1 MACHINE INSPECTION WARNINGS

WARNING!

- Walkway weight limit is 300kgs.

- Do not work on the underside of the Multistream unless there is a tractor connected with the hand brake ‘ON’ or the machine is chocked.

12.2 METERING UNIT MAINTENANCE

WARNING!

Do not adjust chains, sprockets or the proximity sensor unless the tractor supplying hydraulics is turned off.

CAUTION!

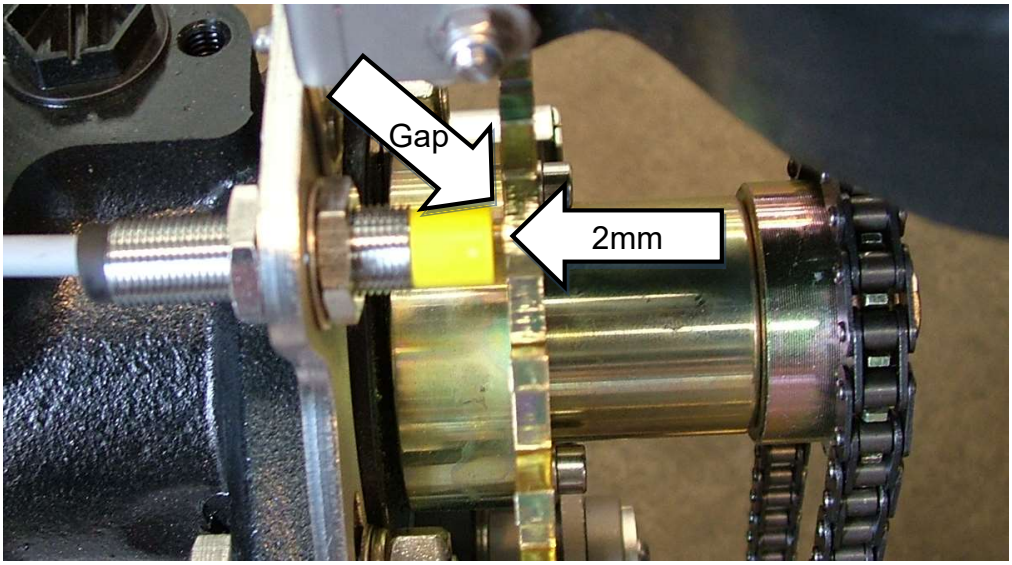
Always wear suitable hearing protection if subjected to prolonged exposure of loud or uncomfortable noises, such as the Multistream fan.

12.2.1 Setting Proximity Sensor

CAUTION!

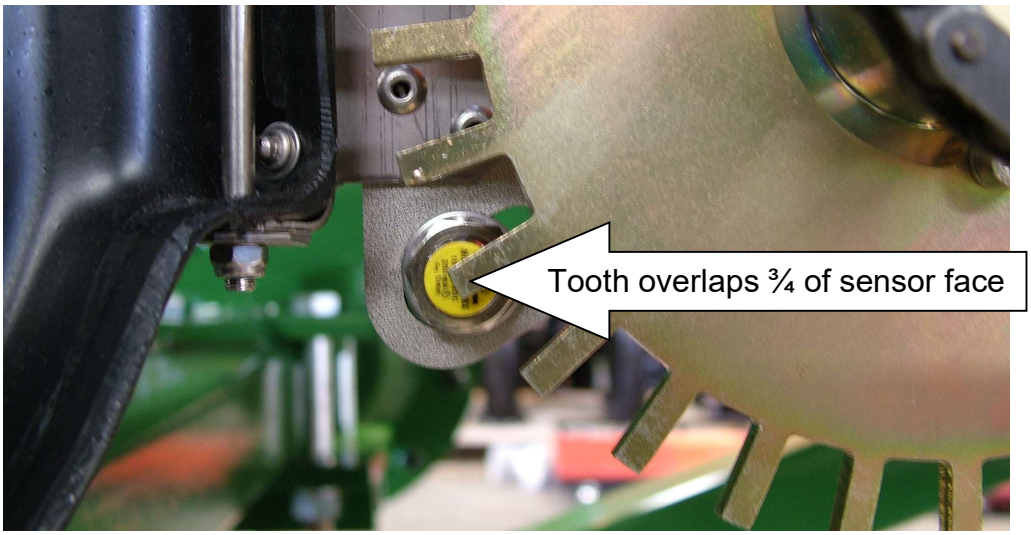
If the motor has been moved significantly, the proximity sensor will need to be reset. The proximity sensor senses the 30 toothed disk on the motor and tells the monitor how fast the machine is seeding. If this is adjusted incorrectly, the machine can seed intermittently and the rates will fluctuate. If there is no signal, the monitor will report a feedback error and shut down the metering unit in question.

The clearance of the proximity sensor to the disk, and the degree of overlap on the tooth needs to be accurately set. Clearance between the sprocket tooth and the end of the proximity switch is 2mm.



Picture 12.2.1: Sensor Gap 2mm

Teeth should overlap ¾ of the end of the proximity sensor when looking at the end of the sensor. When checking the sensor gap, all 30 teeth should be checked for the correct clearance, not just one.



Picture 12.2.2: Sensor Overlap

Chain tension should not require adjustment when switching from low to high rate (or high to low) on the seed metering units (See Section 8.3). Check 8 mm bolts are tight when changing sprockets (tension to 10 Nm). Take care not to lose flat and spring washers.

