GOLDACRES

Australia's World Class Sprayers

Prairie Eco

MY13 Operators Manual

For further information about any of the products shown please visit - www.goldacres.com.au.

All information in this operator's manual is based on the latest product information available at the time of printing. The policy of Goldacres is one of continuous improvement and as such, Goldacres reserve the right to alter any specifications and designs without notice and without incurring any obligation regarding such changes.

Goldacres Trading Pty Ltd
3 Morang Crescent
Mitchell Park Vic 3355

Ph: 03 5342 6399
Fax: 03 5342 6308

Revision number: 1.0
12/08/2014

Part #: GA5063725

Contents

Chapter 1

INTRODUCTION

Welcome

Congratulations on your purchase of a Goldacres sprayer. For more than a quarter of a century Goldacres has supplied Australian farmers with quality, innovative and technologically advanced spraying solutions - equipment designed in Australia for Australian conditions.

Goldacres not only produce Australia's finest range of spraying equipment - we also keenly value the unique relationship we enjoy with owners of our equipment. We are pleased to welcome you as a Goldacres owner and look forward to making your spray applications as efficient as possible.

Please use this comprehensive resource to gain a full understanding of your equipment, and don't hesitate to contact your Goldacres Dealer or Goldacres for further information.

Roger Richards
General Manager

Goldacres Ballarat

GOLDACRES - RESELLER TERMS AND CONDITIONS OF SALE

Goldacres Goods are only available for purchase upon the terms and conditions set out below.

Interpretation

1. In terms and conditions:
(1) "Goldacres" means Goldacres Trading Pty. Ltd. A.C.N. 061 306 732 trading as Goldacres Agricultural Equipment (its successors and assigns) which is the seller of the Goods;
(2) "Purchaser" means the purchaser of the Goods;
(3) "Goods" means the products and, if any, the services sold or provided by Goldacres to the Purchaser;
(4) "GST Act" and "GST" are given the meanings referred to in a New Tax System (Goods and Services Tax) Act 1999.
(5) "PPSA" means the Personal Property Securities Act 2009 (Clth) (as amended);
(6) Nothing in these terms and conditions shall be read or applied so as to exclude, restrict or modify or have the effect of excluding, restricting or modifying, any condition, warranty, guarantee, right or remedy implied by law (including the Competition and Consumer Act 2010) and which by law cannot be excluded, restricted or modified.

General

2. (1) The Goods and all other products or services provided by Goldacres are provided subject to these terms and conditions. These terms and conditions and any terms and conditions incorporated herein by virtue of clause 3 hereto shall prevail over all other terms and conditions of the Purchaser or otherwise to the extent of any inconsistency.
(2) These terms and conditions may not be modified or amended without the expressed written consent of Goldacres endorsed by the Managing Director of Goldacres Trading P/L.

Additional Terms and Conditions

3. From time to time Goldacres may provide additional or extended warranties in respect of certain goods and/or services. Where such additional or extended warranties are provided to a Purchaser in writing they will be incorporated into these terms and conditions provided that in the event of any inconsistency between these terms and conditions and the terms of any additional or extended warranty, the provisions of the additional or extended warranty shall prevail.

Goldacres quotations.

4. Unless previously withdrawn, Goldacres quotations are open for acceptance within the period stated therein or, when no period is stated, with 14 days only of the quotation date. Goldacres reserves the right to refuse any order based on any quotation within 7 days of receipt of the order.

Packing

5. The cost of any special packing and packing materials used in relation to the Goods shall be at the Purchaser's expense notwithstanding that such cost may have been omitted from any quotation.

Shortage

6. The Purchaser waives any claim for shortage of any Goods delivered if a claim in respect thereof has not been lodged with Goldacres within (7) seven days from the date of receipt of the Goods by the Purchaser.

Specifications, etc: Catalogues, etc: Quantities

7. All specifications, (including but not limited to: drawings, particulars of weights, volumes, capacities, dimensions, load factors) are approximate only and any deviation shall not be taken to vitiate any contract with Goldacres or form any claim against Goldacres. The descriptions, illustrations, and performances contained in catalogues, price lists and other advertising matter do not form part of the contract of sale of the Goods. Where specifications, drawings or other particulars are supplied by the Purchaser, Goldacres' price is made on estimates of quantities required. Should there be any adjustments in quantities above or below the quantities estimated by Goldacres and set out in a quotation, then any such increase or decrease shall be adjusted on a unit rate basis according to unit prices set out in the quotation.

Performance, Capacities, Chemicals, Liquids, Application Methods, Environmental Effects

8. Any performance, volumes, and/or capacity figures given by Goldacres are estimates only. Goldacres shall be under no liability for damages for failure to obtain such figures unless specifically guaranteed in writing and any such written guarantee shall be subject to the recognised tolerances applicable to such figures. The suitability of chemicals and other liquids for any application and the application methods and the environmental effects shall be the sole decision and responsibility of the Purchaser and the user of the Goods. Goldacres gives no warranty as to the suitability of any chemicals or other liquids for any application, nor the application methods nor the environmental effects, which may result from the use of the Goods. Goldacres shall be under no liability for damages arising out of the use of any chemicals, liquids, or mixtures in the Goods nor for any application, nor for the application methods nor for the environmental effects, which may result from the use of the Goods.

Delivery/Service Times

9. The delivery times and service times made known to the Purchaser are estimates only and Goldacres shall not be liable for late delivery, non-delivery or delay and under no circumstances shall Goldacres be liable for any loss, damage or delay occasioned by the Purchaser or its customers arising from the late or non-delivery or late installation of the Goods.

Loss or damage in transit

10. Goldacres is not responsible for any loss or damage to Goods in transit. Goldacres shall render the Purchaser such assistance as may be necessary to press claims on carriers provided that the Purchaser shall have notified Goldacres and the carriers immediately the loss or damage is discovered on receipt of Goods and shall lodge a claim on the carrier within three days of the date of receipt of the Goods. Insurance of Goods in transit is the responsibility of the Purchaser.

Limit of Liability

11. (1) Goldacres liability for Goods manufactured by it is limited to:
(a) where the law implies consumer guarantees into these terms and conditions pursuant to Part 3.2 Division 1 of Schedule 2 to the Competition and Consumer Act 2010 (C'th") ("consumer guarantees") which cannot be excluded and Goldacres breaches a consumer guarantee, the loss and damage the Purchaser is entitled to at law which cannot be excluded by these terms and conditions;
and, in all other cases
(b) making good any defects by repairing the same or at Goldacres option by replacement within a period not exceeding either 1000 hours or twelve calendar months, whichever comes first, after the Goods have been dispatched provided that:
(i) the defects have arisen solely from faulty materials or workmanship;
(ii) the Goods have not received maltreatment inattention or interference;
(iii) accessories of any kind used by the Purchaser are manufactured or approved by Goldacres;
(iv) where applicable, the seals on the Goods remain unbroken;
(v) there has been no improper adjustment, calibration or operation;
(vi) the use of accessories including consumables, hardware or software (not manufactured by Goldacres) has been approved in writing by Goldacres;
(vii) no contamination or leakage has been caused or induced;
(viii) any modification to the Goods have been authorised in writing by Goldacres;
(ix) there has been no inadequate or incorrect use, storage, handling or application of the Goods;
(x) there has been no use or operation of the Goods outside of the physical, electrical or environmental specifications of the Goods;
(xi) there has been no inadequate or incorrect site preparations;
(xii) there has been no inadequate or improper maintenance of the Goods;
(xiii) it has not been caused by fair wear and tear; and
(xiv) firstly the Goods have been thoroughly inspected and any damage (from whatever cause) to the Goods (and in particular – the structure, welding, seams, bolts, booms) has been repaired prior to the Goods being operated, used driven or moved and on each occasion the tanks are filled; and
(xv) there has been no failure to comply with the requirements of all present or future laws or regulations relating to the Goods and/or the use and/or the operation of the Goods; and
(xvi) there has been no failure to maintain a record of hours of operation (which record shall contain full details of all inspections, repairs and maintenance) and produce same to Goldacres at the time of the claim;
(xvii) the defective Goods or any damaged part of the Goods are promptly returned free of cost to Goldacres or a representative of Goldacres;
(xviii) all warranty related repairs have been carried out with the prior authorisation of Goldacres;
(2) If Goods or any part thereof are not manufactured by Goldacres, in particular engines, engine accessories, transmissions, transfer cases, differentials, tyres, tubes, batteries, radios and UHFs, the guarantee of the manufacturer thereof shall be accepted by the Purchaser and is the only guarantee given to the Purchaser in respect of the Goods or that part provided always that this clause does not seek to exclude the consumer guarantees;
(3) In the case of hydraulic systems, Goldacres shall replace defective parts in accordance with clause 11(1) of these conditions, provided that the failure of the part was not related to contamination within the system, Goldacres shall not be liable for labour in the case of repairing hydraulic system defects;
(4) Goldacres will not accept liability for damage attributed to fair wear and tear including but not limited to fair wear and tear to nozzles, chains, belts, filters, brake pads, polyethylene bushes and liquid pump valves, valve O-rings, diaphragms and seals;
(5) Goldacres shall not be liable for and the Purchaser releases Goldacres from any claims in respect of faulty or defective design of any Goods supplied unless such a design has been wholly prepared by Goldacres and the responsibility for any claim has been specifically accepted by Goldacres in writing and in any event Goldacres liability hereunder shall be strictly limited to the replacement of defective parts in accordance with paragraph 11(1) of these conditions provided always that this clause does not seek to exclude the consumer guarantees;
(6) Except as provided herein, all express and implied warranties, guarantees and conditions under statute or general law as to the merchantability, description, quality, suitability or fitness of the Goods for any purpose or as to design, assembly, installation, materials or workmanship or otherwise are hereby expressly excluded and Goldacres shall not be liable for physical or financial injury, loss or damage or for consequential loss or damage of any kind arising out of the supply, layout, assembly, installation or operation of the Goods or arising out of Goldacres negligence or in any other way whatsoever;
(7) The benefit of any warranty provided under these terms and conditions shall only be available to the Purchaser and shall not be transferable by the Purchaser;
(8) The warranties provided under these terms and conditions do not extend to second hand or used Goods that may be sold by Goldacres.

12. Goldacres liability for breach of a consumer guarantee is hereby limited (in the case of goods and services not used for personal, domestic or household purposes) to:
(1) in the case of Goods, any one or more of the following:
(a) the replacement of the Goods or the supply of equivalent Goods;
(b) the repair of the Goods;
(c) the payment of the cost of replacing the Goods or acquiring the equivalent Goods;
(d) the payment of having the Goods repaired; or
(2) in the case of services;
(a) the supplying of the services again; or
(b) the payment of the cost of having the services supplied again.

Prices

13. (1) Unless otherwise stated in writing by Goldacres, all prices quoted by Goldacres are inclusive of GST for supplies within Australia and exclusive of GST for exports outside of Australia. Prices quoted are those ruling at the time of quotation or the date the price is given and are based on rates of freight, insurance, customs, duties, taxes, exchange, shipping expenses, sorting and stacking charges, cartage, cost of materials and other charges affecting the cost of production ruling on that date and any alterations thereto either before acceptance of or during currency of the contract shall be to the Purchaser's account.
(2) For the purpose of 38-185 of the GST Act, the day upon which the seller gives the invoice for the supply shall be the date of the invoice.

Payment

14. (1) The purchase price in relation to the Goods and the cost of the service shall be payable without deduction and or set off and payment thereof shall be made on or before the thirteenth day of the month following the delivery of the Goods or performance of the services unless other terms of payment are expressly stated in writing.
(2) A decreasing or increasing adjustment and or the issuing of an adjustment note, pursuant to Division 21 and Division 29-C of the GST Act, shall not, in any way, constitute a release, waiver, and or forgiveness of the debt incurred by the Purchaser.

Interest on overdue payments

15. If Goldacres is not paid for any Goods or services on the due date specified in this agreement without prejudice to any other right or remedy, all outstanding money shall bear interest at the rate set, pursuant to the Penalty Interest Rates Act, Victoria, 1986, as such money, together with interest shall be recoverable forthwith from the Purchaser.

Rights in relation to Goods.

16. (1) Title to the Goods supplied by Goldacres to the Purchaser shall remain with Goldacres until the total amount due in respect of the Goods and all monies owing to Goldacres have been paid in full (the "Debts"). Risk in the Goods shall pass to the Purchaser upon delivery.
(2) The Purchaser shall have the right to resell Goods but only as fiduciary agent and trustee for Goldacres by way of bona fide sale at full market value and in the ordinary course of its business.
(3) Until all the Debts have been paid in full:
(a) the Purchaser shall take custody of the Goods as trustee, fiduciary agent and bailee for Goldacres;
(b) the Purchaser shall keep the Goods separate from any other goods and properly marked, stored, protected and insured;
(c) the Purchaser must hold all of the money it receives ("Proceeds"):
(i) from the sale of any property into which Goods supplied have been incorporated; and
(ii) from the sale of Goods or provision of services including the Goods supplied by the Goldacres as bailee, fiduciary agent and trustee for Goldacres, but the Purchaser need not hold on trust any money exceeding the amount of the Debts at the time the money is received.
(d) The Purchaser expressly acknowledges that it is bound by the fiduciary obligation created in the preceding paragraph and acknowledges that:
(i) it must hold the Proceeds on trust for Goldacres;
(ii) it must place the whole of the Proceeds in an account separate from its own moneys (the "Proceeds Account");
(iii) it must maintain the Proceeds Account separate from its own moneys at all times.
(iv) it must maintain proper records for the Proceeds Account.
(v) it must not assign or encumber any book debts arising from sales made in circumstances set out in clauses 16(c)(i) and (ii) or do any other act in derogation of Goldacres' legal or beneficial interests; and
(vi) it must account to Goldacres on demand for all moneys standing to the credit of such account.
(e) For the purposes of identification of different consignments of Goods purchased from Goldacres and receipt of Proceeds, the Purchaser agrees that the principle of "Last In, First Out" shall be applied to any items that cannot be distinguished.
(f) Goldacres may trace the Proceeds in equity.
(4) Goldacres may at any time, without notice to the Purchaser and without prejudice to any other rights which it may have against the Purchaser, terminate any contract connected with the Goods and the bailment referred to in clause 16(3) and enter upon any premises owned or occupied by the Purchaser where Goldacres reasonably believes the Goods may be stored, and repossess the Goods without liability for any damaged caused, and subsequently dispose of the Goods at Goldacres' discretion if:
(a) the Debts are not paid in accordance with these terms and conditions or any other contract or arrangement between Goldacres and the Purchaser; or
(b) Goldacres receives notice of or reasonably believes that:
(i) a third person may attempt to levy execution against the Goods; or
(ii) the Purchaser is insolvent (within the meaning of the Corporations Act 2001) or bankrupt; or
(iii) the Purchaser has entered into any arrangement or composition with its creditors, gone into liquidation, or has appointed a receiver, a receiver and manager or administrator.
(5) If after repossession under clause 16(4) Goldacres sells the Goods, Goldacres shall account to the Purchaser for any proceeds of sale (less expenses of repossession and sale) that exceeds the amount of the outstanding Debts.
(6) If any Goods belonging to Goldacres are disposed of by the Purchaser or an insurance claim is made in respect of them, Goldacres shall be entitled to trace the sale or insurance proceeds, which proceeds shall be held by the Purchaser in a separate bank account on trust for Goldacres.
(7) The Purchaser agrees and acknowledges that in the event it sells Goods to a third party on account, it will include in its terms and conditions of sale a provision under which the Purchaser retains title to the Goods until such time that the total amount due in respect of the Goods and all monies owing to the Purchaser have been paid in full by that third party debtor. The Purchaser also agrees and acknowledges that in these instances, it will register its PMSI in accordance with the PPSA in respect of its security interest in the Goods.

