

MarMac Twin Puff Strawberry Sprayer Operator's Manual

**Front Boom, Rear Hydraulic Power Pack & Trailing
Tank System**

Marshall Machinery – Legana - Tasmania

Index

1. Introduction
2. Intended Use
3. General Safety Information
 - 3.1. Personal Protective Equipment
 - 3.1.1. Twin Puff Specific Safety advice
4. Tractor Requirements
5. Installation & Setup
 - 5.1 Rear Hydraulic Power Pack & Tank Installation
 - 5.2 PTO Installation
 - 5.3 Hydraulic, Electrical & Chemical Connections
 - 5.4 Front Mast & Boom Installation
 - 5.5 Diagonal Supports
 - 5.6 Stand Removal
 - 5.7 Front Connections
6. Pre-Start Inspection
7. Starting & Operating Procedure
8. Hydraulic System Operation
9. Spray System Setup & Adjustment
10. Spray Calibration & Metering
 - 10.1 Calibration Formula
 - 10.2 Calibration Procedure
 - 10.3 Calibration Example
11. Chemical Tank & Filtration System
12. Cleaning & Flushing
13. Boom Folding Safety
14. Cooling System & Fan Safety
15. Maintenance Schedule
16. Lubrication Points
17. Hydraulic System Specifications
18. Gearbox Specifications
19. Tyres & Wheels
20. Removal of Rear Power Pack & Tank Unit
21. Safety Decals & Signage
22. Storage
23. Warranty & Service Information
24. Service Record

1. Introduction

This Operator's Manual provides important safety, setup, operation, calibration, maintenance, and servicing information for the MARMAC Twin Puff Strawberry Sprayer system.

The machine consists of:

- Front-mounted Twin Puff spray mast and boom assembly
- Rear-mounted hydraulic power pack
- Trailing chemical tank and hitch assembly
- PTO-driven hydraulic system
- Spray delivery and filtration system
- Raven Bravo 180S spray controller system

This manual must be read and understood before operating, servicing, transporting, or maintaining the machine.

Failure to follow these instructions may result in:

- Serious injury or death
- Chemical exposure
- Machine damage
- Reduced spraying performance
- Voiding of warranty

Only trained and authorised operators are permitted to operate this equipment.

2. Intended Use

The MARMAC Twin Puff Strawberry Sprayer is designed specifically for:

- Application of approved agricultural chemicals
- Strawberry crop spraying
- Low-volume targeted spray application

The machine must only be used:

- With compatible agricultural tractors
- Within specified hydraulic and PTO capacities
- In accordance with chemical manufacturer recommendations
- In accordance with applicable Australian WHS and agricultural safety regulations

Do not modify the machine without written approval from the manufacturer.

3. General Safety Information

WARNING Before operating the machine:

- Carry out a full risk assessment of the work area
- Ensure all operators are trained and competent
- Ensure all guards, shields, decals, and safety devices are fitted correctly
- Keep all bystanders at least 5 metres away during operation
- Never allow passengers on the machine
- Never place hands near rotating, moving, or pinch-point components
- Shut down tractor and isolate power before servicing
- Never approach rotating PTO shafts or moving driveline components

Always follow tractor manufacturer safety instructions and chemical label requirements.

3.1. Personal Protective Equipment (PPE)

Operators must wear appropriate PPE including:

- Protective clothing
- Chemical-resistant gloves
- Safety boots
- Eye protection
- Hearing protection
- Respiratory protection where required

3.1.1 Twin Puff Specific Safety Advice

WARNING Turning too sharply can cause collision and damage to chem valves etc.



4. Tractor Requirements

Before installation, ensure the tractor is:

- Structurally suitable and stable
- Minimum 110 HP
- Hydraulic capacity greater than 50 L/min
- Maximum hydraulic pressure 180 Bar
- Equipped with:
 - CAT 2 rear linkage hooks
 - 1,000 RPM PTO
 - Suitable front mounting structure
 - Adequate ballast and stability

Example fitment shown in this manual references the Deutz-Fahr 5115 TTV configuration prepared by [Marshall Machinery](#).



5. Installation & Setup

5.1. Rear Hydraulic Power Pack & Tank Installation

WARNING Use only on stable, level, hard ground surfaces, preferably concrete.

1. Position the rear power pack and trailing tank securely on supplied support stands.
 2. Apply tractor park brake and chock trailer wheels.
 3. Reverse tractor carefully into position.
 4. Connect lower linkage arms.
 5. Attach top link and level the assembly.
 6. Ensure PTO alignment with gearbox input shaft.
-

5.2. PTO Installation

WARNING Never connect or service PTO components with engine running and PTO still moving.

- Shut tractor engine OFF before connecting PTO.
- Ensure PTO universal joint phasing is correct.
- Ensure PTO lock detent engages correctly.
- Confirm PTO shaft length is correct and does not bottom out during movement.
- Ensure all PTO guards and covers are fitted correctly.

The PTO on the Tractor must operate in:

- 1,000 RPM PTO gearing only and the PTO must not exceed 1,000 RPM.

IMPORTANT

Rear 3 point linkage height must be adjusted in the tractor and locked in position to minimise PTO operating angle.

Recommended:

- Ideal continuous angle: less than 5°
- Maximum operating angle: 30°

Lock tractor linkage height settings after adjustment.

Power Pack PTO Alignment picture and grease points



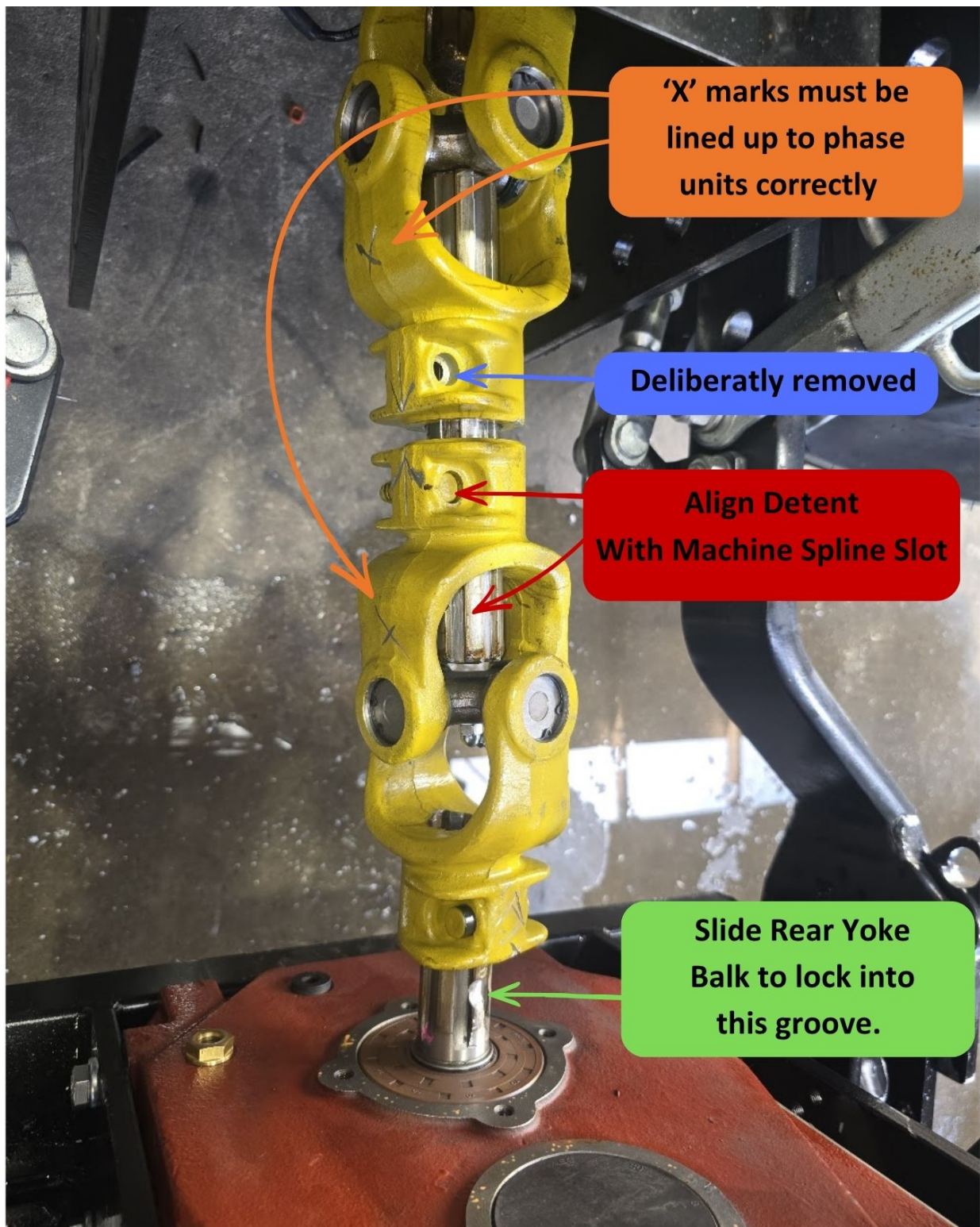
Below shows the groove that the PTO shaft must be slid over and locked into to ensure correct PTO shaft spacing.