12.2.2 Visual Inspections

- Inspect the metering wheels at regular intervals to check for damage,
- Inspect the metering flap at regular intervals. When in position 1, it should be tight around the bottom of the metering wheels. If not, it is possible that some large item has been passed through the metering unit,
- Excessive gap is only a problem if the metering unit allows seed to run through when the metering wheels are not moving. Some metering flap adjustment is possible by loosening the 2 bolts holding the locking plate and moving flap closer to the wheels,
- Check the window and base door seals. Tighten locking clips if necessary,
- Check the operation of the metering flap and dividing flap, especially when using compound fertiliser to prevent product build up,
- Ensure that the space under the metering flap is kept clean, otherwise the flap may jamb, and
- Leaving potash rich fertiliser in the metering unit during the off-season could result in pin-hole corrosion through the stainless steel.

12.2.3 Metering Unit Lubrication / Maintenance

- Remove chains and sprockets and soak in diesel during the off-season,
- Use wax on chains in lieu of oil or grease to prevent the collection of dirt which accelerates wear, and
- Adjust the chain tension by loosening the bolts at the top and bottom of the hydraulic motor. The chain is tensioned correctly when there is approx 10 – 15 mm of movement mid span between the sprockets.

12.3 CHASSIS MAINTENANCE

12.3.1 Multistream Chassis Hardware

- Check turnbuckles are tight on the tank straps, especially on new machines,
- Check Tow-behind dolly head bolts on A9500BH and M9000BH models. Torque should be 135 Nm for lubricated threads,
- On the steering axle on Tow-behind machines, check and retighten tie rod ball joint bolts to 491 Nm (360 ft/lbs) on a lubricated thread,
- Check ‘rocking’ end-play on axle hubs once per season,
- Check axle mounting hardware is secured once per season. This includes bolts and plates on all 100 and 110 series axles and blocks on all 150 series axles,
- Inspect walkway support arms and bolts at regular intervals.

12.3.2 Wheel Nut Tension

Check wheel nuts weekly. Ensure wheel studs have a small amount of anti-seize and then tightened to:

- M22 on 100 and 110 series (10 stud) hubs to 575 Nm (424 ft/lbs).
- M24 on 150 series (12 stud) hubs to 730 Nm (538 ft/lbs).
- M27 0n 150 series (12 stud) hubs to 1070Nm (789ft/lbs).

12.3.3 Daily Maintenance

- Check all hoses for rubbing or kinking,
- Check for air leaks on tank lids and metering units,
- Check heat exchanger is clear of dust and debris in the core. To clean, open cover and blow out from the cover side. Alternatively, water can be used, and
- Inspect jacks, both mechanical and hydraulic for function and oil leaks.

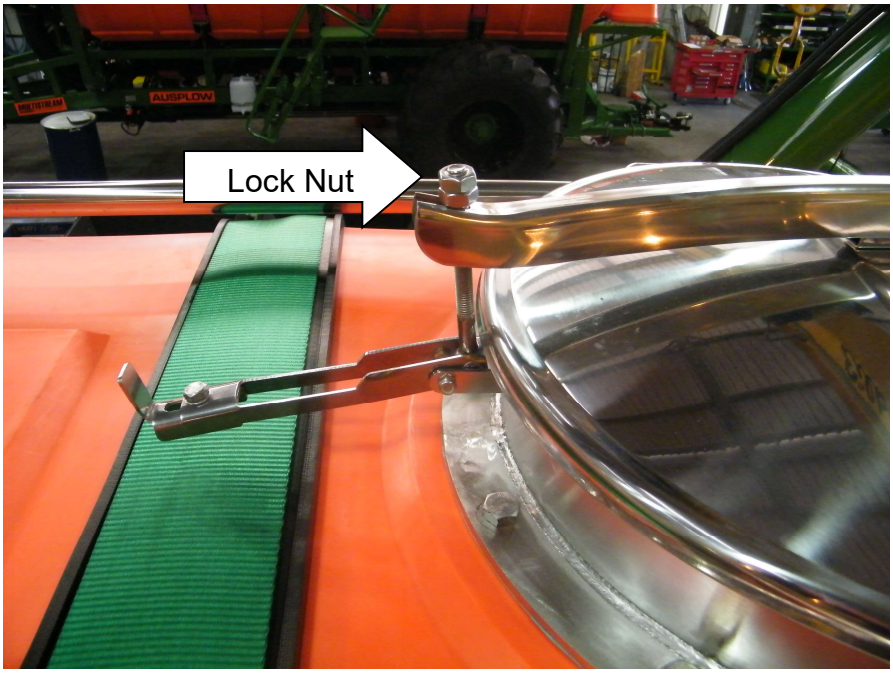
12.4 TANK LID SEALING

Multistreams use a pressurised metering system on all granular tanks. By pressurising the tanks, product can flow from the tank, into the airstream under gravity without being affected by an upward airstream from the main system air flow. As a consequence, any air leak from above the metering flap will affect product metering.

Whilst air can escape from the sight window on the front of the metering unit, the main cause of air leaks is from improper tank lid sealing. This can be caused by:

- Insufficient clamping pressure on the lid handle,
- Grain or fertiliser sitting on the rim of the lid,
- Damage to the tank lid seal and / or
- Damage to the tank lid stainless steel sealing ring.