PPSA provisions

17. (1) The Purchaser acknowledges that these terms and conditions constitute a security agreement for the purposes of section 20 of the PPSA and that a security interest exists in all Goods (and any associated Proceeds from their sale) previously supplied by Goldacres to the Purchaser (if any) and in all in future Goods (and any associated Proceeds from their sale) that may be supplied to the Purchaser by Goldacres.
(2) The Purchaser acknowledges that Goldacres has a first ranking purchase money security interest ("PMSI") (as defined in section 14 of the PPSA) in the Goods and the Purchaser must not jeopardise such ranking (whether by act or omission).
(3) The Purchaser acknowledges that it has received value as at the date of first delivery of the Goods and has not agreed to postpone the time for attachment of the security interest (as defined in the PPSA) granted to Goldacres under these terms and conditions.
(4) The Purchaser will execute documents and do such further acts as may be required by Goldacres to register the security interest granted to Goldacres under these terms and conditions under the PPSA.
(5) Until ownership of the Goods passes, the Purchaser must not give to Goldacres a written demand or allow any other person to give Goldacres a written demand requiring Goldacres to register a financing change statement under the PPSA in respect of Goldacres' interest in the Goods.
(6) The Purchaser must indemnify Goldacres and on demand reimburse Goldacres for all costs and expenses incurred by Goldacres in respect of these terms and conditions including but not limited to Goldacres registering its security interest in the Goods, lodging, discharging or amending any financing statement or financing change statement, or otherwise complying with the PPSA.
(7) The Purchaser agrees (other than as provided in these terms and conditions) not to sell, lease, mortgage, deal with, dispose of or create or attempt to create any other security interest in or affecting the Goods unless and until the Purchaser's Debts have been satisfied.
(8) The Purchaser waives its rights under the following provisions of Chapter 4 of the PPSA:
(a) to receive a notice on enforcement action against liquid assets (section 121(4),
(b) to receive a notice to seize collateral (section 123);
(c) to receive a notice of disposal of Goods by Goldacres purchasing the Goods (section 129);
(d) to receive a notice to dispose of Goods (section 130);
(e) to receive a statement of account following disposal of Goods (section 132(2));
(f) to receive a statement of account if no disposal of Goods for each 6 month period (section 132(4));
(g) to receive notice of any proposal of Goldacres to retain Goods (section 135(2));
(h) to object to any proposal of Goldacres to either retain or dispose of Goods (section 137(2));
(i) to redeem the Goods (section 142);
(j) to reinstate the security agreement (section 143);
(k) to receive a notice of any verification statement (section 157(1) and section 157(3);
(9) The rights Goldacres may have under the PPSA are supplementary and in addition to those set out in these terms and conditions and do not derogate from the rights and remedies of Goldacres under these terms and conditions or under any other statute or under general law.
(10) The Purchaser must give 10 business days prior written notice of any proposed change in the Purchaser's name or other identifying characteristics and details.

Purchasers property

18. Any property of the Purchaser under Goldacres' custody or control shall be entirely at the Purchaser's risk as regards loss or damage caused to the property or by it.

Storage

19. Goldacres reserves the right to make a reasonable charge for storage if delivery instructions are not provided by the Purchaser within (14) fourteen days of a request by Goldacres for such information.

Returned Goods

20. Goldacres shall not be under any obligation to accept Goods returned by the Purchaser and will do so only on terms to be agreed in writing in each individual case.

Goods sold

21. All Goods to be supplied by Goldacres shall be described on the purchase order agreed by Goldacres and the Purchaser and the description on such purchase order modified as so agreed shall prevail over other descriptions including any Purchaser's specification or enquiry.

Cancellation

22. No order may be cancelled except with the consent in writing and on terms, which will indemnify Goldacres against all losses.

No waiver

23. The failure of any party to enforce the provisions of these terms and conditions or to exercise any rights expressed in these terms and conditions shall not be a waiver of such provisions or rights and shall not affect the enforcement of this agreement. The exercise by any party of any of its rights expressed in this agreement shall not preclude or prejudice such party from exercising the same or any other rights it may have irrespective of any previous action taken by that party.

Force Majeure

24. If by reason of any fact, circumstance, matter or thing beyond the reasonable control of Goldacres is unable to perform in whole or in part any obligation under these terms and conditions then Goldacres shall be relieved of that obligation under these terms and conditions to the extent and for the period that it is so unable to perform and shall not be liable to the Purchaser in respect of such inability.

Passing of risk

25. Risk in the Goods shall pass to the Purchaser upon delivery of the Goods to the Purchaser or collection of the Goods by the Purchaser's agent or carrier as the case may be.

Exclusion of liability

26. To the extent permitted by law Goldacres shall not be liable to the Purchaser in contract or in tort arising out of, or in connection with, or relating to, the performance of the Goods or any breach of these conditions or any fact, matter or thing relating to the Goods or error (whether or not it is negligent or a breach of contract) in information supplied to the Purchaser or a user before or after the date of the Purchaser's or user's use of the Goods and Goldacres shall be under no liability for damages arising out of the use of any chemicals, liquids, or mixtures in the Goods, nor for any application, not for the application methods nor for the environmental effects, which may result therefrom or from the use of the Goods.

Exclusion of representations and arrangements

27. To the extent permitted by law the terms and conditions supersede and exclude all prior and other discussions, representations (contractual or otherwise) and arrangements relating to the supply of the Goods or any part thereof including, but without limiting the generality of the foregoing, those relating to the performance of the Goods or any part thereof or the results that ought to be expected from using the Goods.

Place of contract

28. The contract for sale of the Goods and the provision of the services is made in the State of Victoria and the Purchaser agrees to submit all disputes arising with Goldacres to the courts of such State and any court competent to hear appeals therefrom.

Chapter 2

SAFETY

General

The following pages outline important safety information. At Goldacres safety is a high priority. These safety and warning instructions MUST be followed to ensure the safe operation of your Goldacres equipment.

Explanation of key terms used in this operator's manual are:

Danger

You will be killed or seriously hurt if you don't follow instructions

Warning

You can be seriously hurt if you don't follow instructions

Caution

You can be hurt or machine damage can result if you don't follow instructions

Note

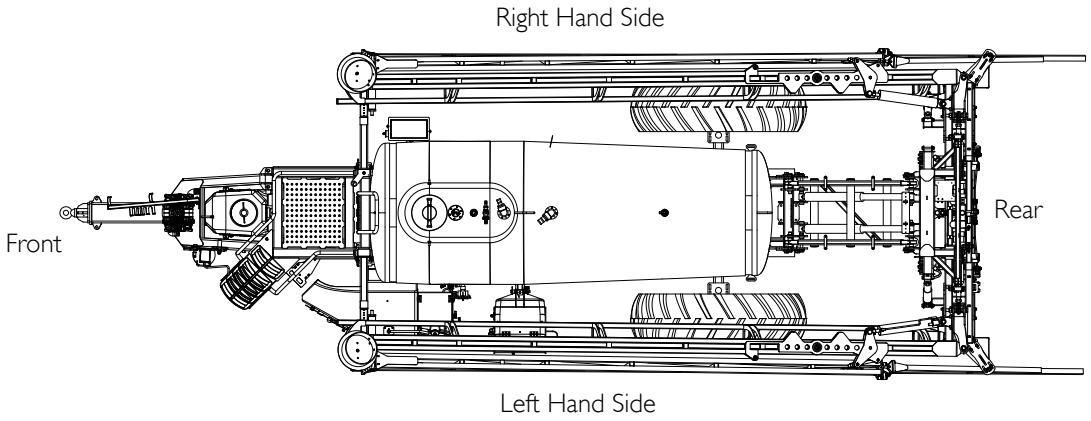
Is used to notify people of installation, operation or maintenance information that is important but not hazard related.

The Operator

All operators of this equipment should be adequately trained in the safe operation of this equipment. It is important that all operator's have read and fully understand the operators manual prior to using this equipment.

All new operators should be trained in an area without bystanders or obstructions and become familiar with the sprayer prior to operation.

Machine Orientation



Safety Precautions

Notes

- Always read, and understand, the operator's manual prior to operation of this equipment.
- It is the responsibility of the operator to ensure that there are no decals missing from the equipment and that any damaged, or missing, decals are replaced prior to operation.
- Goldacres equipment ordered, or operated, outside the guideline limitations may not be warranted by Goldacres for successful performance. Operators working outside these limitations do so at their own risk, unless specific advice has been sought from, and provided by, Goldacres in writing.
- Always read and follow the chemical manufacturer's guidelines for safe application as per the chemical label. Particular attention should be given to the recommended target application rate of the chemical being applied as per the chemical label.
- Inspect the equipment thoroughly for damage and wear before operation.
- Lubricate the equipment as per recommended requirements before operating.
- Flush chemicals from equipment immediately after use.
- Certain chemicals may be unsuitable for use with Goldacres standard plumbing designs. Consult your Goldacres dealer if in doubt.
- Do not operate the equipment while under the influence of any drugs, alcohol or if excessively tired.
- Make sure that the equipment complies with all relevant road regulations when transporting.
- Goldacres equipment uses several materials that may be harmful to the environment. Potentially harmful waste used with Goldacres equipment includes such items as oil, fuel, coolant, brake fluid and batteries. If these items are disposed of incorrectly the waste can threaten the surrounding environment and ecology. The waste products can leech into surrounding water sources and contaminate the area.
- When draining fluids from the equipment use appropriate, leak proof containers. Do not use food or beverage containers because someone may consume the contents by mistake.

Cautions

- A supply of fresh water should be with the equipment at all times.
- Water tanks are not designed for use with diesel fuel or any flammable liquid.
- Do not use this machine in ambient temperatures exceeding 40 degrees Celsius.
- Each individual boom section has a maximum delivery of 35 litres per minute with clean filters fitted.
- The maximum combined flow of all boom sections is limited to 140 litres per minute, or 50% of the pump flow whichever is the lesser amount, with clean filters.
- Do not exceed the maximum spraying pressure of 8 Bar.
- Ensure that all bolts are tightened and secured before operation.
- Where fitted, care should be taken to never overfill the diaphragm pump with oil or operate at speeds exceeding 540 rpm.
- Always ensure that the boom is securely supported when travelling.
- Do not travel at excessive speeds over rough terrain. The superior ride characteristics of this machine can disguise the impact of rough terrain, on the driveline and suspension system on the machine. After impact with gutters, sinkholes, rocks etc. stop the machine and inspect for damage.
- Check the wheel nut tension on a regular basis. The torque and inspection frequency is outlined in the maintenance section.

Support Machine Safely

Before raising the machine off the ground;

✓ Ensure that the boom is in its closed position.

✓ Park on a flat level, firm area.

✓ Where possible before lifting the machine, empty the spray tank.

✓ Chock all wheels that remain on the ground.

✓ Securely lift the machine using a jack and support the machine on work stands.

× Do not rely solely on the jack before working under the machine.

× Do not support the sprayer using materials that may crumble.

× Do not work under the machine when supported solely by a jack.

Changing Wheels and Tyres

Changing
An experienced person with the correct equipment should mount the wheels on the sprayer.

When changing a wheel on the sprayer ensure that the sprayer is on firm level ground and the wheels are chocked.

Tyre maintenance
Maintain correct tyre pressure at all times. Inflation of tyres above or below the recommended pressure exerts additional pressure on the tyre, which may result in tyre damage.

Extreme caution is required during the inflation of tyres. If the tyre is inflated at a rapid rate separation and/or explosion of the rim can occur. This event can inflict serious or fatal injuries to the operator.

✓ Always use a tyre inflation gauge.

× Do not weld, heat or modify the rim.

✓ Be proactive and continually check the condition of your tyres.

Maintenance Warning (Crush Hazard)

Never attempt to maintain axles, wheels or components within the vicinity of the wheels with the engine running.

Burn Risk

- Ensure safety around hydraulic lines when at operating temperature.

Warnings

- Any unauthorised modifications to this equipment may affect its function and create a serious safety risk.
- Do not drink water from the hand wash bottle.
- Keep clear of overhead obstructions – especially power lines as contact can be fatal.
- Never attempt to clean parts, or nozzles, by blowing with mouth.
- Never attempt to siphon chemicals, or substances, by sucking with mouth.
- It is imperative that the vehicle manufacturer's specifications be checked and all instructions for use when transporting, or towing, be adhered to at all times.
- Care should be taken when transferring liquid into the tank to ensure that the gross weight of the equipment does not exceed the carrying and braking capacity of the vehicle to which as specified by the vehicle manufacturer.

  NOTE: 1 Litre Water = 1 Kg.
- Water weighs 1kg per litre, however conversion factors must be used when spraying liquids that are heavier or lighter than water. Example: liquid nitrogen has a density of 1.28 kg/L and will therefore be significantly heavier than water if the tank is filled completely. The total weight of a tank full of chemical, should not exceed that of a full tank of water. Machine damage can result if the machine is over weight. (See filling instructions in the Operations chapter for more information.)
- Suitable care should be taken when driving the vehicle. Consideration should be given to both the carrying capacity of the vehicle and the gradient of the terrain when determining the speed at which the vehicle can be driven safely.
- Ensure that the maximum speed of the vehicle, when loaded, is within the vehicle manufacturer's limitations.
- Ensure equipment is securely fastened, or attached, to vehicle at all times.
- Never stand within the radius of boom wings.

- Never work under any hydraulically raised boom.

Personal Protective Equipment (PPE)

Always wear close fitting clothing and safety equipment designed for the job.

- Exposure to loud noise over an extended period can cause impairment or loss of hearing. Be active in the conservation of your hearing and wear appropriate hearing protection at all times.
- Chemicals can be harmful to humans, appropriate PPE should be used when handling chemicals. Always refer to the chemical manufacturers label for guidelines on the appropriate PPE to use with the chemical/s you are using.

Airborne Particles

- Always stand well clear of equipment during operation.
- Any spray drift is dangerous and may be hazardous to humans.
- When heating and welding components, ensure that all paint and other such materials are removed. Often hazardous airborne particles and fumes are generated from welding and heating.

Do Not Heat Pressurized Fluid Lines

When conducting any process on the machine that involves heat; be aware of pressurized fluid lines in the vicinity of your work area.

Pressurized lines can be easily cut when the heat over shoots the target object.

Do Not Carry Passengers

Do not stand or carry passengers on the steps or platform when the equipment is in motion or when the booms are being folded or unfolded.

Fluids Under Pressure

Fluids escaping from high pressure lines can cause serious injury to skin. Hydraulic oil can easily penetrate human skin. This hazard can be avoided by relieving the pressure in the system.