Note: The position shown in the picture is **not** the operating position. The PTO shaft must be slid further rearward and locked into the groove shown to achieve the correct working position and shaft spacing.

Also note the modified detent in the front yoke. The spring-loaded detent button has been purposely removed to allow movement within the spline drive.

WARNING: This area must be kept properly lubricated at all times and must never be accessed while the PTO is rotating or while the engine is running.

The splined centre shaft also has an extended ground-down section on the spline. This section must be correctly aligned with the opposite end to allow the PTO shaft to slide in and out freely within the designed operating range.



5.3. Hydraulic, Electrical & Chemical Connections

Connect:

- Hydraulic couplers
- Electrical connections
- Chemical hoses

Ensure:

- Rubber seals are fitted inside fly-nut chemical couplings
 - Hydraulic hoses are connected correctly and free from leaks
 - Electrical wiring is secured away from moving parts
-

5.4. Front Mast & Boom Installation and Removal

WARNING Booms must remain fully unfolded during fitting, removal and storage.

Never fit or remove the machine with booms folded rearwards.

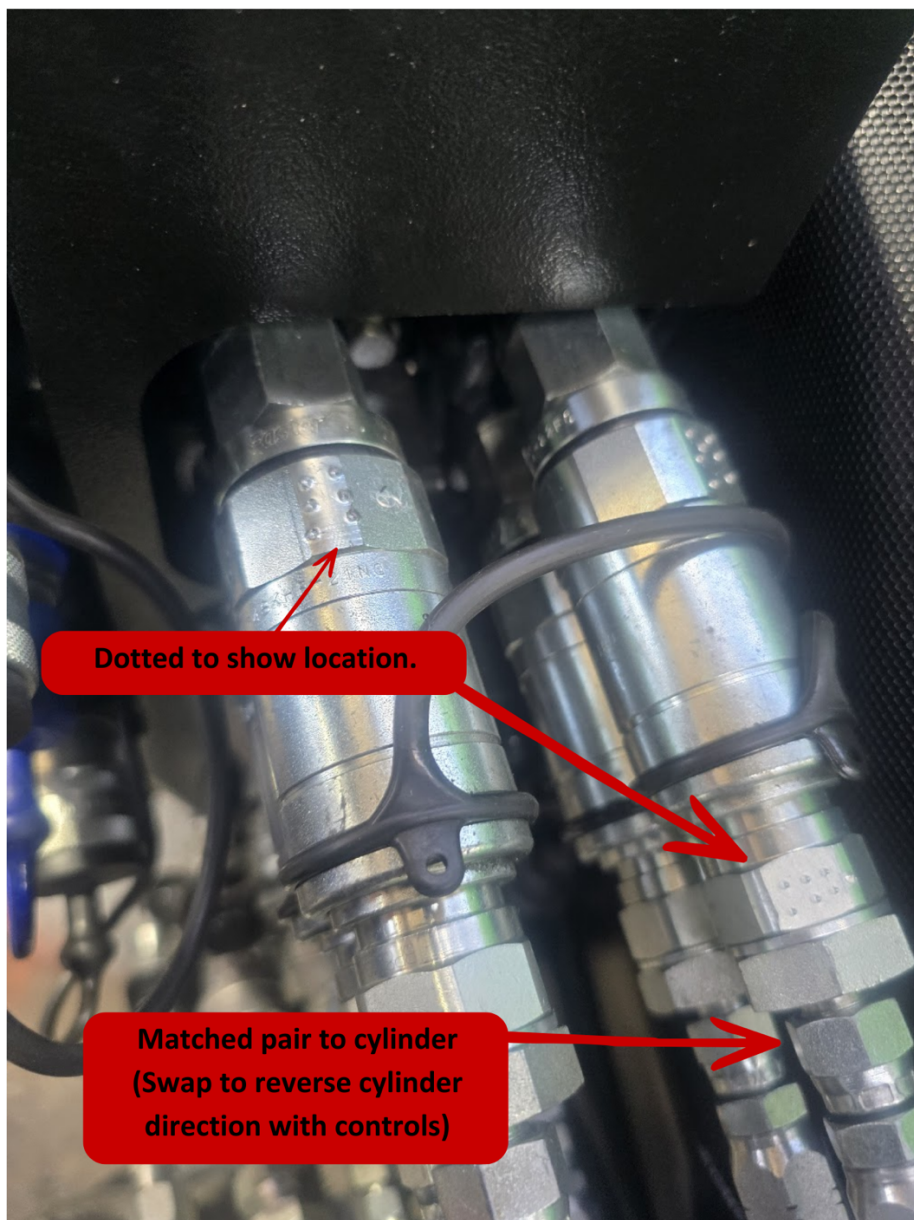
1. Position front mast assembly securely on supplied stands.

Boom Stands must be used on level concrete surface



2. Drive tractor carefully toward front mounting frame.
3. Connect hydraulic hoses using matching identification markings.

The picture below shows the dots indicating the hydraulic hose identification markings, with each hose connected to the corresponding paired tractor hydraulic outlet.



Dotted to show location.

Matched pair to cylinder
(Swap to reverse cylinder
direction with controls)

The lower connections do not have to be connected in a specific arrangement, but they all must be connected before running fans.



Fan motor hoses

4. Operate hydraulic lift carefully to align mounting frame.



Hold blue button to the right of the arm rest to unlock hydraulics

On hand control using your thumb:

- Pushing button 1 will extend the LH boom forward if retracted
- Pushing button 2 will swing the LH boom backwards if extended
- Pushing button 3 will extend the RH boom forward if retracted
- Pushing button 4 will swing the RH boom backwards if extended
- Pushing button 5 will raise the boom
- Pushing button 6 will lower the boom
- Pushing button 7 will tilt the RH side of the boom down
- Pushing button 8 will tilt the LH side of the boom down

Note: If hydraulic hoses have not been connected as instructed then controls will differ.