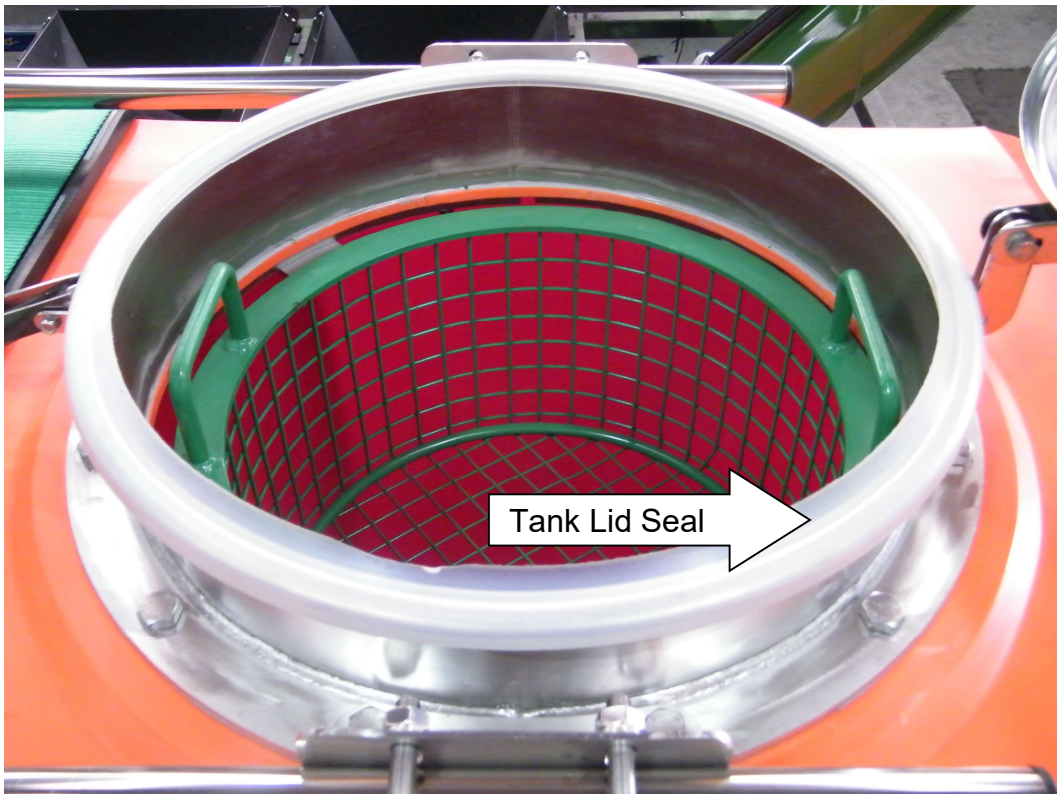
To adjust the lid clamping force, adjust the two lock nuts before locking lever is lifted over the lid handle to secure it.



Picture 12.4.1: Adjustment of Tank Lid Handle

Pictures 12.4.2: Correct Tank Lid Lever Engagement

Pay particular attention to the tank lid seal join for suspected air leaks.



Picture 12.4.3: Tank Lid Seal

12.5 GREASING SCHEDULE

Grease all points using a multipurpose extreme pressure grease as per Table below.

Greasing Position	Number of points	Schedule (Hrs)	Number of Pumps
Metering Shaft	2 per metering unit	50	2
Wheel Hubs	1 each hub	100	4 - 6
Steering Axle and Hitch	6	50	4 - 6
Dolly Ball	1	10	4 - 6
10” Auger Top	1	10	4 - 6

Table 12.5.1: Machine Greasing

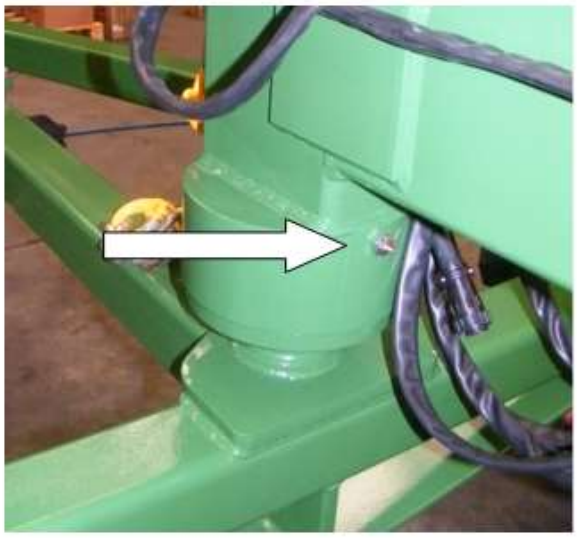
CAUTION!

- The entire weight on the front axle should be removed by jacking up the front of the chassis every 200 hours and at the end of the season to ensure grease is pushed into areas of the bushes that support direct load contact when stationary.