Do not disconnect any hoses, nozzles or filters while equipment is operating. Disconnecting these components while under pressure may result in uncontrolled fluid discharge which may be hazardous.

When the repair is complete ensure that all fittings and lines are secured before re-applying pressure.

Machine Operation

- High speed turning places severe stresses on the wheels and axles and should be avoided. It is essential to observe the effects of turning on the open spray boom. Excessive turning speeds transmit great stresses to the spray boom and WILL CAUSE boom damage.
- MAXIMUM SPEED WHEN CORNERING, TURNING AT AN ANGLE GREATER THAN 45° OR DRIVING ON A SLOPE OR UNEVEN TERRAIN IS 5KM/H. When fitted with narrow wheel track and with high centre of gravity, the Goldacres Prairie Eco sprayer may become unstable when turning at excessive speed or when operating on excessively steep terrain.

Collision prevention and warning lights

- Before operating the machine check with the relevant road management authorities for information regarding safe and legal transport on public roads in the state where the machine is being operated.
- To assist in the prevention of collisions with other road users the Goldacres Prairie Eco sprayers, are fitted with warning lights and signs in accordance with Vic Roads regulations.
- Keep lighting and signs in good order and replace any damaged or faulty fixtures.

Working at Heights

Please contact your local government on the restrictions and safety requirements needed to operate at heights.

- There is a risk of falling if a person has "climbed" into the machine.
- Do not "climb" on machine to get access.
- Use ladder or work platform to get access to parts or areas of the machine above local government restrictions.

Slippery Surfaces

- The surface of the platform has raised portions to stop slipping.
- The platform surface needs to be kept clean of mud and other material to help stop slipping.

Main Tank

- Danger - Confined space do not enter.
- Do not enter the tank for any purpose.

Dangers

- Check area to be sprayed for overhead powerlines. Contact between the machine and powerlines can result in serious injury or death. If there are powerlines in the spray area, exercise extreme caution when tilting boom wings.
- Do NOT walk on machine platform when near power lines.

Entanglement in Rotating Drive Lines

- Rotating drives can cause serious injury or even death when entanglement occurs. Keep hands, feet, hair and clothing away from all moving parts to prevent injury. Never operate this machine with covers, shrouds, or guards removed.

Safe Use of Chemicals

The safe use of Ag chemicals with this equipment is the responsibility of the owner/operators. All operators should be trained in the safe use of Ag chemicals. Goldacres suggest that a relevant course is completed by owners/operators prior to operation of this equipment as a spray unit.

Personal Protective Equipment (PPE)

Always wear close fitting clothing and safety equipment designed for the job.

Chemicals can be harmful to humans, appropriate PPE should be used when handling chemicals. Always refer to the chemical manufacturers label for guidelines on the appropriate PPE to use with the chemicals you are using.

Goldacres also suggest that you read and understand the following Australian standards:

- Australian Standard for Chemical protective clothing AS3765
- Australian Standard for Respiratory protection devices AS1715

Airborne particles

Always stand well clear of equipment during operation. Any spray drift is dangerous and may be hazardous to humans and animals.

Fluids under pressure

DO NOT disconnect any hoses, nozzles or filters while equipment is operating. Disconnecting these components while under pressure may result in uncontrolled fluid discharge which may be hazardous.

When the repair is complete ensure that all fittings and lines are secured before re-applying pressure.

Safety Decals

Understanding safety decals and their purpose assists in the safe operation of your sprayer. Safety decals are there for your protection and it is the responsibility of the owner operator to replace damaged and/or missing safety decals.

Regularly review safety decals with operators. It is very important to ensure that all new machine components and replacement parts include current hazard identification decals.

Replacement safety decals can be ordered from your Goldacres dealer or directly from Goldacres. Part numbers and descriptions of the decals on this machine can be found in the parts manual supplied.

Parts Ordering

When ordering parts from your Goldacres dealer, please quote:

- Serial No.
- Part No. required
- Part Description
- Quantity Required

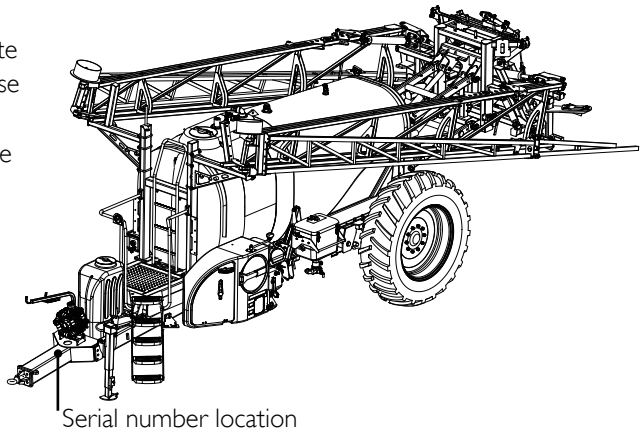
The parts manual supplied with this machine includes all the relevant information that you need when ordering parts from your Goldacres dealer. When returning parts to a Goldacres dealer, for service or repair all parts MUST be cleaned thoroughly before sending them. Goldacres cannot expose technicians to the many potentially hazardous pesticides and substances that are in use.

NOTE: Please ensure that all parts are clearly labelled with the owner's details, and a brief description of the fault. Goldacres are not liable for the return of any goods to a Goldacres Dealer. The goods must be returned to the point of sale. The customer will be responsible for any cost incurred by a Goldacres appointed person travelling to any site outside the point of sale.

Genuine Goldacres parts only should be used on Goldacres equipment.

Identification

When ordering parts or requesting service information for your sprayer it is important to quote the serial number of your machine, and the purchase date, in order to receive accurate information. The location of the serial number plate on your machine is shown in the picture.



Serial number location

Chapter 3

GENERAL INFORMATION & SPECS

General

Chassis:
The chassis is an all steel construction, that is fully welded for superior strength. The chassis is shot blasted, primed and then protected by the Goldacres paint process for excellent chemical resistance and durability.

Paint Colours:

Wheels:	N23 Neutral Grey
Steel work:	G13 Dark Green

Tank:
All tanks are constructed from UV resistant polyethylene. Polyethylene tanks have a very high chemical resistance. Due to the rotomoulding process, there can be a variance in the overall dimensions of the tank which in turn results in variations to the tank capacity. For this reason, calibration markings should be used as a guide only.

Agitation:
The Supermix agitator is located at the back of the tank and is used to generate increased agitation within the tank. The pressure line to the Supermix agitator from the control manifold passes through a nozzle and then through the barrel into the tank. This causes extra agitation as flow around the agitator is sucked into the barrel and is then passed back into the tank. To increase this venturi effect, the bypass flow from the electric regulating valve also passes through the barrel, multiplying the agitation effect. For further information refer to the "maintenance" chapter.

Boom Valves:
Motorised boom valves, for control of boom section on/off, are fitted as standard. These are mounted on the boom centre section at the rear of the sprayer. The number fitted is dependent on the number of boom sections and number of boom lines.

Controller:
Prairie Eco sprayers are supplied standard with a Raven SCS450 automatic rate controller. Automatic rate controllers will maintain a user defined application rate automatically as the towing vehicle speed changes. In order to function, the automatic rate controller relies on a flow meter, speed sensor and control valve. For specific information on the Raven controller please refer to Raven operator's manual supplied and "calibration" section of this manual.

Filtration:
Filtration is a critical part of the sprayer's performance.

As standard Prairie Eco sprayers are fitted with:

1 x Suction filter (30 mesh)
2 x Pressure filters (1 x 80 & 1 x 100 mesh)
Nozzle strainers (50 mesh)

Pump:
Udor, positive displacement, oil backed diaphragm pumps are fitted as standard on Goldacres equipment. The normal operating range is from 1 - 8 bar which is sufficient for efficient nozzle performance. A PTO drive is standard and a hydraulic drive is optional.

Chemical Induction:
The method of chemical induction into your sprayer is dependent on the optional chemical induction equipment fitted to your sprayer.

Goldacres chemical induction equipment available includes:
- Chemical probe
- Chemical induction hopper
- Transcal volumetric measuring device
- Direct Chemical Injection modules

Booms:
Goldacres booms are available in a variety of sizes up to 36 metres in width. Delta booms up to 24 metres and Tri Tech booms up to 30 metres can be fitted to the Special Evolution range - these booms feature hydraulic lift and fold, with control from the cabin of your tractor. Individual wing tilt is available as an option.

All booms feature: pitch, roll and yaw suspension in order to provide a superior boom ride and assist in the efficient application of chemical to your target

Nozzles:
As information regarding nozzles is specific to those being used in your application, no specific reference is made to nozzle application rates or nozzle types in this operator's manual. Goldacres suggest the use of a current TeeJet or Lechler nozzle selection catalogue for reference to nozzle sizes, outputs, spray patterns and general spraying information. For more technical information on the function of spray nozzles and factors affecting their performance you can also use the TeeJet "User's guide to spray nozzles".

The TeeJet & Lechler nozzle selection catalogue and Users guides to spray nozzles are available from your Goldacres dealer, or as a free download from the TeeJet web site: www.teejet.com
Lechler web site: www.lechler.de

Machine Limitations:
All Goldacres equipment is subject to operating limitations, it is the operator's responsibility to ensure that this equipment is being operated within these limitations and appropriately to the operating conditions at hand.

Goldacres do not endorse use of this machine for spraying at speeds greater than 20 km/hr and should not be used in ambient temperatures exceeding 40 degrees celsius.

Each indivual boom section has a maximum delivery of 35 litres per minute with clean filters fitted. With clean filters fitted, the maximum combined flow of all boom sections is limited to 140 litres per minute, or 50% of the pump flow, whichever is the lesser amount.

Custom built equipment:
Where the owner of this sprayer has requested that custom built equipment or options be fitted to this sprayer it is necessary to understand that custom fabrication and engineering is subject to many variables. Goldacres cannot fully field test all custom built options prior to despatch, and owners of new sprayers fitted with custom built equipment or options need to understand that the functionality of these items may require refining in order to operate as desired.

Axles

Prairie Eco 6500 litre sprayers are fitted with Air Bag suspension.

The air bag suspension consists of a 12 volt air compressor, a ride height valve, 2 air bags, shock absorbers, axle (used as air reservoir) and hosing.

The 12 volt compressor is powered up when the ignition is switched on. A fuse is fitted to the ignition relay box to protect the compressor circuit. The compressor, located in the right hand pod, has a pressure cut out switch fitted to it which cuts the power to the compressor when the reservoir recommended pressure is achieved. When the pressure in the reservoir drops below approx 70psi, the compressor will start again. The pressure cut out switch can be adjusted by turning the nut at the end of the spring to apply more or less pressure to the contact spring. The recommended maximum pressure to run in the air bag system is 110 psi. Optimum pressure is 100 psi. If the compressor runs continually there may be an air leak present. All hoses and fittings must be checked and repaired if necessary.

The compressor draws its air through a paper element filter mounted on the right hand side boom rest. This filter element must be cleaned daily. In dusty conditions this filter must be cleaned on a more regular basis. Ground conditions, ground speeds and wind conditions can all be factors in determining what measures are necessary to supply clean air to the compressor.

A gauge that displays air pressure is located on the front of the machine.

Further information on air bag suspension and axles can be found in the maintenance and troubleshooting chapters.

Wheels and tyres

All tyres used on Goldacres sprayers have been designed to carry the maximum loaded weight of the sprayer when travelling at 20 km/h. The load capacity of the tyres decreases as travelling speed increases so it is important to heed this travelling speed limit.

The tyre pressure also needs to be checked regularly (check every 8 to 12 hours of operation) and maintained at the required tyre pressure.

There are many factors concerning the appropriate tyre pressure for a particular tyre and load. For example, the tyre size, rim type, tyre status (driven or free rolling), load, speed, haul length and ply rating all need to be considered when determining the tyre pressure.

The rated pressure and capacity, shown in the chart below, is applicable when the machine is stationary. The cyclic loading pressure & km/hr is applicable for machines that are loaded and moving.

To determine the correct tyre pressure:

- Determine the maximum weight of the sprayer when loaded (do not forget to add the weight of the any other tanks on the sprayer when filled).
- Allow for each tyre to carry half the maximum loaded weight of the sprayer (this does not allow for any load on the tractor pull or cyclical loading, which provides for a safety margin).
- Determine what tyre size and ply is on the sprayer.
- Determine what appropriate tyre pressure will provide the load capacity required by the respective tyre as indicated in the following table.

For further information on wheels & tyres please refer to the "maintenance" chapter.

Tyre Size	Ply	Load Index	Speed Index	Rated Pressure (KPa)	Rated Capacity (Kg) @ 25kph	Cyclic Loading Pressure (KPa)
18.4x38	16	159	A8	320	5340	322
20.8x42	16	160	A8	220	5490	286

Hydraulics

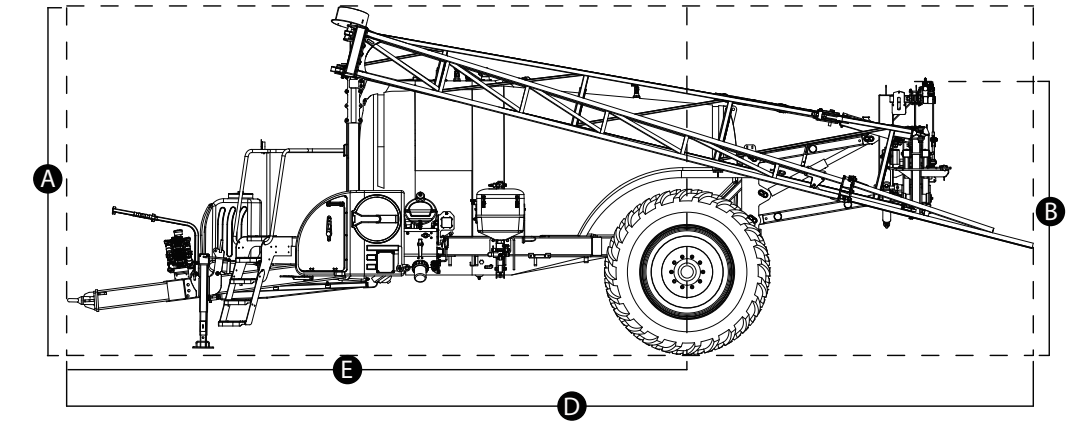
Prairie Eco sprayers can be set up for use on closed centre and open centre hydraulic systems. It is important that you are familar with the operating system of your tractor prior to connecting your sprayer.

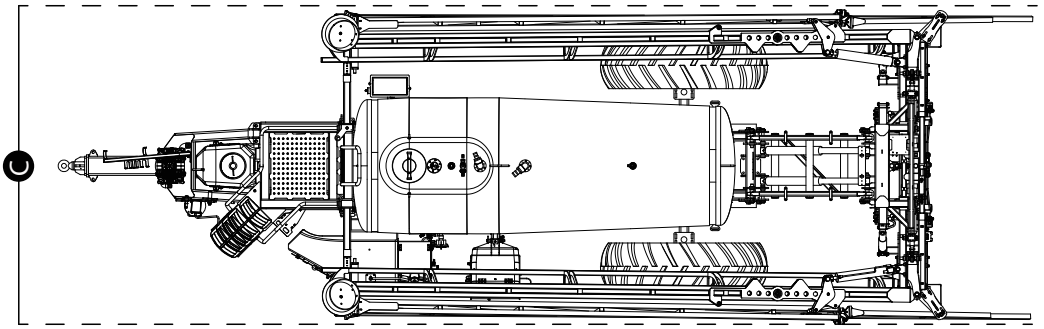
Further information on your specific system should be supplied by your dealer if required.