5. Bolt assembly securely to tractor mounting frame.

See below 3 photos for example of how the boom stands must be securely fastened to the frame on both sides using the supplied top and bottom bolts and nuts.







**Boom stand lower Bolt and
Nut RH**

The below tap must be turned **off** when removing the boom from the tractor, as it allows the boom to be lifted clear of the tractor mounts. When the boom is in operation, the valve must remain in the **open** position, as shown in the below photos.



5.5. Diagonal Supports

Diagonal supports must be fitted between:

- Tractor frame attachment points
- Spray mast

Diagonal support lengths need to be adjusted in length if the boom is repositioned on the mounting hitch of the tractor to change the sprayer working heights

If mounting height is changed:

1. Remove retaining bolts
2. Adjust support length
3. Refit and tighten bolts securely

Picture below shows these supports being adjusted.



5.6. Stand Removal

After machine is securely mounted:

1. Raise the Boom with stands fitting so that the stands clear of ground.
2. Remove retaining bolts holding the stands to Boom.
3. Remove stands completely

The stand bases are tapered to allow tractor tyre clearance during installation.

5.7. Front Connections

Connect:

- Electrical connector
- Chemical hoses

Ensure:

- Rubber gaskets are fitted correctly
- No chemical leaks are present

On tractors prepared by [Marshall Machinery](#), the sprayer lighting kit is powered through the Euro plug near the mid-mounted hydraulic outlets and switched using the tractor park lights.

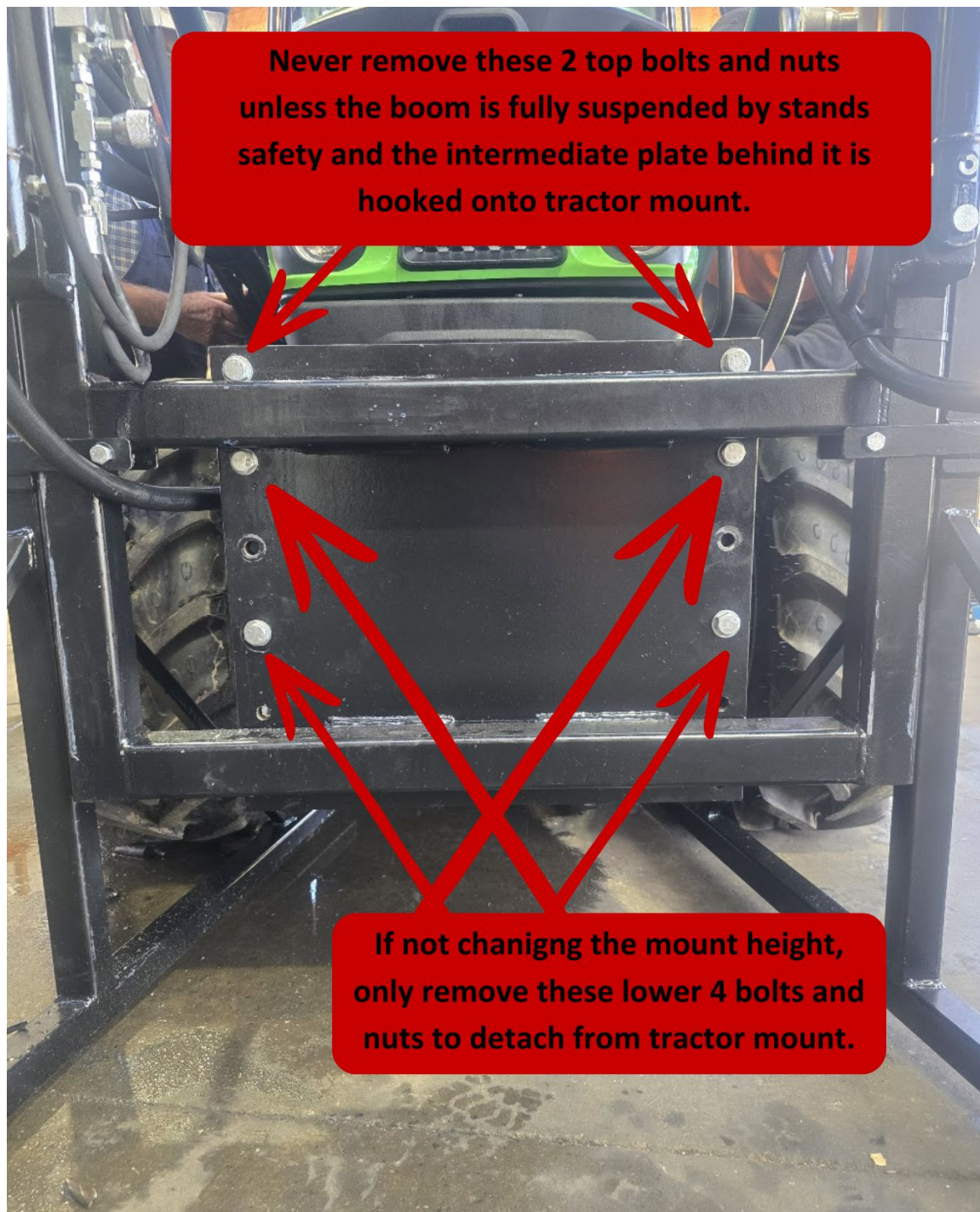
5.8 – Boom removal

The boom can be mounted to the tractor in three different height positions.

WARNING Do not remove the two top bolts and nuts unless changing the height position of the front mast/boom system.

When removing the front boom assembly from the tractor, only the lower four bolts and nuts need to be removed. Ensure the park stands are securely bolted in position and the mast is lowered so the base steel sits flat on a solid concrete surface to safely support the mast assembly.

Always use safe lifting procedures and a suitable lifting chain or lifting device to ensure the boom assembly is properly supported during removal and installation.