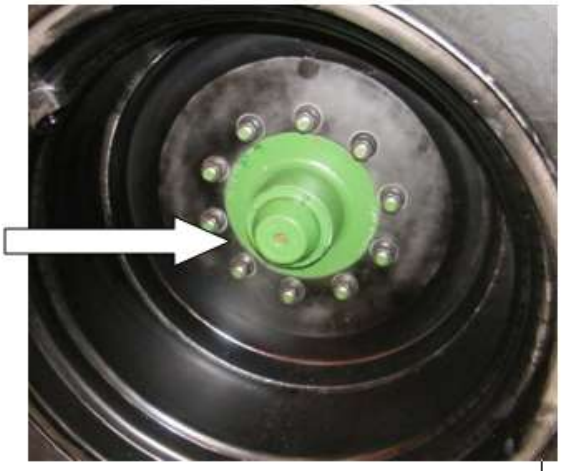
- During this servicing, grease should be pumped into the lubricated areas until it is visible from all grease exit points (i.e. from the top ***and*** bottom of king pin bushes. If grease does not exit from these points, the assembly should be disassembled and checked for wear in the bushes and thrust washers.

Picture 12.5.1: 10” Auger Top Grease Point

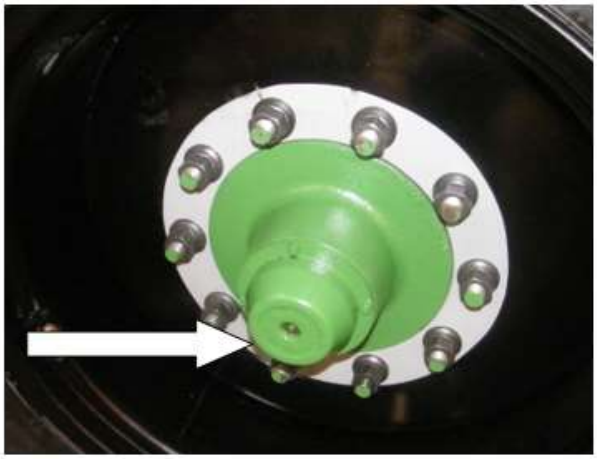
Picture 12.5.2: Metering Shaft Grease Points



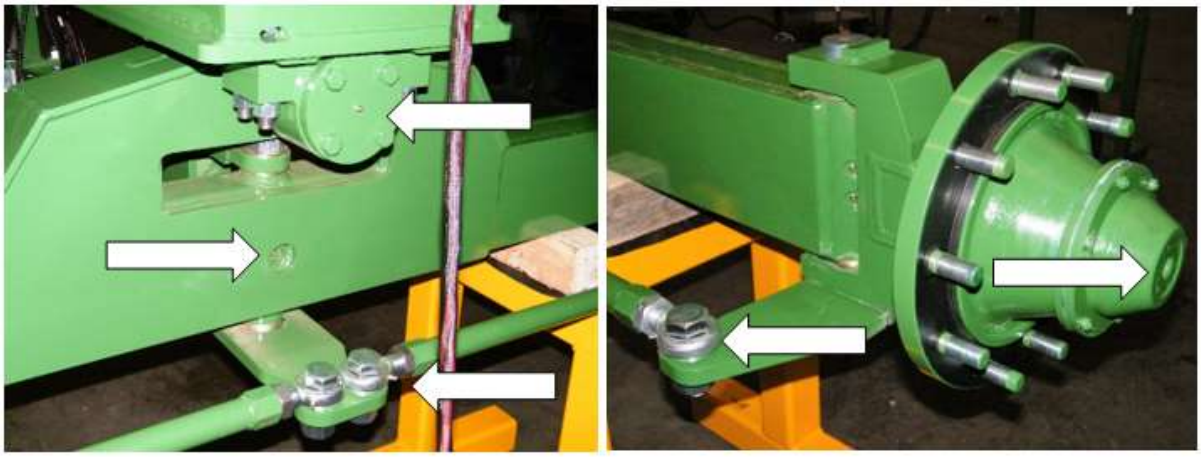
Picture 12.5.3: Dolly Ball Grease Point



Picture 12.5.4: Rear Wheel Hub Grease Points



Picture 12.5.5: Front Wheel Hub Grease Points



Picture 12.5.6: Steering Axle/Hitch and Wheel Hub Grease Points

12.6 AIR HOSE MAINTENANCE

The increase in cropping programme size, fertiliser rates and the aggressive nature of modern compound fertilisers have contributed to an increase in hose wear rates, particularly with 127mm and 63mm hoses.

The life of these hoses can be significantly increased if they are turned a quarter of a turn after visual inspection reveals hoses are wearing thin on the outside of bends. Use the writing on the Airseeder hose as a reference point to determine how far the hose has been rotated. Where possible, sharp bends should be removed in hoses.

Internal wear in 32mm hoses is generally not an issue however these hoses should be checked to ensure that they do not lay across sharp objects on the bar frame, accelerating external wear. If this occurs, a short off-cut of hose can be spliced over the wear point to increase life.

12.7 TYRE PRESSURES

Multistream tyres are factory set at 160kpa (23psi) for Radials and 240kpa (35psi) for Bias Ply tyres.