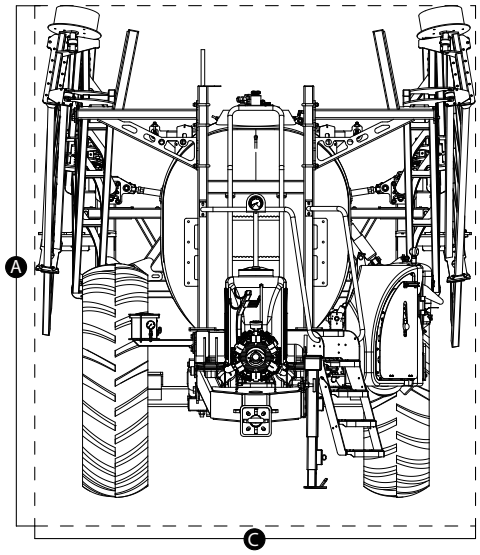
Dimensions

The following information is provided as a guide only.

Variations in dimensions may occur without notification. To ensure that the dimensions are accurate for your sprayer it is recommended that you measure your sprayer individually.







Model	Boom size	A Front Height	B Rear Height	C Width	D Total Length	E Wheelbase
6530	30m	3800	3150	3450	9950	6450
6533	33m	4200	3150	3450	9850	6450
6536	36m	4200	3150	3450	9850	6250

Chapter 4

PRE-OPERATION

Drawbar connections

The standard drawbar connections are as shown in the pictures below. It is important that the dielectric grease (supplied with each sprayer) is applied to electrical connections prior to connection. This assists with lubrication and prevention of corrosion on these connections.

Raven SCS440/450 male & female connectors

Tail light connection

Raven male and female speed sensor connections

Hydraulic hose connections

Draw bar connection mounting plate

Safety chains (optional)

Connecting to the tractor

Prior to connecting your tractor to the sprayer, it is important that the operator has read and fully understands this operator's manual.

Step 1: Ensure that the tractor is suitably rated to safely tow the sprayer and that the drawbar pin size matches the hitch on the sprayer. The standard hole size is 50mm. A replaceable insert (Part number GA4582455) can be purchased to reduce wear if required. A replaceable bush (GA5075075), reduces the size of the hole in the hitch if a smaller pin is to be used.

Step 2: With the sprayer parked on a level surface, use the sprayer jack to raise the sprayer hitch in line with the tractor hitch.

Step 3: Reverse the tractor into sprayer hitch until aligned, and insert drawbar pin (not supplied). Then connect safety chains.

Step 4: With the sprayer securely attached to the tractor, raise the jack until weight is transferred to the tractor. Then raise the jack and store in the transport position.

Step 5: Fit the PTO shaft (if applicable).

- Grease the PTO shaft as per the lubrication schedule
- Ensure that all safety guards and chains are in place

It is important that the instructions "fitting the PTO shaft" are followed for first time PTO shaft setup.

NOTE: The wide angle joint must be connected to the tractor PTO shaft.

For hydraulic drive pumps - connect hydraulic hoses to tractor remote outlets. (Refer to "general info & specs" chapter for important hydraulic information.)

Step 6: Fit the spray controller and any other switch boxes supplied in tractor cabin. Make sure that all controllers and switch boxes are securely mounted.

Step 7: Connect any power leads from Raven Console directly to battery.

Step 8: Connect drawbar connections.

All except two hydraulic hoses have a tag zip tied to them that denotes what they are for. Connect the hoses to the appropriate place on the tractor. Ensure that the connection points are clean before fitting to the tractor.

Two of the hydraulic lines don't have a tag on them, these are the pump lines. The pump can run in either direction so it does not matter which port (pressure or tank) that the hoses go into.

If the sprayer isn't fitted with spool valves, its very important that the hydraulic lines are connected in the correct pairs to the tractor remotes.

If not already done, apply some dielectric grease to the electrical connections. (wiring loom, speed sensor cable, tail light plug etc) Then connect them to the appropriate plug at the rear of the tractor.

Disconnection of the sprayer from the tractor is the reverse of the above instructions.

Hydraulic drive pumps

Diaphragm pumps can also be driven by a hydraulic motor which is bolted directly to the front of the pump.

The oil line to the hydraulic pump is fitted with a needle valve that regulates oil flow to the pump. Many tractors feature hydraulic oil flow regulation in the cabin, however this needle valve can be used to control the flow on tractors that are not fitted with hydraulic oil flow regulation.

Where the tractor has the capability to regulate flow from the cabin, it is recommended to close the needle valve and adjust the hydraulic oil flow from the tractor to set the pump running at 400 - 500 rpm. Do not exceed 540 RPM.

To set the pump speed:
On the Raven 450 series consoles this must be set up through the data menu.

Hydraulic drive - needle valve

Hydraulic drive pump

Fitting the PTO shaft

Wide angle PTO shafts are fitted as standard to Prairie Eco sprayers. When using/hitching a sprayer (especially for the first time) the following critical points concerning the PTO shaft must be considered:

Maximum PTO operating length
Try to obtain the greatest possible overlap. In its working position, the PTO shaft must not be extended by more than half the profile overlap (Pu) available when fully compressed (Lz). The maximum PTO operating length is shown on the diagram below as Lb)

PTO shaft length adjustment
To adjust the length:

1. Hold the shafts next to each other in the shortest working position and mark them.
2. Shorten the inner and outer guard tubes equally.
3. Shorten inner and outer sliding profiles by the same length as the guard tubes.
4. Round off all sharp edges and remove burrs.
5. Grease sliding profiles before reassembling.

NOTE: It is important that enough "travel" is allowed in the PTO shaft to ensure that it does not collapse fully when travelling through a ditch etc and cause damage to the pump.

Maximum PTO joint operation

Ensure equal joint angles. For standard PTO shafts the following are guidelines for operation:

Continuous operation - 17 degrees
Short duration - 25 degrees
Stationary - 25 degrees

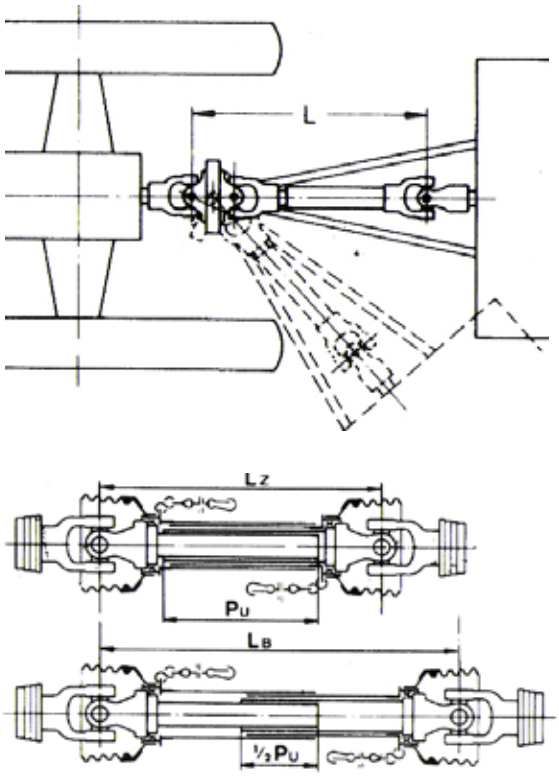
For wide angle PTO shafts the following are guidelines for operation:

Continuous operation - 25 degrees
Short duration - 80 degrees
Stationary - 80 degrees

Coupling the PTO shaft
Press in the locking pin and simultaneously push PTO shaft onto pump or tractor PTO shaft until pin engages. Pull PTO shaft back to make sure pin has engaged and the shaft cannot come off.

Chains
Chains must be fitted so as to allow sufficient articulation of the shaft in all working positions.

NOTE: The PTO shaft must not be suspended from the chain.



Mounting the consoles

The mounting of the consoles within the cabin of your tractor is a critical part of the set up process. It is important that the consoles are mounted in the cabin in such a way that it cannot cause harm to the operator under any circumstance while also being mounted in a user friendly way.

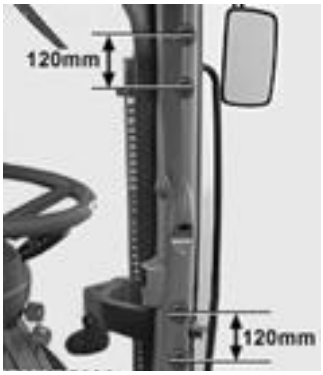
When the sprayer is removed from the tractor, and the consoles are to remain fitted, please ensure that all console's remain firmly mounted and cannot become a projectile.

For specific information on mounting the consoles, please refer to the Raven installation and service manual supplied.

An example of console mounting in the cab can be seen below. NOTE: SCS4400 console shown.

Console mounted on accessory bar.

If, as shown below, there are mounting holes in the pillars of the tractor, a bracket (GA4522930) is supplied with the console mounting kit to allow the console to be mounted to these.



Connecting the consoles

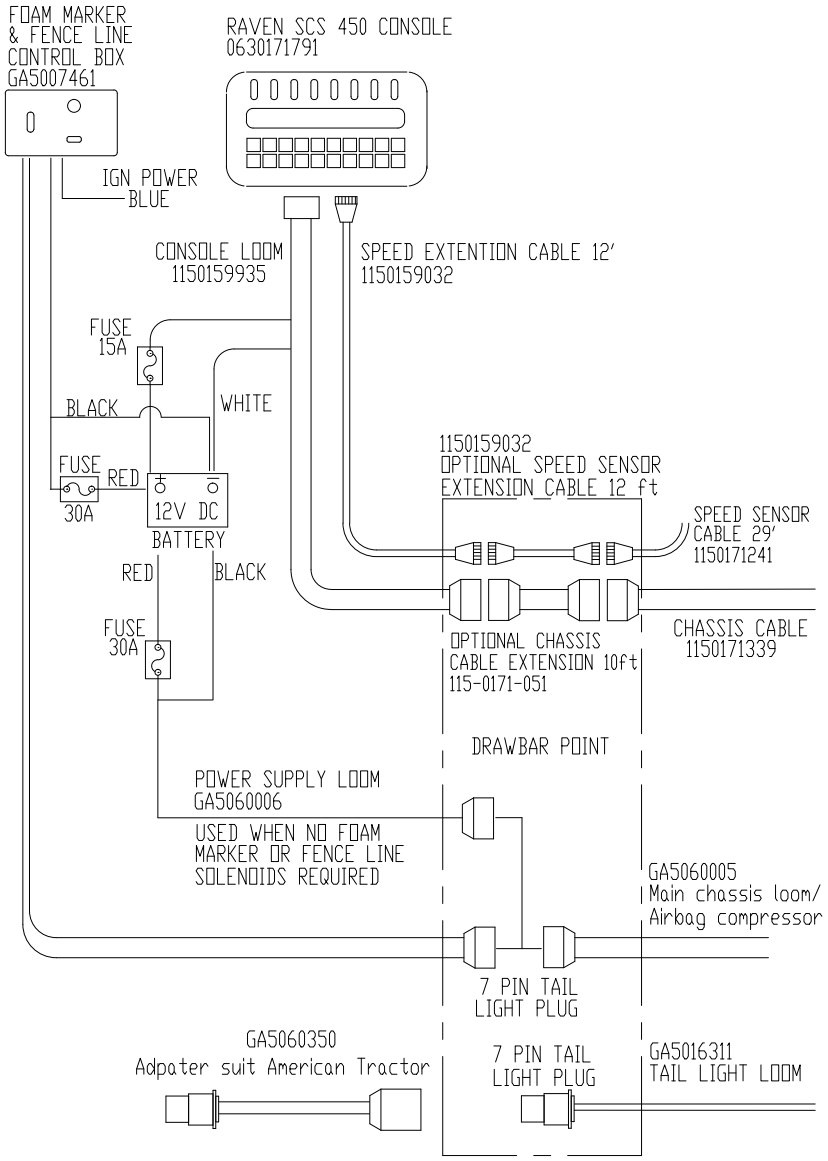
The consoles should be connected as per the electrical schematics following. These schematics provide you with a layout of all connections to ensure that the system is properly connected prior to operation.

To connect to the battery:
With the consoles mounted in the cabin, turn the power switch to OFF and route the red (+) and black (-) battery wires to a 12v battery. Attach the black battery wire to a negative terminal and the red battery wire to a positive terminal.

The Blue wire connects into the ignition source and the small black wire connects to earth.

NOTE: The negative should be connected last to prevent the chance of a short.

Raven SCS450 wiring layout



Chapter 5

CALIBRATION

General

Spraying is a complex task, that is affected by many variables. It is the responsibility of the operator to be familar with spraying variables and to understand the spraying process prior to operation.

In general, the operator should know:

- The target application rate.
- The required operating (spray) pressure.
- The speed of travel.
- The desired droplet size.

To make the spray application as accurate as possible, it is critical that your spray equipment is regularly calibrated.

The Raven automatic controller is designed to improve the uniformity of spray applications. Raven controllers will monitor and control the determined application volume, but prior calculations will be required to ensure spraying pressures do not exceed operating parameters. (Refer to Teejet catalogue) The Raven system comprises a console, flowmeter, speed sensor and liquid flow control valve.

As the sprayer is moving, the console records ground speed and then calculates the amount of flow required to maintain the respective application rate at that speed. The console monitors the amount of flow being used via the flowmeter and then determines if the flow is correct for that speed. Flow adjustments are made by the control valve which varies the amount (volume) of by-pass and thus the volume being applied.

When the console is in the automatic mode, as the ground speed increases, the flow to the booms required to maintain the application volume will be increased. This will result in the pressure (as displayed on the gauge) increasing. Conversely, as the ground speed decreases, the required flow to the booms, as well as the pressure, decreases.

When the console is in the manual mode, as the ground speed increases, the pressure and flow will remain constant and the application volume will decrease. Similarly, as the ground speed decreases, again the pressure and flow will remain constant and the application rate will increase.