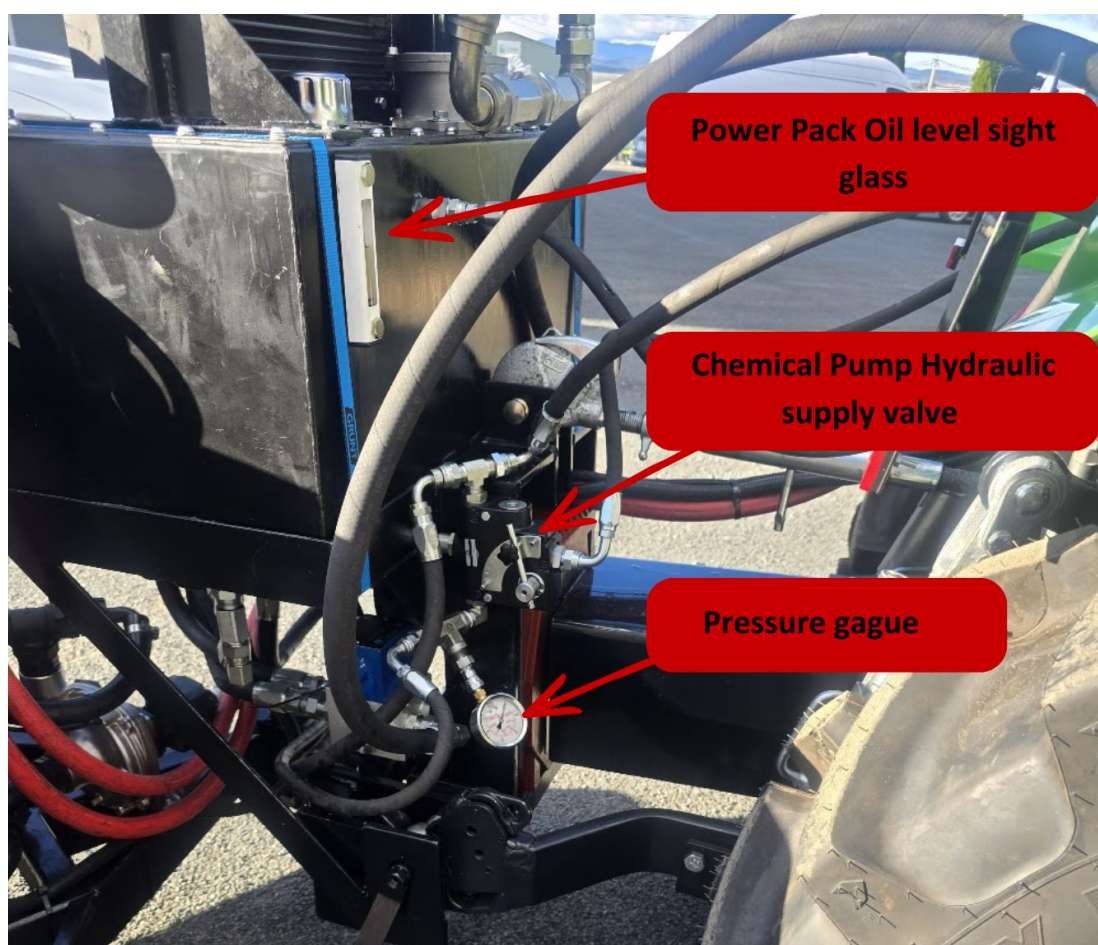


6. Pre-Start Inspection

Before operation:

- Inspect hoses, clamps, and fittings
- Check hydraulic oil level

Power pack oil level to be 20mm below the top black line in the sight glass, when level and oil is cold. The power pack must be level with the tractor, and height positioned so power pack input shaft is inline with the tractor PTO shaft. See picture below for illustration and location of site glass.



- Check gearbox oil level
- Check tyre pressures
- Check all wheel bolts and nuts are completely tensioned
- Ensure all guards and PTO shields are fitted
- Ensure spray lines and nozzles are secure and clear
- Ensure filters are clean

Picture below of the Main Chemical Suction Filter which should be cleaned after every tank. The Red valve in picture below can be used to shut off chemical flow between chemical tank and this filter when checking/cleaning.



- Ensure fan intake mesh is clean
- Confirm all personnel are clear of machine

7. Starting & Operating Procedure

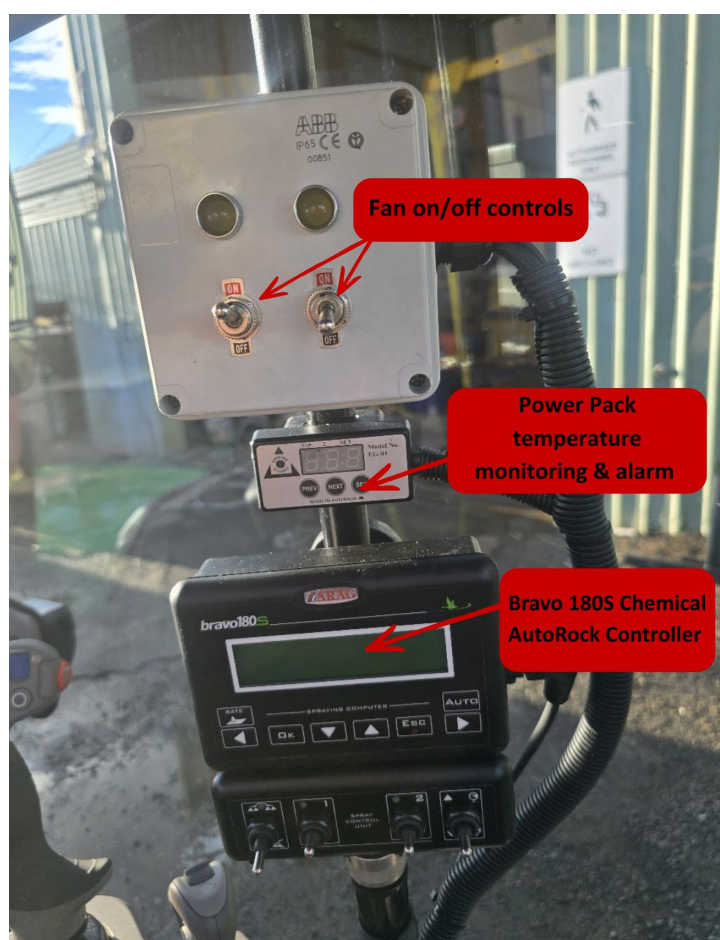
PTO Startup Procedure

1. Ensure both fan switches are OFF.
2. Amber fan switch lights must be OFF.
3. Start tractor at idle speed.
4. Ensure all persons remain at least 5 metres away.
5. Engage PTO at low engine speed (950 RPM or less).
6. Check for:
 - Excessive vibration
 - Noise
 - Guard interference

Increase engine speed to:

- Approximately 1,700 engine RPM
- Approximately 850 PTO RPM

Switch fans on one at a time. The **top control box** in the photo below turns the hydraulically driven fans on and off. Always engage and run the PTO before switching the fans on.