		Cold Inflation Pressure (kPa)							Max 10 km/h	
	14.9-28 @ 40 km/h	100	120	140	170	190	210	220	260	
Maximum load per tyre (kgs)	Single Configuration	1180	1360	1450	1600	1750	1850	1900	2280	

		Cold Inflation Pressure (kPa)								Max 10 km/h
	24.5-32 @ 40 km/h	85	100	120	140	160	180	200	220	286
Maximum load per tyre (kgs)	Single Configuration	2650	2900	3250	3550	3750	4000	4375	4500	8415
	Double Configuration	2230	2550	2860	3125	3300	3520	3850	3960	7405

		Cold Inflation Pressure (kPa)							Max 10 km/h
	30.5-32@ 40 km/h	85	100	120	140	160	180	200	250
Maximum load per tyre (kgs)	Single Configuration	3250	3350	3875	4250	4625	5000	5355	10010
	Double Configuration	2860	3125	3410	3740	4070	4400	4710	8805

		Cold Inflation Pressure (kPa)								Max 10 km/h
	710/70R38 @ 40 km/h	60	80	100	120	140	160	200	240	300
Maximum load per tyre (kgs)	Single Configuration	3165	3635	4175	4715	5255	5800	6330	6700	11390
	Double Configuration	2785	3200	3675	4150	4625	5105	5570	5895	10020

		Cold Inflation Pressure (kPa)									Max 10 km/h
	800/65R32 @ 40 km/h	80	100	120	160	200	240	280	320	360	440
Maximum load per tyre (kgs)	Single Configuration	3450	3975	4875	5325	5850	6375	6900	7500	8250	14000

		Cold Inflation Pressure (kPa)								Max 10 km/h
	900/60R32 @ 40 km/h	80	100	140	160	200	240	280	320	380
Maximum load per tyre (kgs)	Single Configuration	3795	4290	5280	5860	6520	7015	7675	8250	14025

		Cold Inflation Pressure (kPa)		
	900/60R42LSW @ 15 km/h	320	340	360
Maximum load per tyre (kgs)	Single Configuration	17400	17800	18300

The correct operating tyre pressure will depend on the type of tyre and its operating load as shown in the following tables.

12.8 ENGINE DRIVE MAINTENANCE SUPPLEMENT

Refer to the Multistream Engine Drive Operators & Parts Manual.

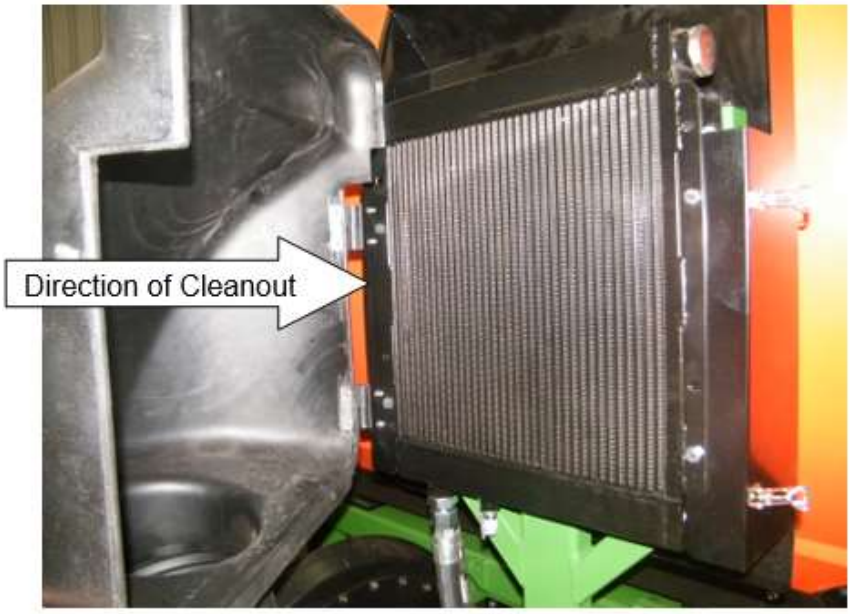
12.9 PRIMARY RISER WEAR PAD

CAUTION!

- Located in the top of the primary risers, the rubber wear pad is subjected to significant wear and distortion forces and should be checked every 1000ha.
- Failure to replace the wear pad when worn or deformed may lead to uneven seed distribution and air seeder hoses blocking.

12.10 HEAT EXCHANGER

The heat exchanger can become blocked depending on the amount of fertiliser, dust and straw present during seeding. The fan speed and air pressure alarms can be used to monitor this condition.



Picture 12.10.1: Heat Exchanger Door Removal

To clean the heat exchanger, unclip the 2 catches and open the cover enough to lift it off its hinges. Blow out the radiator from the cowling side of the heat exchanger to clean. High-pressure water can also be used to clean the radiator however the core must be completely dry before

seeding. This can be achieved by allowing the fan to run without product for 5 - 10 minutes with the cover in the closed position.

CAUTION!

At the end of the season, when disconnecting the safety bypass line, drain approximately 1 litre of oil out of the line before fitting cap. This will prevent the core 'bursting' during the summer months when the oil heats up and expands in the system.

13.0 TROUBLE SHOOTING

13.1 FAULTS AND RECTIFICATION

13.1.1 Fan Speed Slow for New Machines / Tractors

- Modern tractors are fitted with a pressure and flow compensating pump. Available flow reduces very quickly once the operating pressure is over 2200 psi. For example, some tractors produce more than 30kw of hydraulic power at pressures below 2200 psi. As soon as the pressure exceeds this, the flow drops rapidly and available power can be as little as 15kw by 2600 psi.
- A small reduction in return pressure in the order of 100 psi can often result in more than a 400 rpm improvement in fan speed.
- **The operating pressure of the Multistream cannot be reduced but if the supply and return pressures from the tractor can be kept to a minimum, significant improvements in fan Rpm can be achieved, particularly on Tow-behind Multistreams.**

13.1.2 Dealer Checks

If the fan is not achieving 3500rpm when hot:

- Measure the Airseeder / Multistream inlet pressure using a 3000psi gauge at the test point on the high-pressure oil filter near the fan, see Picture 4.4.1.
- Measure the Multistream return pressure using an 800psi gauge at the test point on the base of the heat exchanger, see Picture 4.6.2. The pressure here should be below 200psi when hot.