Record your console calibration information in the table below for future reference:

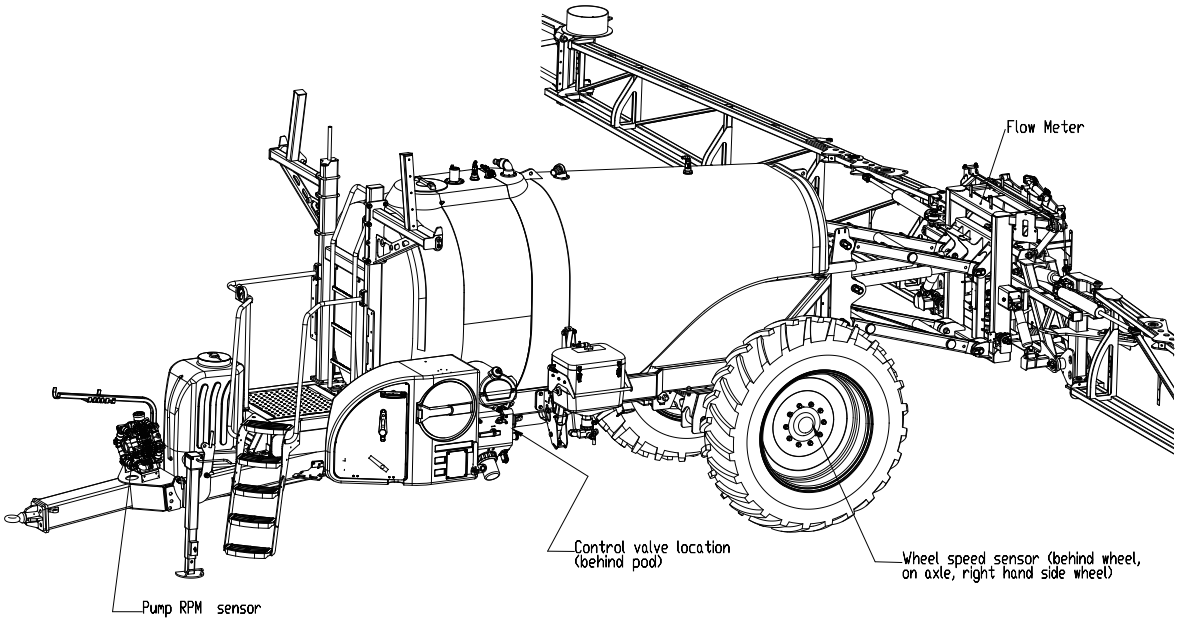
Boom 1 Cal	
Boom 2 Cal	
Boom 3 Cal	
Boom 4 Cal	
Boom 5 Cal	
Boom 6 Cal	
Boom 7 Cal	
Speed Cal	
Meter Cal	
Valve Cal	
Rate 1	
Rate 2	
Tier 1	
Tier 2	
Pump Cal	

$$\text{L/Min (per nozzle)} = \frac{\text{L/ha x km/hr x W}}{60{,}000}$$

$$\text{L/ha} = \frac{60000 \times \text{l/min (per nozzle)}}{\text{Km/hr x W (metres)}}$$

$$\text{Km/hr} = \frac{\text{Metres x 3.6}}{\text{Time (seconds)}}$$

Control valve, speed sensor & flow meter locations



Control valve

The Teejet control valve is located behind the left hand side pod.

The control valve regulates the flow going to the boom sections directed via the console. It controls the flow to the boom by regulating the amount of liquid that bypasses back to tank.

The control valve is a positive ball valve which means it can control flow infinitely to the boom from 0 l/min to the maximum pump output.

The control valve can be operated in manual mode from the console for boom priming, flushing and also trouble shooting.

The standard Teejet valve calibration number is 2123 and is written on the valve.

Flowmeter

There is a flowmeter on the sprayer, with a calibration number attached to it on a white tag. The number that is applicable is the one in square brackets, i.e. [185]. Note this number down as this is the number that should be entered as the Meter Cal. number.

The flowmeter must be flushed with fresh water before the sprayer is left unused for an extended period of time. Also do not allow water to freeze in the flowmeter as this can damage the housing.

The Flowmeter should be checked at the start of every spraying season and periodically during the season. The simplest way to check the accuracy of the flowmeter is to fill the tank to a previously determined volume mark (usually top fill marking) and then empty the tank through the flowmeter (i.e. via a self-test). Compare the reading from the flowmeter with the previous known volume. If there is a relatively large discrepancy (i.e. more than 50 litres out of a 3000 litre tank), the flowmeter should be removed from the sprayer, disassembled and the condition of the turbine checked and cleaned

(make sure it spins freely). The flowmeter should then be reassembled and replaced on the sprayer. Perform the volume check again and if there is still a discrepancy, the Meter Cal No. can be changed.

Example:

Meter Cal =185

Volume of liquid measured =3100

Known volume of liquid =3000

Corrected meter Cal:

$$\frac{185 \times 3100}{3000} = 191$$

The flow meter is located at the rear of the sprayer, on the boom centre section, above the boom valves.

Speed sensors

Raven automatic rate controllers can utilise a speed reading from:

A wheel speed sensor
GPS receiver
Radar speed sensor

Wheel speed sensor:

The wheel speed sensor is fitted to the right hand side wheel of the sprayer and uses four magnets (2 north pole (red) and 2 south pole (black)) fitted onto the rim to measure speed.

A north and south magnet must pass the sensor before a pulse is counted. The sensor must be mounted between 12mm & 19mm from the face of the magnet to receive a reading. The magnets must pass directly through the centre of the sensor face.

The speed calibration figure on the console indicates a measurement of the circumference of the wheel as it rolls across the ground. The wheel speed sensor detects when the wheel completes one revolution and the console calculates the distance the wheel travels - therefore giving a km/hr reading.

If the ground speed display reading is incorrect the calibration and sensor condition must be checked (see the troubleshooting section)

GPS receiver

If a GPS unit is fitted, GPS ground speed can be obtained and used in place of the wheel speed sensor.

To receive a speed reading from the GPS unit a **pulsed niema** string must be connected to the speed cable of the console. The console must then be set up to accept GPS speed. This is called radar in the console calibration settings. When using GPS the console speed cal figure is 200 initially and then can be fine tuned from this figure. See "calibration" chapter for further information on console setup.

Radar speed sensor:

The console can also utlise a radar signal for ground speed reading.

A "T harness" can be fitted to the tractor radar harness to send a pulsed signal to the console speed harness. The console must be setup to receive speed as "Radar."

When using a radar the console speed cal figure is 200 initially and then can be fine tuned from this figure. See "calibration" chapter for further information on console setup.

SCS450 console calibration

The following information is applicable for the Raven SCS 450 consoles:

Initially displaying "SP 1" and "CAL"

STEP 1: Press [ENTER] to lock in "SP 1" (Wheel-Drive or Drive-Shaft Speed Sensor)

For Radar Speed Sensor, toggle to "SP 2" by pressing [CE] then [ENTER]

STEP 2: Press [ENTER] to lock in "C-SD" (Standard Valve)

NOTE: These 2 steps are very important because the system will appear to function properly but if the units are incorrect the quantities will be very inaccurate. If an error has been made whilst calibrating these 2 steps, turn the console off then turn back on again with [CE] pressed and all information will be cleared. To see what has been programmed, depress [SELF TEST] for about 5 seconds and the programmed information should be displayed (flashing and toggling)

STEP 3:

Press [BOOM CAL] then [ENTER]

Enter Boom Section 1 in Centimetres, Press [ENTER]

(For example 6m = 600 cm. Press [6] then [0] then [0])

The Raven 450 console has provisions for handling up to 5 boom sections. To measure the boom width for each boom section, count the number of nozzles in each section and multiply by the nozzle spacing. i.e. 12 nozzles in one section at 50 cm (½ metre) spacings = 12 x 0.5m = 6 metres.

STEP 4: Press [1] to select boom section 2 (b-02) Key in Boom Section 2, then press [ENTER]

STEP 5: Insert remaining boom sections by using toggle [☐] & [☐] buttons [1] or [2] If a boom section is not needed, enter a "0" for the length.

STEP 6:

Press [SPEED CAL] then [ENTER]

Enter Speed Cal in Decimetres (1metre = 10 decimetres)

Press [ENTER] (eg 477)

Speed Cal is the distance measured by 10 revolutions of the Speed Sensor Wheel. This is best done with the tank half full of water (best simulates average between full and empty) and measured on ground that is typical to what will be encountered when spraying. Also note the tyre pressure when this procedure is performed. This tyre pressure needs to be maintained for the speed cal to be accurate. The speed cal should be checked at the start of every spraying season as the speed cal may need to be altered to compensate for tyre wear, etc.

NOTE: For 450 console with 4 wheel magnets (2 red and 2 black) - measure distance and multiply by 10 (to convert into decimetres)

For 450 console with 2 wheel magnets (1 red and 1 black) - measure distance and multiply by 10 (to convert into decimetres) then multiply by 2

STEP 7: Press [METER CAL] then [ENTER]
Enter Meter Cal for litres. Press [ENTER] (eg 185)
Meter Cal is the Calibration number on the Flow Meter white tag. The required number for litres is the number in square brackets.

STEP 8:
Press [VALVE CAL] then [ENTER]
Enter "2123"
Press [ENTER]

STEP 9:

Press [RATE 1] then [ENTER]
Enter Rate 1 (litres per hectare)
Press [ENTER] (eg 60)

STEP 10:

Press [RATE 2] then [ENTER]
Enter Rate 2 (litres per hectare)
Press [ENTER] (eg 75)

NOTE: Rate 2 can be the same as Rate 1 if only the one rate is to be used.

STEP 11: OPTIONAL
Press [VOL/TANK] then [ENTER]
Enter the Volume in Tank at start of spraying
Press [ENTER] (eg 3000)

STEP 12: OPTIONAL

Press [TIME] then [ENTER]
Enter the time of the day. Press [ENTER]
(eg 10:30)

STEP 13: (WHERE HYDRAULIC DRIVE IS FITTED TO SPRAYER PUMP)

Press [SPEED] and hold down for 5 seconds until speed value begins to flash. When the pump is fitted with hydraulic drive, the flashing 'speed' figure represents the pump's RPM.

TO ZERO INFORMATION WHEN ENTERING NEW FIELD

When entering a new field, the previous data in the console can be changed to zero so that the new data is current for that field only.

NOTE: Write down all necessary data before removing data from console memory

To zero out data in Area and Volume:

STEP 1: Write down the previous information for Area and Volume

STEP 2: Press Area or Volume (Total or Field for 450 consoles)

STEP 3: Press [ENTER]

STEP 4: Enter "0"

STEP 5: Press [ENTER]

The Area and Volume will now count from zero for the new field.

SELF-TEST SIMULATION

By simulating speed, the Raven controller can be tested without having to move. The Raven works in rate (i.e. litres per hectare) and a speed is required in order to calculate a rate. The self-test simulation provides the console with a simulated speed even though the sprayer is stationary and thus the console will be able to display a rate.

This self-test should be performed when first testing the system so that the operator can become familiar with the working system.

STEP 1: Press [SELF TEST] then [ENTER]
Enter speed (i.e. 12.0 for 12 km/h)
Press [ENTER]
Press [SPEED] to verify speed

The sprayer will now operate so that it can be tested. Switch the boom sections on and off to see that the system compensates and the applied rate returns to the required rate. The self-test will cancel when motion from the vehicle is detected by the speed sensor. For radar speed sensor, disconnect the speed cable going into the back of the console in order to do a self-test.

Jug test procedure

The method of carrying out the jug test is as follows:

NOTE: There may be a noticeable difference between pressure shown on main spray pressure gauge on sprayer and the gauge installed on the boom. This is due to normal pressure loss through the circuit.

There is only one pressure gauge fitted to the sprayer, this gauge is reading the return pressure.

You will need:

- A calibrated measuring container that can measure the medium in litres, in 10 ml increments. e.g. 0.45 Lt.
- A timing device showing seconds.
- A pressure gauge mounted at the nozzle tip to verify the system pressure being delivered at the nozzle. Goldacres part numbers QJ4676-1/4-NYR will mount a suitable gauge to the nozzle body bayonet fitting. (Not including gauge).

1. Check the plumbing system for kinked or obstructed hoses and repair or replace any hoses that restrict the normal flow of the liquid.
2. Start your sprayer

   a. For sprayers not fitted with a spray application controller, set the boom operating pressure to the pressure at which you expect to spray.

   b. For sprayers fitted with a spray application controller, initiate a 'self test' procedure and set the application rate and speed to the settings depicted in your "Rate Chart" at which you expect to spray.

3. Then place the jug under one of the nozzles, for 1 minute (exactly) and then record the volume of liquid collected.
4. Repeat the test over a representative sample of the jets in each boom section
5. Compare the volume collected from each nozzle to the stated volume in your rate chart. It should be no more than plus or minus 10% of the volume stated in your Nozzle Supplier's rate chart

6. In the event that any of your nozzles do not deliver the required volume, a further investigation is required which may include, but not be limited to:

a. Cleaning the nozzles, using the method recommended by the nozzle supplier.

b. Replacing the nozzles. (TeeJet advise that nozzles that flow greater than +10% of their stated volume are 'worn out' and should be replaced.)

c. Cleaning nozzle filters.

d. Replacing filters.

e. Replacing pump diaphragms.

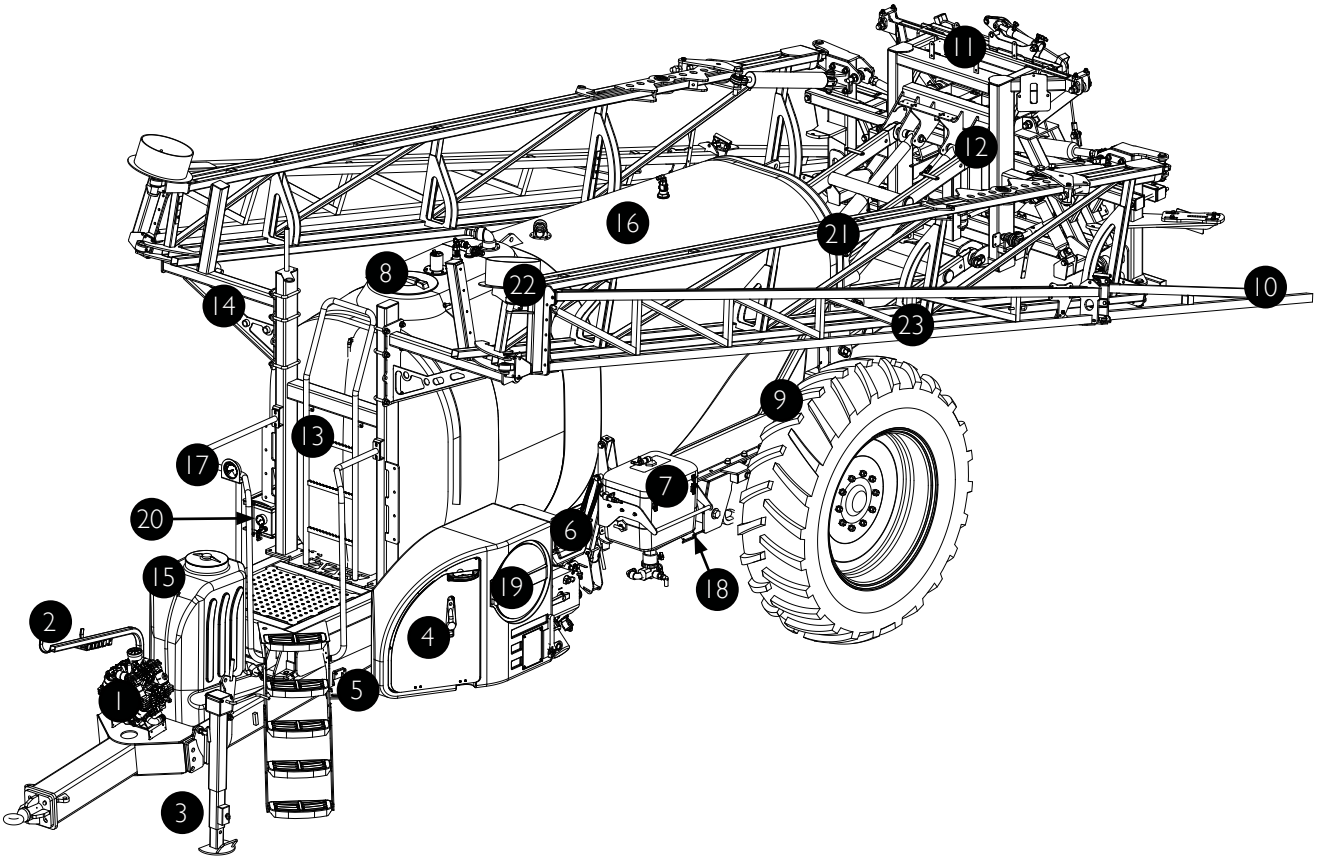
f. Replacing the pump.

g. Ensuring that the application rate required does not exceed the maximum flow and pressure parameters of the sprayer.