Fan on/off controls

Power Pack
temperature
monitoring & alarm

Bravo 180S Chemical
AutoRock Controller

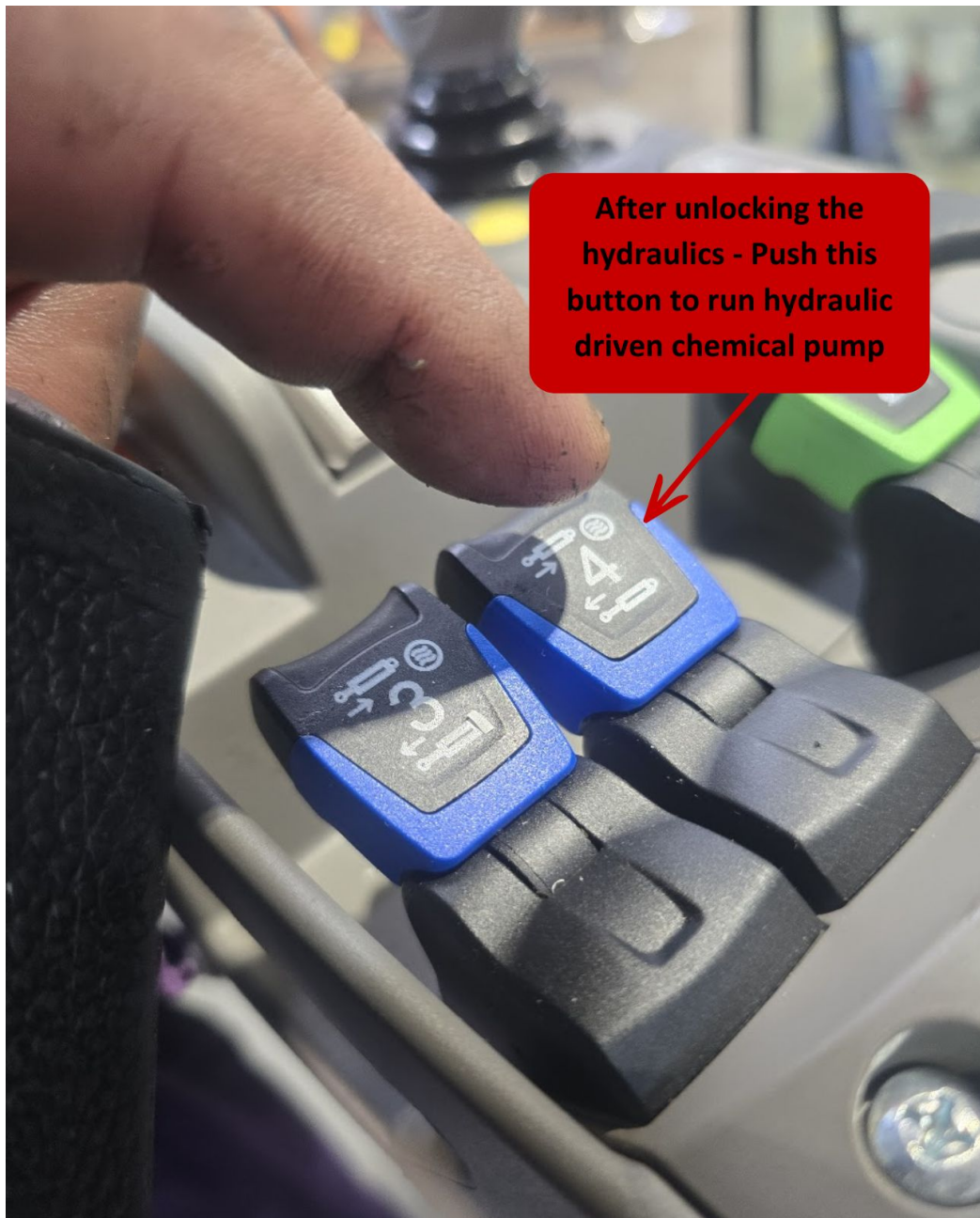
Continue monitoring:

- Noise
- Vibration
- Oil leaks
- Airflow
- Spray operation

8. Hydraulic System Operation

To enable tractor hydraulics:

1. Hold blue hydraulic unlock button until tractor display confirms activation.



2. Activate hydraulic remote #4 to operate chemical pump.
3. Remote must be set to:
 - Continuous flow
 - Approximately 50% flow rate

Pump operating pressure:

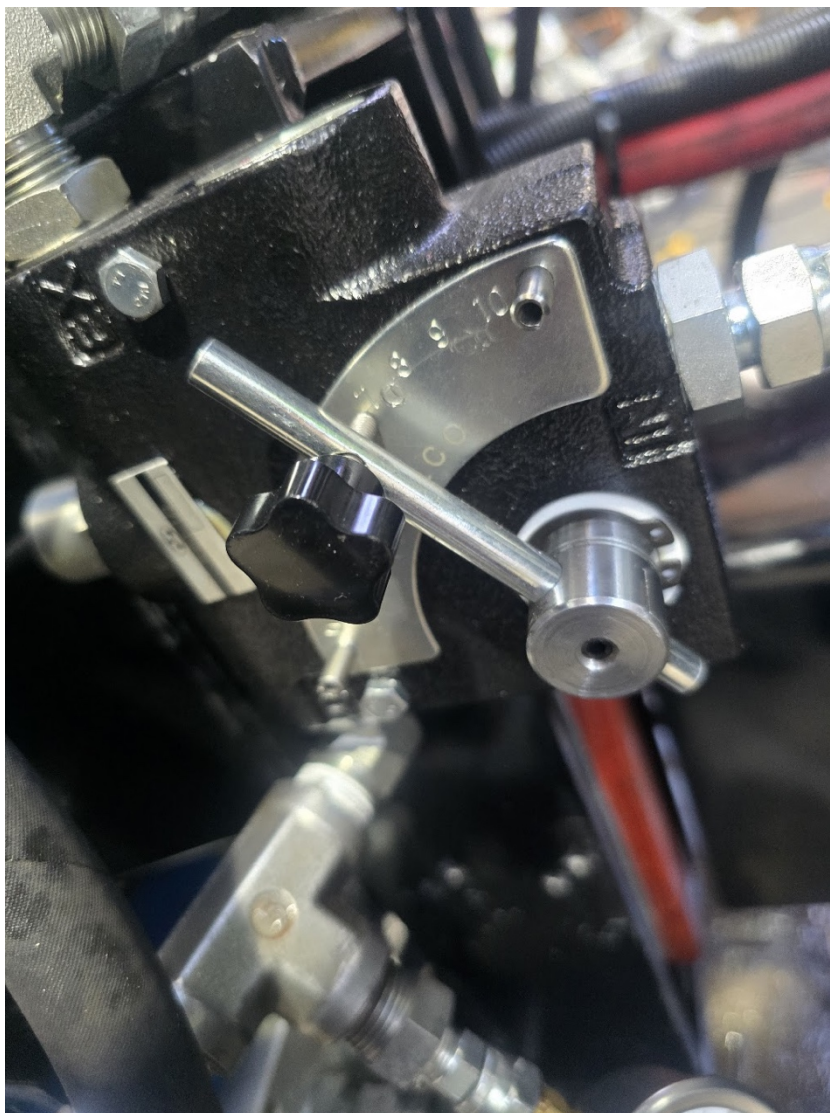
- Less than 50 Bar

Priority flow valve preset:

- Position #7



The valve that controls the max hydraulic flow to drive the chemical pump should be set in position #7 as in photo below.



The tank must contain sufficient water or spray solution before operating the hydraulic-driven chemical pump. Running the pump dry may cause overheating and damage.

8.1 Hydraulic system adjustments

There are valves located throughout the Twin Puff system that can be adjusted to change the speed ect. of the system. These valves are shown in the below photos