13.1.3 Typical Pressure Readouts – Pressure and Return Lines

Tables 13.1.1 and 13.1.2 below show typical system pressures in PSI with the fan engaged at recommended fan speeds with granular metering units engaged only.

If the 'Pressure @ Filter' values are not achieved, check and adjust if necessary, tractor high-pressure standby pressures.

If the 'Pressure @ Heat Exchanger' values are not in this range, a restriction exists in the return line or the entry or exit of oil to the tractor remotes.

# of Outlets	Suggested Fan RPM TBT	Pressure @ Filter (PSI) TBT	Pressure @ Heat Exchanger (PSI) TBT
20 to 28	3000	1800	100
32 to 36	3100	1900	110
40 to 42	3200	2000	120
44 to 48	3300	2100	130
49 to 54	3400	2200	140
55 to 60	3500	2350	155
61 to 64	3600	2500	170
70	3700	2650	185

Table 13.1.1: Typical Hydraulic Operating Pressures – TBT

# of Outlets	Suggested Fan RPM TBH	Pressure @ Filter (PSI) TBH	Pressure @ Heat Exchanger (PSI) TBH
20 to 28	3200	2000	120
32 to 36	3300	2100	130
40 to 42	3400	2200	140
44 to 48	3500	2300	150
49 to 54	3600	2400	160
55 to 60	3700	2550	175
61 to 64	3800	2700	190
70	3900	2850	200

Table 13.1.2: Typical Hydraulic Operating Pressures – TBH

13.1.4 Fan Speed Slowing on Existing Machines

If fan Rpm reduces without adjustment of hydraulic flow, check the following:

- Tractor hydraulic oil level,
- Tractor hydraulic pump performance,
- High pressure oil filter. If the filter shows red during normal running conditions (whilst warm), replace and recheck fan Rpm,
- Test tractor hydraulics as indicated in Section 13.1.3,
- Test fan motor, and
- Test Multistream hydraulics including:
    - The pressure line and remote,
    - The main return line and coupling(s), and
    - The hydraulic valve block.

Internal testing of the fan motor and hydraulic valve block will require the return of components to the factory or an authorised repair centre.

13.1.5 All Metering Units Do Not Run

- Check tractor is supplying oil.
    - Topcon: Turn off the master switch located at the bottom of the monitor screen (Red 'OFF'; green 'ON');
- If the metering wheels don't turn, the problem is hydraulic. Check the following items:
    - Remotes are plugged in correctly, and
    - Hydraulics are engaged.
- If the metering wheels turn, the problem is electrical. Check the following:
    - Check fuses at battery (both models),
    - Check loom connections and looms for damage,
    - Check power loom to monitor and POD / MDECU,
    - Check power at the battery is at least 12 volts and battery terminals are clean and secure (most common fault).

13.1.6 A Single Metering Unit Does Not Run

Carry out all the tests shown in the Section 13.1.5. If the unit still does not run, a valve or loom fault must be identified.
Example trouble shooting:

Bin 1 – not working,
Bin 2 – working, and
Bin 3 – working.

- Swap over the 4 pin weather pac from (for example) bin 1 to bin 2,
- Topcon does not require additional programming, which runs the metering units to full speed. Make sure the lower doors are open if there is product in the tanks or alternatively, remove metering unit drive chains,
- If metering unit 1 now works and metering 2 does not, the problem is in the loom,
- Check all plugs and connections to the Rate Controller,
- If metering unit 1 still does not work, the problem will be either the hydraulic block valve or the lead that goes to the valve,
- Change the lead that attaches to the valve with another tank (e.g. Tank 2) and try again,
- If bin 1 still does not work, the valve is faulty, and
- If bin 1 now works, the fault is in the short lead that attaches to the valve.

13.1.7 Multistream Does Not Seed

The following issues may cause the Multistream not to apply product:

- All tanks not applying product:
    - One of the following alarm conditions has been breached:
        - Low fan alarm, and / or
        - Low air system pressure.
- One tank not applying product:
    - Air leak from:
        - Tank lid,
        - Tank to metering unit gasket, and / or
        - Metering unit sight glass on front of metering unit.
    - Chain has come off metering unit sprockets,
    - Electrical fault (See Section 13.1.6 above),
    - Product bridging. This can be caused by:
        - Incompatible inoculants, or

- Product being compacted due to being transported over excessive distances when bins have been refilled.

13.2 SEEDING RATES APPEAR TO BE INCORRECT

13.2.1 Variation in Tank Sizes

Due to the material type (Polyethylene) used in the construction of the Multistream, there can be variations of up to 5% in the size of individual plastic tanks. The tanks can also change volume slightly due to bowing in the wall between tanks, depending on the filling sequence on some models.

CAUTION!

Each bin needs to be calibrated individually.