Chapter 6

OPERATION

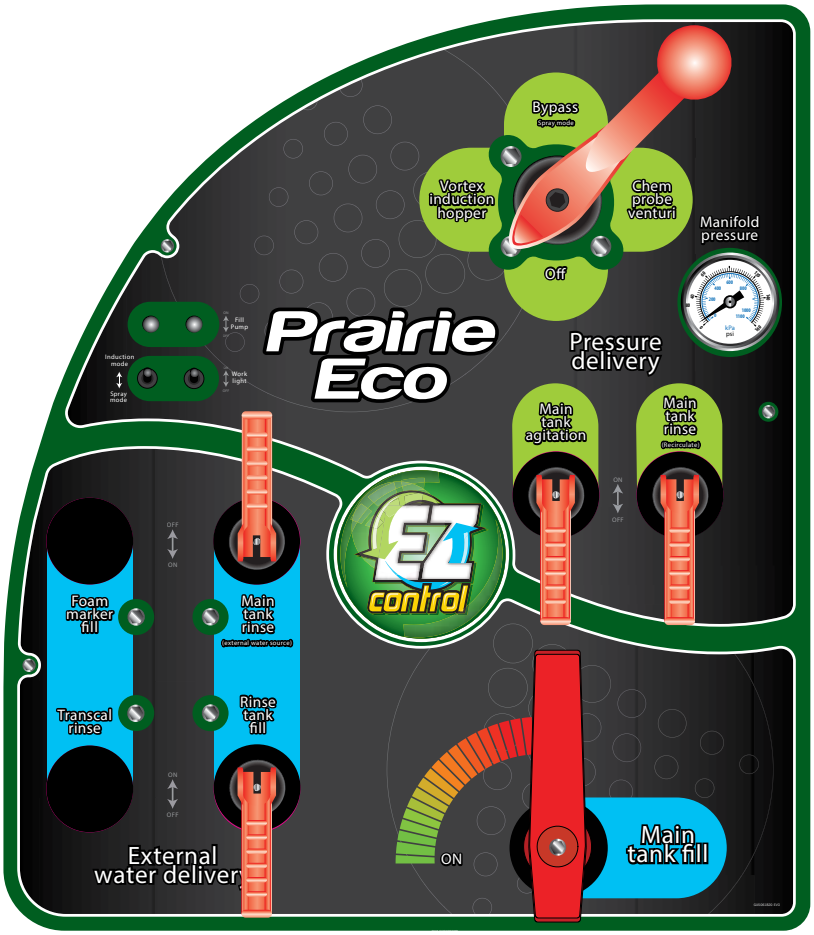
Key features



Number	Feature
1	Diaphragm pump
2	Drawbar connection arm
3	Mechanical jack
4	EZ control
5	Fill point
6	Hand wash tank
7	Induction hopper
8	Main tank lid
9	Mudguard *(optional)*
10	Boom tip
11	Flow meter
12	Boom paralift

Number	Feature
13	Ladder
14	Boom rest
15	Flush water tank
16	Main tank
17	Pressure gauge
18	Pressure filters
19	Storage locker
20	Right hand pod
21	Boom inner wing
22	Boom cable drum
23	Boom outer wing

EZ Control



EZ Control key functions

External water delivery functions. *(These functions are only available when external water is being pumped into the system)*	Use
Main tank fill	Used to direct external water delivery, coming from quick fill, to main tank. When main tank fill is ON the other functions of the external water delivery station can be used, however they will not be under pressure as only a small amount of flow will be directed to the external water delivery station. With the main tank fill tap off - the pressure will go up.
Main tank rinse (external water source)	Turning on this function allows the use of the tank rinse nozzles with larger quantities of fresh water making it useful for a more thorough flushing/decontamination.
Rinse water fill	Used to fill the rinse water tank.
Foam marker fill	Not used
Transcal rinse	Not used
Enviro drum coupling rinse	With the micromatic/envirodrum coupling connected to the enviro rinse coupling, having this function ON, will allow fresh water to circulate through the coupling.

EZ Control key functions (continued)

Pressure delivery *(These functions only available when the main spray pump is operating - pressuring the system)*	Use
Rotary Valve (short end of handle points to desired function)	12 o'clock position - Bypass (spray mode)
	3 o'clock position - Chem Probe Venturi
	6 o'clock position - Off
	9 o'clock position - Vortex Induction Hopper
Pressure regulator	The pressure regulator allows the operator to set the relief pressure of the pressure manifold (max 110psi)
Manifold pressure gauge	Indicates the manifold pressure
Main tank rinse (recirculate)	Turning ON allows flow to recirculate through system for a more thorough flushing/decontamination.
Manifold Pressure	Displays the pressure in the pressure delivery manifold
Spray/Induction Mode Switch **NOTE:** The sprayer console must be powered up and turned on for the spray mode switch to work.	Up position - Induction mode. Able to use Hopper and Probe
	Down Position - Spray mode. Switch must be in this position to spray
Work Light	Turns work light on and off.

Filling

When filling the sprayer it is necessary to connect to an external water source.

The main tank should always be filled through the quick fill. This line fills through the top of the tank and then through a hose inside the tank so that the water is deposited in the centre of the tank. Water can then be pumped into the system from an external pump.

WARNING: Water weighs 1kg per litre. Conversion factors must be used when spraying liquids that are heavier than water. The total weight of the liquid being sprayed should not exceed the equivelant weight of a full tank of water. Exceeding this weight, can lead to sprayer damage.
ie: Liquid nitrogen has a density of 1.28kg per litre. Tank size is 6500L

6500L / 1.28kg = 5078L

This means that the total volume of liquid Nitrogen allowed in a 6500L tank is 5078L.

This rule applies for all tanks sizes. If unsure about the density/weight of the chemicals being applied, contact your agronomist or chemical supplier.

The following steps should be used as a guide to filling the machine:

Main tank fill:

1. Connect the fill hose (not supplied) to quick fill cam lock coupling.
2. Make sure that the "main tank fill" handle on the EZ control is in the OFF position (so that there can be no flow coming out of the tank if it is not already empty) & that other fill functions are OFF.
3. Turn the fresh water pumping system on (make sure the pressure does not exceed 100psi)
4. Turn "main tank fill" handle on EZ control to ON. The main tank should now be filling.
5. When the required amount of water has been transferred into the main tank, stop the flow by turning the "main tank fill" to OFF.

CAUTION: Turn tap off slowly to avoid large pressure spikes which may cause damage.

EZ Control

External water delivery station:

The external water delivery station allows several filling functions of the sprayer to be performed simultaneously.

Filling - continued

1. With fresh water coming into the system as per "Main tank fill" instructions, ensure that all fill functions including the "main tank fill" ball valve, on the external water delivery station are turned to OFF.
2. Turn the desired function ON by selecting the appropriate lever as labelled.
3. When the required amount of water has been transferred, turn the appropriate valve to OFF.
4. When all functions have been performed, turn the fresh water pumping system OFF.

Adding chemical to the main tank:
Where chemical induction equipment (chemical probe, induction hopper) has been fitted, please refer to the instructions on operating this equipment, further in this chapter or at the rear of this manual.

Agitation

To achieve satisfactory agitation, the following guidelines are recommended.

1. Add 20 percent of the tanks volume of fresh water to the main tank.
2. Add all chemicals.
3. Add the remaining quanity of water required.
4. Turn the agitator on with the pump at operating speed.

NOTE: Check to ensure that the supermix agitator is working (there should be a visible circulation of water near the back of the tank near the agitator).

5. If the tank has been filled and the spray mixture has been allowed to settle, agitate for as long as it takes the pump to pump the quantity of water in the tank. For example: with 5000 litres in the tank with a 250l/min pump agitate for 5000/250 = 20 minutes.

To agitate while spraying: Have the bypass ball valve set to 'bypass' (spray mode) and agitator lever ON.

NOTE: The bypass ball valve must be set to 'bypass' (spray mode) while spraying.

Superflow chemical induction hopper

Overview

The Superflow Chemical Induction Hopper is an alternative method of transferring chemical into the main spray tank. The hopper can be lowered to a more convenient height for adding chemicals. The chemical can either be in liquid form or granular form and once in the hopper the chemical can then be easily transferred into the main spray tank. The hopper facilitates drum rinsing with fresh water and the hopper itself can be rinsed and all rinsate then transferred into the tank.

The hopper transfers the chemical via venturi effect. Water from the main spray tank is pumped under the bottom of the hopper where it passes through a venturi fitting under the hopper. This causes a suction effect and when the bottom of the hopper is open (via the hopper tank valve) the tank contents are drawn into the flow from the pump passing under the hopper and then transferred into the middle of the main spray tank.

NOTE: The level indicator should be used as a guide only.

NOTE: Never let the hopper run empty or suck air, this may cause foaming in the main tank.

Key Features

Number	Function
1	Rinse tap
2	Tank rinse nozzle
3	Level indicator 60L
4	Drain tap

Number	Function
5	Hopper tank ball valve
6	Drum rinse nozzle
7	Pressure water mixing jet valve

Operation

To operate the induction hopper:

1. Add at least 500 litres of clean water to the main spray tank. Initially there needs to be a sufficient amount of water in the tank in order for the pump delivery to create the venturi effect via the venturi fitting. This will also ensure that agitation takes place when the remaining water is added.

2. Lower the hopper for convenience. (Check that the delivery hose to the hopper is not restricted or kinked).

3. Make sure there is power to the sprayer and that the sprayer console is turned on. The switch on the EZ control station should be switched to "induction mode"

4. Ensure that the red handle on the pump three-way ball valve is pointing towards the main tank sump.

5. Open the induction hopper ball valve and (if required) the supermix agitator ball valve located on the EZ control.

6. Ensure the bypass line ball valve and the chemical probe ball valves are closed.

7. Operate the pump at the speed necessary to generate at least 70-80 psi delivery pressure (as displayed on the sprayer pressure gauge). Do not run pump faster than 500 RPM.

NOTE: The higher the pump delivery pressure, the greater the venturi suction and the quicker the hopper will transfer the chemical. The delivery pressure should not exceed 110 psi as determined by the pressure relief valve setting.

8. The wash down hose is also useful for ensuring all chemical is clear of the hopper (only available when fresh water coming into the fill station)

9. Put the required amount of chemical into the hopper (liquid or granular). Wear the necessary protective clothing and use the required safety equipment to avoid exposure to chemicals.

10. Open the hopper tank ball valve at the bottom of the hopper by turning the yellow handle up. The chemical should be now transferring to the main spray tank.

11. Rinse all chemical drums and the hopper as per the rinsing instructions.

When finished using the hopper:

- Close the hopper tank ball valve at the bottom of the hopper by turning the yellow handle so that it is horizontal.
- Turn the bypass valve to spray mode.
- Flick the switch on the EZ control back to "spray mode"
- Turn the induction hopper valve 'OFF'.
- Ensure that the agitator valve is 'ON'. The sprayer should always be agitating until spraying begins.
- Raise the hopper to its transport position and replace the retaining pin and "R" clip in the mechanism.

Rinsing

To rinse the Induction Hopper and chemical drums with fresh water from the external water delivery station:

1. Lower the hopper. (Check that the delivery hose to the hopper is not restricted or kinked).

2. Make sure that all valves on the EZ control external water delivery station are 'OFF'.

3. Make sure that the Hopper Rinse valve on the top of the hopper is 'OFF'.

4. Connect the fresh water fill hose to the quick-fill coupling.

5. Operate the fresh water pumping system between 70 and 100 psi.

6. Turn the Induction Hopper valve on the Pressure delivery station 'ON'.

7. Open the hopper tank valve at the bottom of the hopper by turning the yellow handle 'UP'.

8. Ensure that the hopper drain tap, also located at the bottom of the hopper, remains 'CLOSED'.

9. To rinse a drum, push the drum over the rinsing nozzle located in the top of the hopper.

10. To rinse the hopper, turn the Hopper Rinse valve on the top of the hopper 'ON'. Close this valve

when the hopper has been rinsed.

When the hopper is empty:

- Remove any chemical drums that have been rinsed from the hopper.
- Turn the hopper tank valve at the bottom of the hopper 'OFF' by turning the yellow handle so that it is horizontal.
- Turn the Induction hopper valve on the EZ control Pressure Delivery station 'OFF'.

Drain the hopper of any remaining liquid using the hopper drain tap at the bottom of the hopper.

The hopper can be rinsed and the rinsate emptied through the hopper drain ball valve rather than transferred into the main spray tank.

To do this:

1. Ensure the fresh water filling supply pump system is operating.
2. Open the hopper rinse valve on the top of the hopper.
3. 'OPEN' the hopper tank ball valve at the bottom of the hopper by turning up the yellow handle so that it is vertical, removing the rinsate from the hopper.
4. Open the hopper drain valve.

CAUTION: Do not have the sprayer pump operating.

NOTE:

- Take proper safety precautions to avoid any contact with rinsate when draining, as it may contain chemical residue.
- Be careful as to where the rinsate is being deposited as it may contain chemical residue.
- This procedure will not rinse the hose from the bottom of the hopper to the main tank.

Spray Application

After completing the filling process, you are now ready to start spraying. While travelling from the fill station to the field, the pump should be running at 400 - 500 rpm with the agitator running in order to ensure that the chemical mix is adequately agitated prior to spraying.

NOTE: The following information is provided as a guide only. It is the responsibility of the operator to assess the conditions in the field where the spray application is taking place

NOTE: The rotary ball valve must be turned to 'Bypass' (spray mode) while spraying. The switch on the EZ control must also be in "spray mode".

1. Enter the field, unfold boom and set the boom to desired height above the target and have pump running.
2. Switch on the console and set to run in self test mode (while stationary). Information on running in self test mode can be found in the Raven operators manual supplied.
3. Turn on all boom sections
4. Remain stationary until all boom lines have been completely purged with product from the main tank.
5. Switch off all boom sections.
6. Commence travel on primary swath and engage boom master switch. Auto rate controller will now control application based on the calibration information entered by the operator.
7. To avoid overlap it is recommended that individual boom section switches are used to turn on/off sections as needed.
8. When you have completed the task at hand, please follow the flushing instructions to ensure that all plumbing is flushed.

Flushing

The following information is provided as a general guide for flushing your sprayer following a spray application.

For more specific information regarding flushing, and decontamination, specific to the products that you are applying, it is recommended that you consult the chemical label or your chemical supplier.