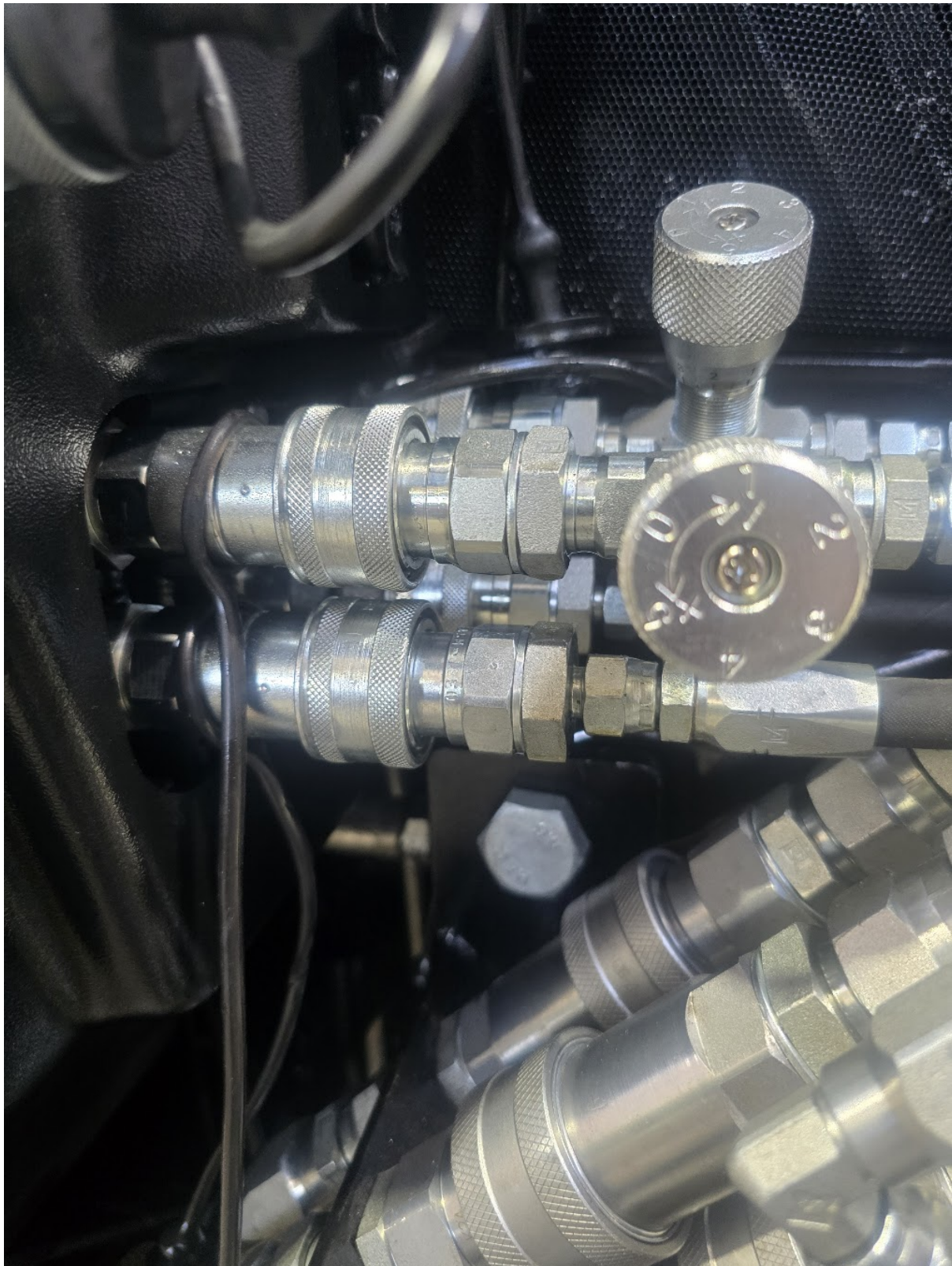


LH up/down speed control



RH up/down speed control

Speed control valves for the boom swing back cylinder





Tilt Lift Speed Adjustments
One control for each side.



9. Spray System Setup & Adjustment

Trumpets, droppers, and nozzle diffusers may be repositioned to suit:

- Crop growth stage
- Plant density
- Fruit positioning
- Row spacing

Adjust nozzle diffusers to optimise:

- Spray penetration
- Coverage
- Drift control

Unused air outlets should be capped to improve efficiency and reduce fuel consumption.

Unused spray lines may be isolated using the red anti-drip valve knobs:

- Rotate clockwise to shut OFF
- Rotate anti-clockwise to open

Chemical lines may be secured using cable ties where necessary to maintain correct nozzle positioning.

10. Spray Calibration & Metering

Refer to the Raven Bravo 180S operator documentation for:

- Controller setup
- Calibration
- Alarm functions
- Spray rate adjustment

IMPORTANT

If the controller Alarms:

- Stop spraying immediately
- Investigate and rectify the fault before continuing

10.1. Calibration Formula

The required nozzle output is calculated as:

$$\text{Output per Nozzle (L/min)} = \frac{\text{Application Rate (L/ha)} \times \text{Speed (km/h)}}{\text{Spray Width (m)} \times 600 \times \text{Number of Nozzles Operating}}$$

10.2. Calibration Procedure

Step 1 – Determine Operating Factors

Establish:

- Application rate (L/ha)
- Travel speed (km/h)
- Spray width (m)
- Number of operating nozzles

Step 2 – Calculate Nozzle Output

Use the calibration formula to determine the required nozzle flow rate.

Step 3 – Select Metering Disc

Select the metering disc that provides the required output at an operating pressure between:

- 1.0 and 5.0 Bar

Note: Lower pressures may cause intermittent opening and closing of non-drip modules, resulting in irregular spray patterns.

10.3. Calibration Example

Operating Factors

- Application rate = 650 L/ha
- Speed = 4 km/h
- Spray width 7 Rows / 6 x 1.15m = 6.9 m
- Operating nozzles 7 x 4 Nozzles = 28 Nozzles

Calculated Nozzle Output

Flow Rate Formula

$$(\text{L/ha} \times \text{Speed (km/h)} \times \text{Spray Width (m)}) \div 600 \div \text{Nozzles (qty)} = \text{L/min}$$

$$650\text{L/ha} \times 4\text{km/h} \times 6.9\text{m} \div 600 \div 28 \text{ Nozzles} = 1.07 \text{ L/min per nozzle}$$

Select the metering disc using below chart to achieve the target flow rate calculated:

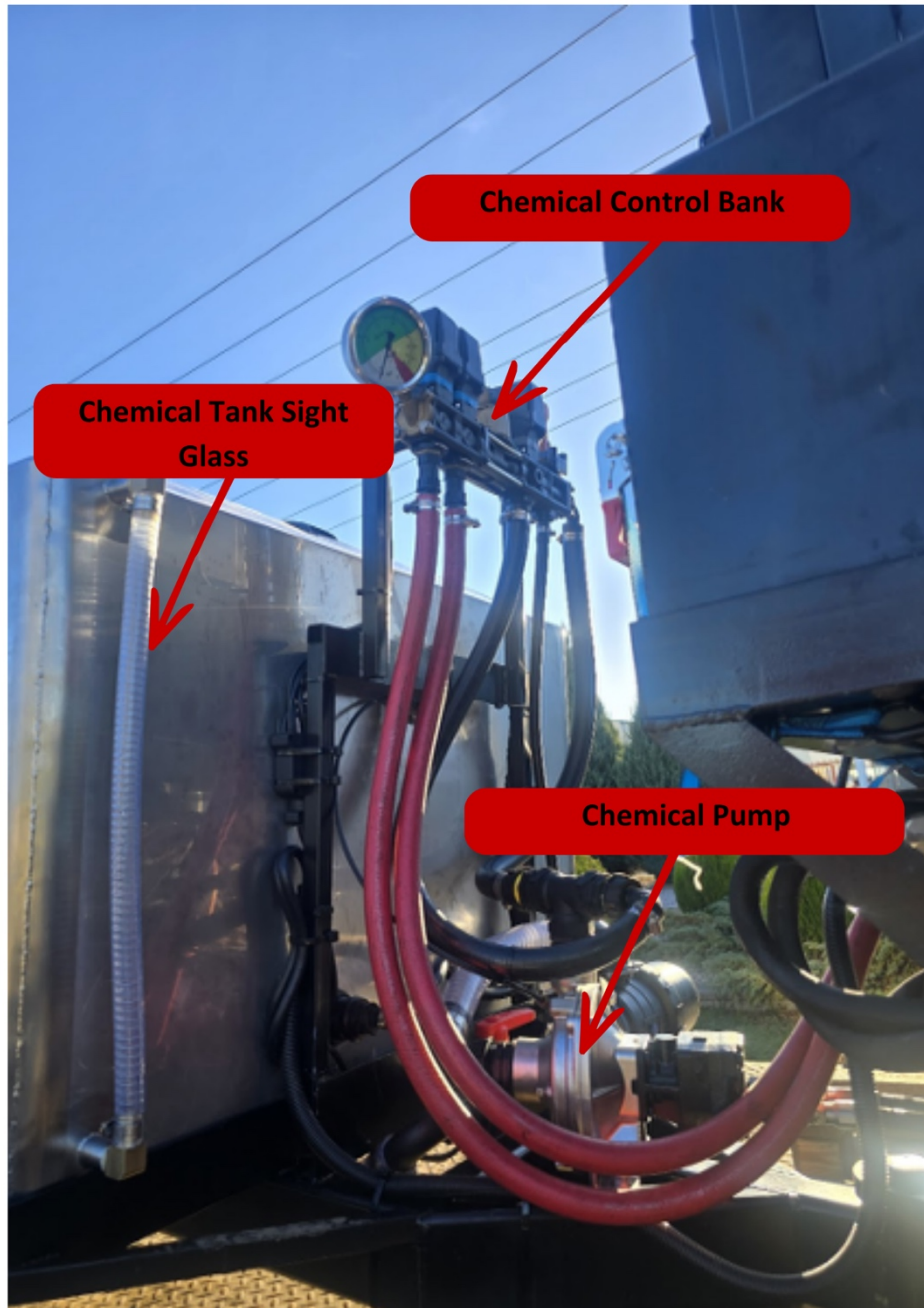
- 1.07 L/min

Example:

- So in this case use DVP-3 Green disc at 2.5 Bar will meter out 1.07 between 2.5-3.0Bar

METERING DISC OUTPUT CHART								
Pressure (Bar)		1.0	1.5	2.0	2.5	3.0	4.0	5.0
Disc No.	Disc Colour	Output (litres/minute)						
DVP-2	Orange	0.48	0.60	0.67	0.77	0.82	0.94	1.07
DVP-3	Green	0.63	0.79	0.89	1.01	1.10	1.25	1.40

11. Chemical Tank & Filtration System



Features include:

- Main chemical filter with shut-off valve
- Venturi agitator control valve
- Tank sight glass
- Rear drain valve
- Quick-fill camlock connection

- Hand wash tank
- Basket filter under lid



Agitator Operation

To operate agitator:

- Place red lever in UP/ON position
- Ensure chemical pump is running

12. Cleaning & Flushing

IMPORTANT The entire spray system must be flushed thoroughly after every spraying shift.

Failure to clean the system may cause:

- Chemical build-up
- Blockages
- Pump damage
- Inaccurate spraying

Cleaning requirements:

- Flush tank completely
- Flush all chemical lines
- Open line-end flush taps
- Clean filters and strainers
- Remove all chemical residue

Never allow chemicals to remain in the tank where settling may occur.

Maintain agitation until tank is fully emptied.

Dispose of rinsate in accordance with local environmental regulations.

13. Boom Folding Safety

WARNING Front mast must be completely lowered before folding booms rearwards.

Booms must only be folded:

- When securely mounted to tractor

Before removing front mast:

- Booms must be fully unfolded and balanced
-

14. Cooling System & Fan Safety

Hydraulic Oil Cooler

The cooling fan above the power pack must operate whenever tractor ignition is ON.

The oil cooler must remain clean and unobstructed.

WARNING

Do NOT use high-pressure cleaners on oil cooler cores.

Do NOT clean while oil cooler fan is running.

Use:

- Low-pressure water
- Compressed air
- Approved degreasers



The following monitor records the temperature of the hydraulic oil. It can be used as a guide to determine if there is an issue with the oil cooling system. It will send an alarm if the oil temperature gets to high.

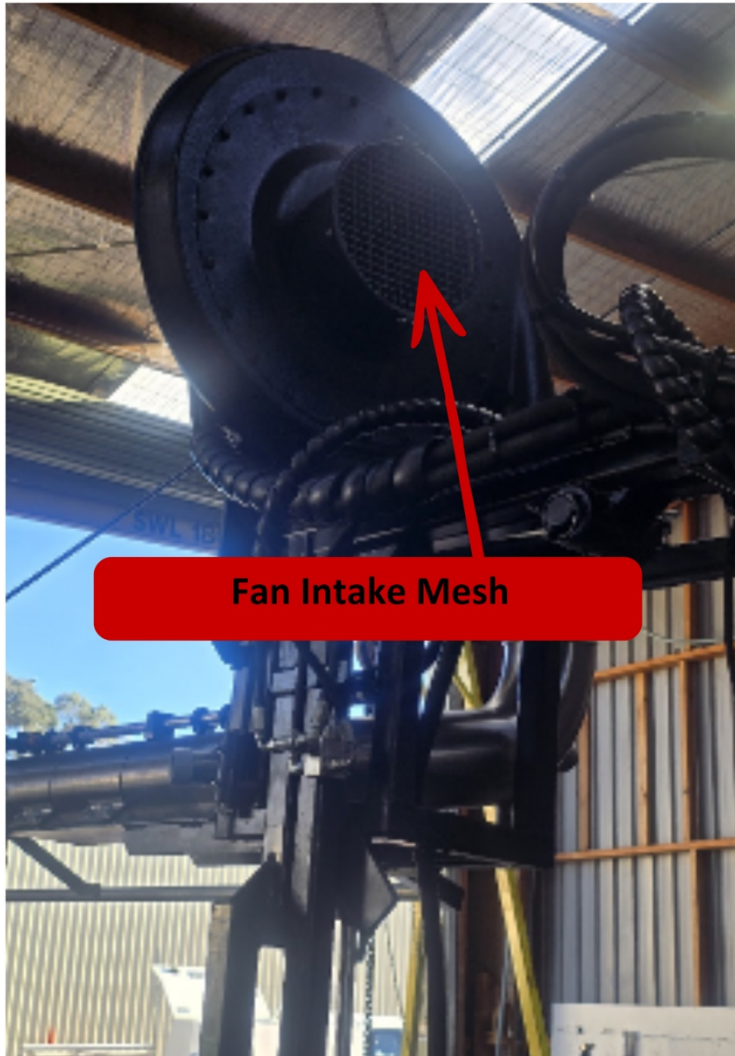


This should not be confused with the below monitor fitted closer to the steering wheel which monitors the temp of the **tractor's** engine and transmission.



Main Hydraulic Fans

Both the LH and RH side fan intake mesh must remain clean and unobstructed.



Do not:

- Remove guards
- Remove decals
- Modify machine without manufacturer approval

Inspect every 500 hours for:

- Free fan rotation
- Hydraulic leaks
- Hose condition

15. Maintenance Schedule

Item	Interval
Grease boom, mast & hitch points	Every 40 hours
Check wheel nuts	Daily when new, then weekly
Inspect hydraulic system	Daily
Replace hydraulic return filter	First 50 hours, then every 500 hours or annually
Replace gearbox oil	First 50 hours, then every 500 hours or annually
Inspect PTO shaft and grease	Every 40 hours
Inspect fans	Every 500 hours

16. Lubrication Points

Multipurpose grease is suitable for this application.

Lubrication points include:

- Mast pivots
- Boom hinges
- Trailer hitch pivots
- PTO universal joints
- PTO spline shaft
- Mast thrust plates and contact surfaces

WARNING

Never access PTO or rotating components with engine running.

Lubrication points shown on following pages.