13.2.2 Using Variable Rate Function

If the variable rate function is used whilst seeding, calculated hectares (Ha) per bin fill will vary from what is actually achieved. The following example below is used to outline how variable rate seeding may affect the Ha per bin fill achieved:

- Bin size: 4700lt
- Effective working Volume @ 95%: 4465lt
- Primary Rate: 80kg/ha
- Secondary Rate 120kg/Ha
- Ha per tank if sown at primary rate: 56Ha
- Ha per tank if sown at secondary rate: 37Ha
- Variation in primary seeding rate: 50%

In the example above, if the variable rate function is used 50% of the time, the variation in primary seeding rate will be 25%. Even if the secondary rate is used 10% of the time, the primary rate will vary by 5%. The final variation in primary seeding rate will be affected by:

- The primary seeding rate,
- The secondary seeding rate, and
- The percentage of time the secondary rate is used.

13.2.3 Accuracy of Scales

Whilst a relatively small and simple issue to rectify, a 5% variation in the accuracy of scales will result in a 5% variation in rates. Always periodically check the accuracy of scales against a known value, i.e. a certified lead or steel weight. The ideal weight to use is 10kg, as this most closely equates to a typical calibration sample.

Often, a variation in readouts on electronic scales can be caused by flat batteries. To achieve the best results, ensure the following is observed when weighing calibration samples:

- Always use good, well charged batteries,
- Remove scales from their case and place on a hard, flat level surface,
- Periodically check the accuracy of scales with a known certified weight,
- Level the scales correctly, and
- Collect the largest calibration sample possible (approximately 20lt).

13.2.4 Metering Wheels Primed

The controller relies on an accurate readout of how much product is delivered with each revolution of the metering wheel. If the metering wheel is not fully primed, it will commence its rotation with empty flutes but will assume they are full and delivering product. This will result in less product being caught than would have otherwise been caught during a correct calibration. This will result in rates going out heavier than desired.

13.2.5 Seed and Fertiliser Dressings

Seed and fertiliser dressings can vary the density, and therefore weight of a given product, if measured as a function of tank volume. Dressings can also affect the ability of a product to flow out of the tank and into the metering system.

When using seed and fertiliser dressings, check density values and product flow by physically inspecting the product as it flows off the metering flap during calibration. As dressings can be sensitive to excess moisture, it may also be necessary to open the tank lids and allow air to circulate up through the tank for longer than the recommended 5 minutes every morning.

13.2.6 Movement in the Metering Flap

If the calibration factor has changed significantly, there may have been a change in the product consistency being seeded. It is also possible that the metering flap has moved in the metering unit. This can be caused by a large lump of fertiliser or rock passing through the metering system, or the securing bolts on the metering flap lever coming loose. To correct, adjust the metering flap and re-calibrate.

13.2.7 Metering System 'Turn Down'

'Turn Down' refers to the ratio between the maximum and minimum Rpm that a shaft can reliably and accurately achieve. For example, a typical car engine may idle at 1000rpm and achieve a maximum speed of 5000rpm.

In this case, the shaft speed (crank shaft) would achieve a 'Turn Down' of 5:1. Below 1000rpm, the engine would 'chug' and eventually 'stall'. On the other hand, it would not be able to achieve more than 5000rpm.

The metering system is also affected by 'Turn Down' because it is linked, via the metering chain drive, to a hydro motor. Therefore, if the rate that is trying to be achieved is too low for the hydro motor, it will 'chug' in a similar fashion to a car that is driven too slowly up a hill in too higher gear.

This will show itself as the inability of the controller to hold or achieve rate which will ultimately affect seeding rates. If this occurs, it will be necessary to fit a slow speed drive or adjust the metering flap to this metering unit to achieve a constant rate.

13.2.8 Seeding Numerous Small Lots

When seeding a number of small sections, particularly if they are odd shaped (such as caused by contour banks), the seeding rig will seed a relatively large percentage of area seeding ground that has already been sown. This issue will show itself more so than a boom spray because most boom sprays have auto-boom switching, whereas the seeding bar must be 'all on' to seed even a small section.

If seeding in these conditions, expect product to go out at a heavier rate than initially desired by up to 10 – 15% depending on the size and shape of the sections.

13.2.9 Setting of Proximity Sensor and Monitor Screen Fluctuations

The most common cause of rate fluctuation is incorrect adjustment of the proximity sensor. Please follow the procedure outlined in Section 12.2.1. to rectify.

Other reasons which may cause monitor screen fluctuations include:

- The seeder is set up with the wrong valve type. See setup screen.
- The metering unit does not turn freely. To rectify, remove the chain and check that each metering unit turns with even force and does not jam in part of its rotation. Switch off the bins functioning correctly. Press and hold down the arrow on the monitor at the left of the bin being switched off until a beep sounds. Remove the chain from the problem bin and drive around the paddock. If rates still fluctuate the motor could be faulty,
- Valve is suspect. Replace and recalibrate, and / or
- The desired application rate of one or more bins is too low or high for the Multistream to achieve. To rectify:
    - Check shaft speeds and fit a slow speed reduction drive for granular bins, or
    - Change nozzle size for liquid bins.

13.3 CRACKING GRAIN

Some grain types such as oil seeds and beans are more susceptible to cracking than others. The following measures can be taken to reduce the incidence of cracked grain:

- Reduce auger speed,
- Reduce fan revs,
- Divert air away from the seed air system to the fertiliser system,
- Inspect / replace the primary riser wear pad, and
- Use ‘fresh’ seed. Seed that has been stored for more than one season, especially if it has been stored in steel silos, becomes brittle and more susceptible to cracking. Oil seeds are particularly at risk.