To use the flush water tank to flush pump & boom only:

1. Turn pump off
2. Turn 3 way ball valve to draw from flush water tank rather than main product tank.
3. Set Raven console into manual mode.
4. Switch all boom sections to ON
5. Hold increase button for 15-20 secs. This will ensure that fast close valve is fully open to direct all flow to booms (This will eliminate bypass from the booms to main tank).
6. Turn pump ON. The pump will now draw water from the flush water tank and direct all flow to the booms.
7. Keep boom switches on until the contents of the flush water tank has been run through the booms.

NOTE: If the pressure gauge increases dramatically, slow down pump RPM

To flush entire system (pump, boom & tank):

1. Drain the main tank.
2. Connect to external water source (to provide fresh water supply).
3. Turn main tank fill tap OFF to direct external water supply to the fill manifold under pressure.
4. Engage tank rinse nozzles with the lever on EZ control (if fitted) and allow rinsate to drain out through the main tank drain.
5. Close main tank drain.
6. Add a quantity of fresh water (a minimum of approximately twice the pumps capacity) to the main tank (as per instructions under filling).
7. Turn on pump with agitator and bypass open to allow fresh water to circulate.
8. Turn off all taps to allow the pressure relief valve to blow off and purge the "relief to tank" line.
9. Operate induction equipment (if fitted), with a quantity of fresh water in order to flush venturi system.
10. Once complete drain chemical induction hopper delivery hose externally.
11. Now follow the instructions for boom flushing as above - keep ball valve drawing from main tank.

Decontamination

Decontamination of your spraying equipment is important when changing chemicals or application methods.
Information specific to your circumstances, the spraying equipment being used and the chemicals being applied should be provided by your agronomist or chemical supplier.

Follow the flushing instructions above, while using the appropriate decontaminating agent for the chemicals being used.

End of day

At the end of the spraying day: Follow the flushing and decontamination procedure as per previous instructions.

1. Unfold the boom in an area convenient to dispose of residual chemical (an area where chemical can not run-off into above ground or sub surface water courses).
2. Clean all filters.
3. Clean all nozzles.
4. Wash down unit
5. Drain main tank

CAUTION If the sprayer is left attached to the tractor when parking the sprayer, make sure the tractor park brake is applied, the engine turned off and the sprayer is securely hitched to the tractor.

If the sprayer is to be disconnected from the tractor:

1. Ensure the main tank and any other tanks are empty.
2. Lower the jack and wind up until weight is taken off tractor.
3. Remove drawbar pin.
4. Remove safety chains.
5. Disconnect all drawbar connections between the sprayer and the tractor (i.e. tail lights, electric controls etc.)
6. Where fitted, remove the PTO shaft from both the sprayer and the tractor.
7. Protect hydraulic hoses and electrical connections.

NOTE: Store the sprayer in a suitable location to prevent freezing. If the sprayer is to be left where freezing may occur, cover the pump and flow meter with a material bag and empty pump and flow meter of all water (run the pump dry for 15-20 seconds). It is also suggested that a small quantity of anti freeze be added to the main tank and circulated through the sprayer to minimise the chance of freezing.

CAUTION: Make sure any ice has thawed before using sprayer or sprayer damage will result.

End of program

If the sprayer is to be stored for a long period of time without use, there are several tasks that need to be performed.

- Clean the sprayer thoroughly as described under "END OF DAY" tasks.
- With the sprayer attached to the towing vehicle, carry out a thorough observation to determine if there is any damage to the sprayer.
- Park the sprayer in a position where it will not be affected by frosts, and preferably out of direct sunlight.
- Ensure the main tank and any other tanks fitted are empty.
- Lower the jack and wind until weight is taken off tractor.
- Remove drawbar pin.
- Remove safety chains.
- Disconnect all drawbar connections between the sprayer and the tractor (i.e. tail lights, foam marker lines, electric controls etc.)
- Where fitted, remove the PTO shaft from both the sprayer and the tractor and store with the sprayer.

If necessary, remove consoles from cabin and store in a safe and secure location. Protect hydraulic hoses and electrical connections.

Transporting the sprayer

1. Make sure the tractor has sufficient towing and braking capacity to tow the sprayer.

2. All relevant transport regulations must be adhered to when transporting the sprayer. (ie: speed regulations, oversize signs, flashing light, etc.) It is the operator's responsibility to know the relevant regulations.

3. Make sure the sprayer is securely hitched to the tractor.

4. Ensure that the boom is securely supported when travelling and that the isolation ball valves on the hydraulic lift cylinders are closed.

5. Where a road pack has been installed connect tail light plug.

CAUTION: Take care when reversing with the sprayer attached. If driver visibility is restricted use another adult, with a clear view to the rear of the sprayer, to give reversing directions.

CAUTION: It is the operator's responsibility to know the tare weight and gross weight of the sprayer. If any alterations are made to the sprayer, it is the operator's responsibility to know the tare weight and the gross weight of the modified sprayer at all times.

Chapter 7

BOOM

General

All booms present a number of safety hazards due to their operation - the operator should read and fully understand the safety instructions in this manual prior to operation.

Goldacres Tri-Tech booms have been designed and built to ensure many years of trouble free service. Aluminium outer boom sections reduce the overall weight of the boom and aid in providing a superior boom ride and longevity.

CAUTION: Goldacres do not endorse use of this machine for spraying at speeds greater than 20 km/hr

CAUTION: Before adjusting the boom alignment, the hydraulic fold circuit must be free of air. Hydraulic circuits that contain air can make the boom appear that it is too far forward. Adjustment of the boom without "bleeding" the hydraulic circuit first will result in a boom that quickly reverts to hanging out of alignment to the back.

CAUTION: All chemicals have corrosive properties to some degree. Prevent damage to the machine by always consulting the chemical MSDS or the chemical supplier for advice concerning the corrosive properties of the chemical. It is the responsibility of the operator to carry out preventative and ongoing maintenance to the machine, particularly while applying chemicals with highly corrosive properties. Machine components should be coated with a suitable protectant prior to use, and then washed down, thoroughly, immediately after every application. Consult the supplier of the substance if you require specific advice about the effectiveness of any particular protectant to prevent premature degradation of machine components.

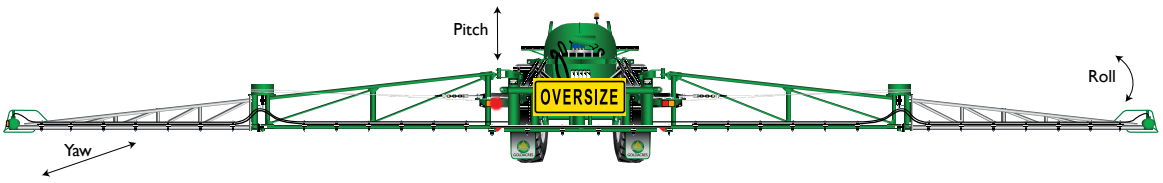
Tri Tech booms feature a unique (patented) boom suspension system.

This system provides suspension in three directions:

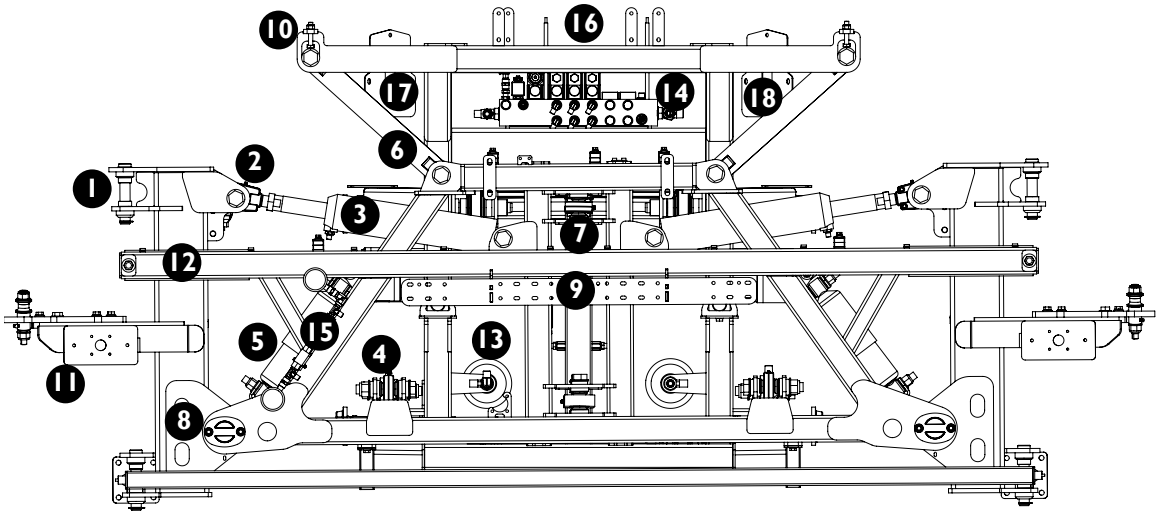
Pitch: Hydraulic cylinders and accumulators dampen the vertical boom movement encountered over rough ground conditions.

Roll: Shock absorbers help maintain constant boom height over sloping and uneven ground.

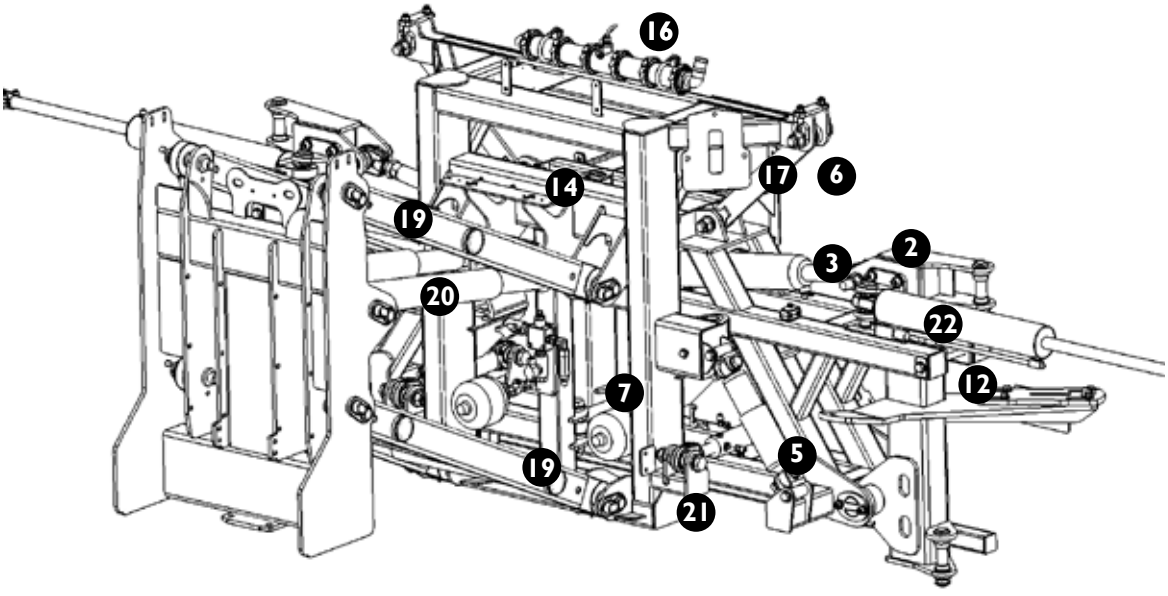
Yaw: Shock absorbers and springs over come the erratic whipping movement, which creates undue stress on the boom frame and uneven spray application. (Hydraulic Yaw suspension is an option)



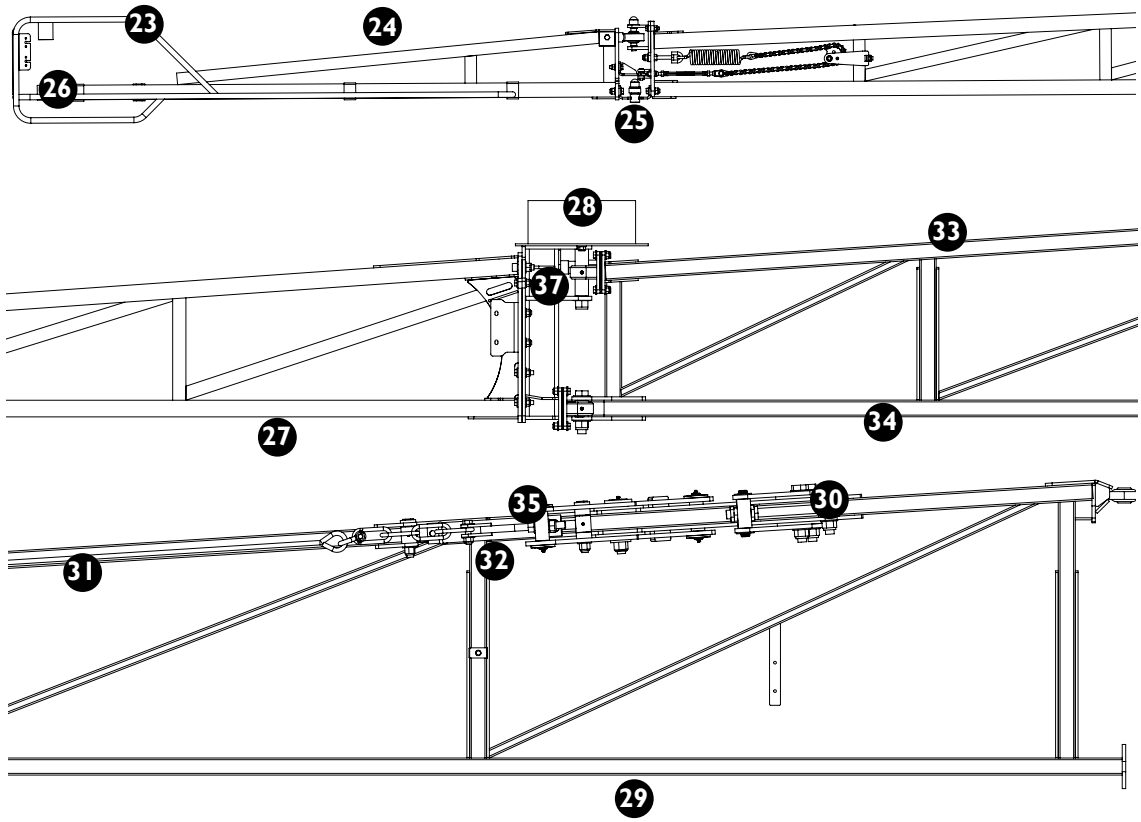
TriTech Boom key features



TriTech Centre Section



TriTech Centre Section and Paralift



Number	Feature
1	Boom rose end
2	Tilt arm adjuster
3	Tilt cylinder (option)
4	Yaw spring (or cylinder) mount
5	Roll shocker
6	Diagonal delta links
7	Lineal delta links
8	Tilt pin (60mm)
9	Boom section controls
10	Boom alignment adjuster
11	Tail light mounting plate
12	Tilt arm wear strips
13	Hydraulic yaw accumulators (option)
14	Electric Over Hydraulic valves (option)
15	Hydraulic yaw controls
16	Flow meter
17	Accuboom node (option)
18	Autoboom node (option)
19	Paralift arms

Number	Feature
20	Lift cylinders
21	Boom lower limit switch
22	Bolt on fold cylinder mount
23	Boom end protector
24	Boom wing tip
25	3D breakaway
26	Fence line jet
27	Boom aluminium outer
28	Boom cable drum
29	Boom steel inner
30	Adjuster for fold ram
31	Boom cable
32	Hydraulic cylinder - for Bi-fold
33	Boom top chord (R.H.S)
34	Boom bottom chord (R.H.S)
35	Cable adjuster
36	Centre Leveling system
37	Boom stopper bolt

Boom Overview

Centre Section

The TriTech centre section is made up of two components, the paralift rear and the boom centre section. The two are held together by delta 4 links. These links allow the boom to be suspended in order to provide roll and yaw suspension.