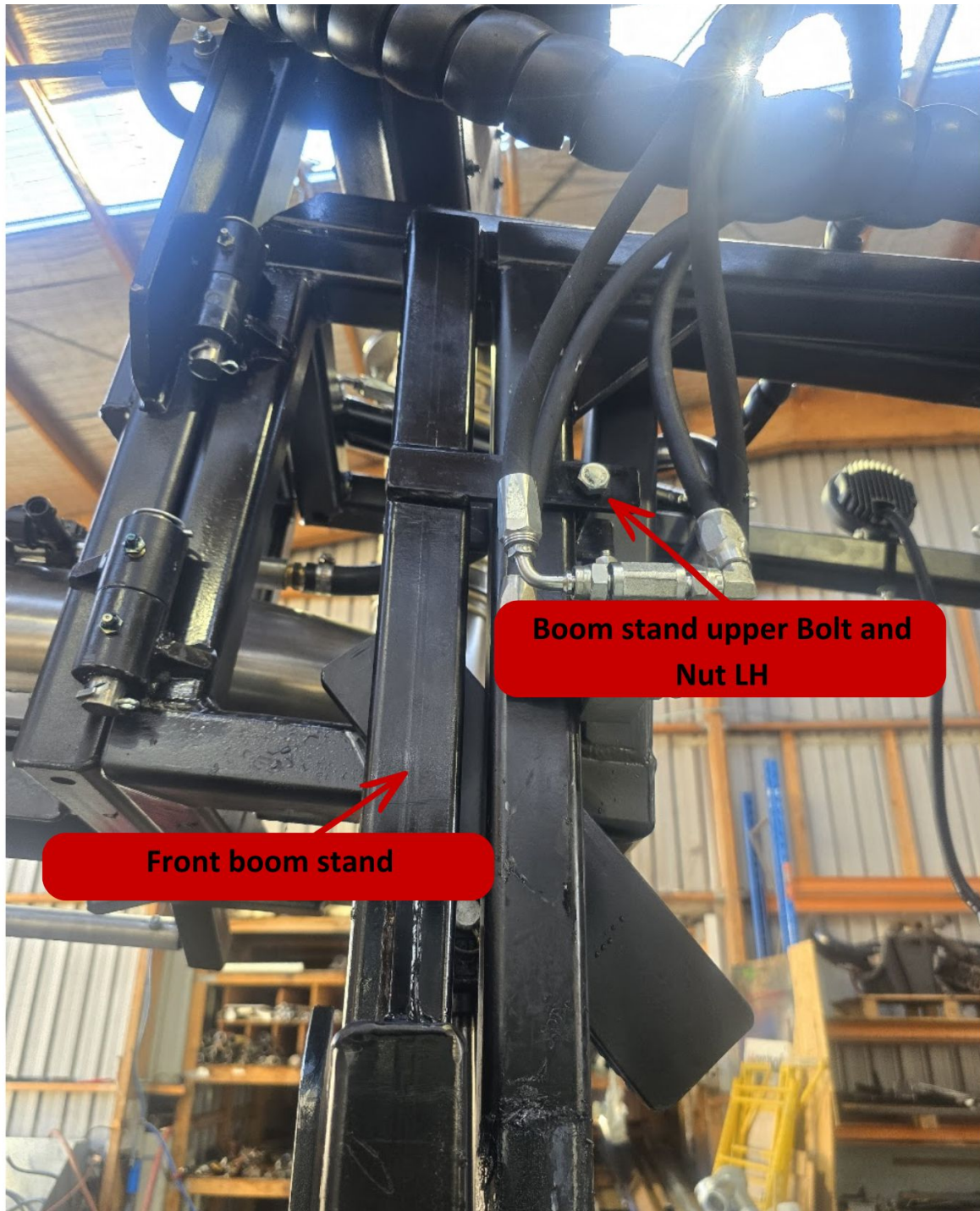
Apply Grease to the thrust surfaces on both sides of the boom daily as required (as blue grease shown in below picture)



Grease the left and right front thrust striking points daily as shown in picture below of one side.



Grease hinge points and boom strikers left and right, as shown one side in picture below





Apply grease here daily

Grease telescopic boom height slides



Grease nipple to grease the boom slides.

Grease boom pivot pin



**Grease nipple to lube boom
pivot.**

All greasing points should have stickers nearby as shown below. It is recommended to maintain the stickers to ensure no points are missed when greasing.



17. Hydraulic System Specifications

Hydraulic oil:

- ISO 68 Hydraulic Oil

Capacity:

- Approximately 130 litres

Correct oil level:

- 20 mm below upper black sight glass line
 - Machine level
 - Oil cold
-

Hydraulic Filters

System contains:

- Two in-tank suction filters
- One return filter

Suction Filters

To service:

1. Drain hydraulic tank
2. Remove top return filter assembly
3. Reach into tank and unscrew suction filters
4. Clean or replace as required

Return Filter

Replace:

- After first 50 hours
 - Then every 500 hours or annually
-

18. Gearbox Specifications

Oil type:

- 80W90 Gear Oil

Correct oil level:

- Centre of sight glass when cold and level

Service interval:

- First 50 hours
- Then every 500 hours or annually

19. Tyres & Wheels

- Inflate tyres to pressure specified on tyre sidewall
- Inspect tyres regularly
- Check wheel nut torque regularly

20. Removal of Rear Power Pack & Tank Unit

1. Park on stable, level ground.
2. Apply park brake.
3. Chock wheels.
4. Lower all equipment to ground.
5. Shut engine OFF.
6. Relieve hydraulic pressure.
7. Disconnect:
 - PTO
 - Hydraulic hoses
 - Electrical connections
 - Chemical hoses
8. Support unit using supplied stands.

21. Safety Decals & Signage

The following decals must remain fitted and legible:

- Pinch Point Warning
- Stand Clear When Machine Operating
- Grease Point Indicators

- Rotating Parts Warning
- Serial Number Plate
- Front Mast Folding Warning
- Chemical Tank Signage

Replace damaged or missing decals immediately.

22. Storage

- Store machine under cover where possible
 - Drain water before frost conditions
 - Relieve hydraulic and spray pressure
 - Isolate electrical power
 - Protect exposed metal surfaces from corrosion
-

23. Warranty & Service Information

For servicing, replacement parts, setup assistance, or technical support contact:

[Marshall Machinery](#) – 03 6330 1808
Legana, Tasmania, Australia

Warranty Summary

The MARMAC Strawberry Sprayer is warranted against defects in materials and workmanship for 12 months from delivery or installation, whichever occurs first, unless otherwise agreed in writing.

Warranty covers:

- Structural frame and fabricated components
- Spray boom assemblies
- Marshall Machinery-installed plumbing and electrical components
- Manufacturing defects affecting normal operation

Warranty does not cover:

- Normal wear items
- Nozzles, filters, hoses, seals, clamps and consumables
- Incorrect operation or setup
- Chemical corrosion or contamination
- Freezing or weather damage
- Unauthorised modifications or repairs

- Transport damage after delivery

Warranty may be void if:

- Non-approved parts are used
- Maintenance schedules are not followed
- Unauthorised repairs or modifications are carried out

Nothing in this warranty excludes rights available under Australian Consumer Law.

24. Service Record

Date: _____ Hours: _____ Work Completed: _____

Date: _____ Hours: _____ Work Completed: _____

Date: _____ Hours: _____ Work Completed: _____

Date: _____ Hours: _____ Work Completed: _____

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