14.0 MANUAL OVER-RIDE

This procedure is only used in the event of an electrical failure in the Multistream.

CAUTION!

- A manually over-ridden product cannot be controlled through the Monitor using the ‘Run / Stop’ switch. It can only be shut down by cutting hydraulic oil flow to the seeder.

- The Multistream will apply the product heavier when driving below the target speed and lighter when driving faster.

14.1 PROCEDURE

- Cut the hydraulic oil flow to the Multistream and ensure that the fan is ‘OFF’,
- Set Fan / Calibrate valve to ‘CALIBRATE’,
- Remove the chains from the bins not being calibrated,
- Fill each bin and calibrate in turn unless the machine is full,
- Place at least 100kgs of product in bin 1 and set the metering unit for calibration,
- Un-screw the manual over-ride valve approx. halfway on the hydraulic vale block that controls Bin No1,
- To prime, engage hydraulics for approx. 5 seconds and shut off,
- Empty the calibration bucket,
- Repeat the procedure and catch product after hydraulics are run for 1 minute (timed),
- Tables 14.1.1 and 14.1.2 give the amount of product that will be caught in 1 minute for the rates 10, 50, 100 and 150 Kg/Ha at 8 km/h for 260mm spacings and 9 km/h for 300mm spacings.
- For different rates, adjust for variance between the adjoining figures or calculate using the procedure below:

- To seed at 80kg/ha with a D260-54, the amount of product caught per minute can be calculated as follows:
  - Read off Table 14.1.1,
  - The rate per minute for 10 kg/ha is 1.87 kg/min. 80 kg/ha corresponds to a rate per minute of 8 x 1.87 = 14.96 kg/min,
  - If the bar size is not listed on the tables below, calculate using the general bar figure in Table 13.1.1. or 13.1.2. For example, a 10.5 metre bar is 10.5 / 10 = 1.05 times bigger than a 10 metre bar. Therefore 1.05 x .133 (10 kg/ha rate) = 0.139 kg/min.

- In the example given above, we must catch 14.96 kg per minute to be seeding at 80 kg/ha at a speed of 8 kmh. If necessary, return the collected product to the bin and readjust the screw. Screw in for heavier and out for lighter seeding,
- Run hydraulics again for 1 minute and weigh. Adjust valve as necessary and repeat calibration if required,
- The other bins are calibrated in the same way but be aware that the one previously set manually will run at the pre-set rate. The product in that bin must be caught as well as the one being tested or alternatively, remove its chain until all other bins are calibrated,
- Replace all chains,
- Once calibration is complete, close all the doors, adjust dividing flaps and switch on fan, and
- Switch on the hydraulics and drive at the predetermined speed of either 8 or 9 km/h, depending on tine spacing.

AUSPLOW BAR	CUT WIDTH	SEEDING 8 Km/h Ha/min	Kg OF PRODUCT CAUGHT IN 1 MINUTE AT THESE RATES			
			10	50	100	150
Model	**10.00**	**0.133**	**1.33**	**6.67**	**13.33**	**20.00**
D260-24	6.24	0.083	0.83	4.15	8.30	12.45
D260-32	8.32	0.111	1.11	5.55	11.09	16.64
D260-36	9.36	0.125	1.25	6.24	12.48	18.72
D260-42	10.92	0.146	1.46	7.28	14.56	21.84
D260-48	12.48	0.166	1.66	8.32	16.64	24.96

D260-54	14.04	0.187	1.87	9.36	18.72	28.08
D260-59	15.34	0.204	2.04	10.20	20.40	30.60
D260-60	15.60	0.207	2.07	10.37	20.75	31.12
D260-64	16.64	0.221	2.21	11.07	22.13	33.20
D260-70	18.20	0.242	2.42	12.10	24.21	36.31

Table 14.1.1: Product caught in 1 minute for 10, 50, 100 and 150 kg/ha for the Ausplow **260 mm spacing machines seeding at 8 km/h**.

AUSPLOW BAR	**CUT WIDTH**	**SEEDING 9 Km/h Ha/min**	**Kg OF PRODUCT CAUGHT IN 1 MINUTE AT THESE RATES**			
			10	50	100	150
Model	**10.00**	**0.150**	**1.50**	**7.50**	**15.00**	**22.50**
D300-32	9.60	0.144	1.44	7.20	14.40	21.60
D300-36	10.80	0.162	1.62	8.10	16.20	24.30
D300-40	12.00	0.180	1.80	9.00	18.00	27.00
D300-44	13.20	0.198	1.98	9.90	19.80	29.70
D300-46	13.80	0.207	2.07	10.35	20.70	31.05
D300-47	14.10	0.212	2.12	10.58	21.15	31.73
D300-48	14.40	0.216	2.16	10.80	21.60	32.40
D300-49	14.70	0.221	2.21	11.03	22.05	33.08
D300-51	15.30	0.230	2.30	11.47	22.95	34.43
D300-55	16.50	0.248	2.48	12.38	24.75	37.13
D300-61	18.30	0.275	2.75	13.73	27.45	41.18

Table 14.1.2: Product caught in 1 minute for 10, 50, 100 and 150 kg/ha for the Ausplow **300 mm spacing machines seeding at 9 km/h**.

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