Roll suspension is when the boom pitches up and down at the tips. Yaw suspension is when the boom moves fore and aft at the tips. If the boom did not feature yaw suspension there would be excessive stresses exerted on the booms and centre section when cornering or corrections of line are made. The yaw suspension allows the chassis of the sprayer to move left and right without any movement being transferred to the boom. The paralift rear will move with the centre of the sprayer but the boom centre section will remain static or level as it rotates around the delta links connecting it to the paralift rear.

The boom yaw is dampened by 2 large springs (1 each side) and 2 dampener shockers to limit the recoil of the yaw springs(optional is hydraulic yaw). These springs must be tensioned all the way. If the springs are not tensioned correctly the boom will be able to yaw excessively and the springs may be damaged. If a spring is damaged, both opposing springs must be replaced at the same time.

The overall yaw travel is limited by rubber bumpers mounted to the paralift rear. If the boom centre section yaws excessively the centre section will contact these and cushion the travel by collapsing the block. If the block collapses totally the yaw travel will be stopped. If the boom is continually yawed excessively this block will wear out and require replacement.

As an option, a hydraulic yaw system may be fitted, each hydraulic cylinder has a nitrogen charged accumulator which also assists in lessening the amount the boom yaw.

Hydraulic Raise and Lower

The paralift enables the boom to be raised and lowered to maintain a consistent boom height above the target.

Prairie Eco feature a paralift rear which uses two hydraulic cylinders to perform the lift, while also acting as a component providing the vertical suspension. Each hydraulic cylinder has a nitrogen charged accumulator which also assists in improving the boom ride. The "boom limit" height switch allows the operator to adjust the minimum ride height of the boom. Boom maintenance information can be found in the "maintenance" chapter of this manual.

The hydraulic lift also enables the boom to be raised prior to folding and then used to lower the boom onto the boom rests.

Hydraulic Fold

The Prairie Eco booms have a hydraulic fold feature, allows the boom to opened and closed from within the cabin.

Hydraulic phasing cylinders are used in the folding operation of the boom. This ensures that both sides of the boom are synchronised and open and close together so that the weight distribution is the same for both sides of the boom.

As hydraulic fluid enters one hydraulic cylinder, it acts upon the first ram and causes it to move. This motion results in an amount of fluid entering the second hydraulic cylinder which causes it to move an equivalent distance. There is also a flow restrictor for each cylinder so that the hydraulic fluid will enter and leave the respective cylinders at a controlled rate. This has the effect of slowing down the rate of fluid transfer and thus causes the boom to open and close more slowly - protecting the boom from damage. If the phasing cylinders do not fold together, information on re-phasing the rams can be found in the "maintenance" chapter.

Boom Balance

The Prairie Evo boom suspension system causes the boom to adopt the same plane as the spray tanker. If one side is heavier than the other, the boom will tend to hang lower on the heavy side, so both sides need to be balanced for the boom ends to be of the same height.

To achieve this, a boom drum weight can be included on the boom and placed strategically so that it compensates and balances the boom. The boom drum can have more weight added and/or be moved to balance the boom correctly.

Before adding any boom weights, it is advised that the boom is adjusted correctly. As per the instructions following in this chapter.

Boom Cables

Boom cables are a critical part of the Prairie Eco booms and it is important to ensure that boom cables are correctly adjusted prior to operation.

Loose boom cables can cause boom damage by allowing the outer boom section to hang out of alignment or to 'break away' too easily. This can shorten the sprayers life by placing unnecessary stresses on the boom, lift and chassis.

The cable tension can be checked by inspecting the cable springs, Further information on boom adjustment and alignment can be found in this chapter.

Boom Valves

Motorised boom valves are fitted as standard and are mounted on the boom centre section at the rear of the sprayer. Motorised boom valves feature a 12 volt motor that opens or closes a stainless steel plunger and thus opening or closing flow to the boom sections as required.

In the event of a valve failure, unscrew the top cap of valve then check that the fuse (3 amp) is ok.

Nozzles

The standard nozzle spacing on Goldacres booms is 500mm. Nozzles are mounted on brackets that are adjustable for different nozzle types. Nozzles are mounted so that they are protected from strikes should the boom make contact with the ground, obstructions or crop.

As information regarding nozzles is specific to those being used in your application, no specific reference is made to nozzle application rates or types in this operator's manual. Goldacres suggest the use of a current TeeJet or Lechler nozzle selection catalogue for reference to nozzle sizes, outputs, spray patterns and general spraying information. For more technical information on the function of spray nozzles and factors affecting their performance you can also use the TeeJet "User's guide to spray nozzles".

The TeeJet & Lechler nozzle selection catalogue and Users guides to spray nozzles are available from your Goldacres dealer, or as a free download from the TeeJet web site: www.teejet.com
Lechler web site: www.lechler.de

Three Dimensional Breakaway

TriTech booms feature the unique three dimensional breakaway hinge which allows the tip to "break" forward, backward and upward if an obstruction is hit. The 3D Breakaway hinge aims to eliminate any further damage to the remainder of the boom should an obstruction be hit.

It is important that the 3D Breakaway hinge is properly adjusted when in operation. Just tightening the spring will not help with the function of the breakaway. Instructions on how to properly adjust the breakaway can be found later in this chapter.

Boom Protection Brackets

Stainless steel boom protectors are fitted on the boom to protect the boom when resting on the boom rests for transport. It is important to ensure that the boom protection brackets are fitted correctly.

Boom End Protector

Boom end protectors are fitted to the breakaway tips to help prevent damage to the boom from ground strike or from hitting an obstruction. They also help to keep the boom from becoming entangled when spraying close to fence lines.

Boom Options

Fence Line Jets

Goldacres offer manually and electrically operated fence line jets. The 'fenceline' jet is designed to enable the operator to spray right up to the boundary fence without having the boom too close to the fence.

This should prevent operators from putting the boom into the fence, especially important when the boom is relatively new and the operator is not familiar with the width of the boom. The fenceline jet should be turned off after the end of the first lap and this can be done either manually via a tap or remotely via an optional electric solenoid (controlled in the cabin).

Hydraulic Yaw Suspension

(optional on TriTech)
Hydraulic yaw suspension is designed to control the yaw movement of the boom centre section. In place of the conventional system, which uses 2 springs and 2 dampers, the hydraulic yaw option uses 2 hydraulic cylinders and nitrogen filled accumulators to centre and dampen the yaw movement.

The two hydraulic cylinders and accumulators are charged with hydraulic pressure and then closed off to create a separate circuit which acts as the yaw suspension.

For further information, refer to the hydraulic yaw suspension section in this chapter.

Bi-fold

(optional on TriTech)

TriTech booms can incorporate a hydraulic bi-fold option which allows the boom outer sections to be folded in to make the entire boom smaller.

For example a 36 metre Tri Tech boom fitted with the bi-fold option would fold back into 18 metres swath width for easier spraying in tight situations.

A centre leveling system is fitted as standard on machines with bi-fold. The centre leveling system holds the centre section level with the sprayer chassis when fold or bi-fold functions are activated. This helps with the even folding of the wings.

See the section at the end of this chapter for information on adjusting booms fitted with bi-fold.

Ultraglide

(optional on TriTech)

The Goldacres ultrasonic boom height levelling system allows you to spray more precisely by automatically adjusting the height of your boom as you travel across the paddock. The operator sets a desired height above the target

This means that you spend less time watching your booms and trying to prevent them from hitting the ground or crop. UltraGlide detects changes in target height and adjusts your boom accordingly.

The ultrasonic sensor detects the height of the target and adjusts the boom height with the hydraulic tilt cylinders to suit the preset height.

Further information on ultrasonic boom height levelling can be found in the "UltraGlide" section at the rear of this manual.

Hydraulic Boom Wing Tilts

TriTech and Delta booms can incorporate a hydraulic tilt option, which allows the individual boom sides to be raised independently when in the working position. This serves to provide greater variability of boom height control to compensate for undulating ground conditions. Boom tilts are operated from switches in the cabin.

Where hydraulic tilts are not fitted, a manually adjustable link is placed in substitute for the tilt cylinder.

Three Tier System (3TS)

Three Tier System(3TS) consists of a twin nozzle body on a single boom line, which runs the Goldacres' RapidFire air operated nozzles which eliminates the need for boom valves.

As an example, a conventional 30 metre boom has one boom line with 60 nozzle outlets (2 per metre) across its width. A 3TS boom replicates this first line with a second line also consisting of 60 nozzles giving a total of 120 nozzles for both lines.

In simple language, 3TS gives you the capacity to vary application rates and speeds by switching extra nozzles on and off.

3TS allows a range of speed changes without the

spray quality being compromised – the correct droplet size is maintained.

Importantly you can use the nozzles you want to use - including air induction nozzles. That's higher speed spraying without the limitations of large droplet size.

Typically nozzles on the first line may flow at 015 flow rate and the nozzles on 3TS's second line at 025. When spraying, the first nozzles automatically switch off when they reach full operating pressure allowing the second line nozzles to commence spraying. As speed increases again and the second line nozzles reach their maximum operating pressure, the first line nozzles will switch on again.

Thus, the flow rates of 015, 025 and 040 can be achieved while maintaining the optimum droplet size and spraying pressure.

RapidFire

The RapidFire system provides rapid, nozzle section shut off that is controlled by air operated solenoids at each nozzle. This system replaces the boom valves and standard check valves that shut off the boom sections and nozzles. This provides greater flexibility in changing boom section widths and faster shut off at the nozzle.

The RapidFire system reduces the amount of plumbing on the sprayer and allows for the fitting of a boom recirculation system. The ability to have more boom sections also works perfectly in conjunction with autoboom shut off systems.

Boom Recirculation (RapidFlow)

In order to ensure that boom lines are charged and ready to spray, a standard sprayer plumbing system will require the boom lines to be purged with chemical mix prior to spraying. RapidFlow allows an agitated chemical mix to be run through the boom lines prior to spraying - pre-charging them and eliminating waste.

This option is included when RapidFire is fitted.

Boom operation

Boom Operation Folding

The boom fold sequence is as below:

1. Starting with the boom in the working position, use the switch in cabin to raise the boom fully.
2. Use the switch to Tilt the wings down.
3. Use the switch to fold the boom completely in.
4. Lower the boom until the boom just touches the rests
5. Then continue to lower the boom a further 100mm so as to put sufficient weight onto the rests.
6. Finally, press the boom fold switch momentarily to fold the booms tight on the rest.

NOTE: Booms must not be folded, or unfolded, while the sprayer is moving. When the boom is between fully open and fully closed , there can be large stresses placed on many boom components. If the sprayer is moving and hits a bump, severe damage to the boom can occur.

NOTE: The booms must be folded continuously without stopping and starting during the sequence. Take care not to fold/unfold booms too fast, as damage can be caused. This speed is set at the factory and should not be adjusted.

CAUTION: Always check for power lines while folding and unfolding the boom, also when using wing tilts, as contact with lines can be fatal.

Un-folding

The boom unfold sequence is as below:

1. Raise the boom fully to clear the boom rests.

2. Use the switch in the cabin to unfold the boom so that the boom is aligned with the centre section.

3. Lower the boom to the desired height above the target.

NOTE: The booms must be folded continuously without stopping and starting during the sequence.

NOTE: To re-phase the fold cylinders, continue holding the boom out button once the boom has fully unfolded.

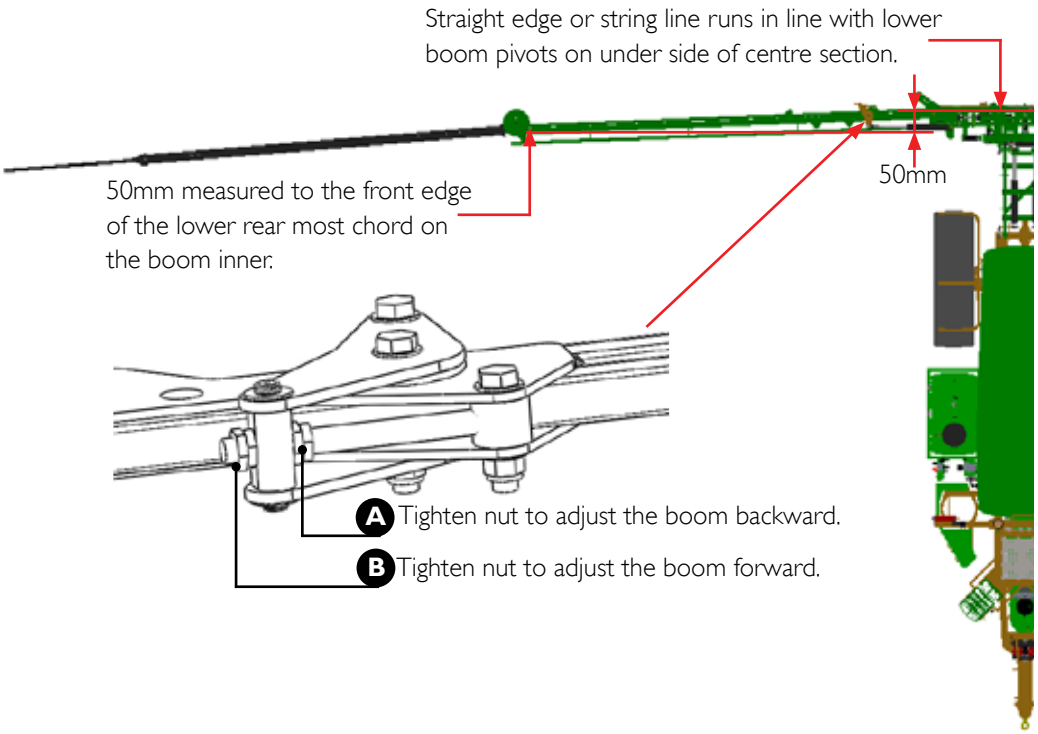
Boom adjustment

Inner Steel Boom Alignment - Working Position

1. Open the boom fully into the working position.
2. Continue to press the unfold button or hold the hydraulic remote open to ensure the fold cylinders are phased completely. They must be at the same length.
3. Look along the inner booms between the cable drums to assess the alignment.

   All booms must be 50mm forward of the centre section at the cable drums. A string line can also be used for measuring the lead of the inner boom (see below).
4. If adjustment is required, loosen the two lock-nuts on the boom fold adjuster bolt at the rear of the boom.
5. To adjust the boom forward, tighten the outer adjuster nut. To adjust the boom rearward, tighten the inner adjuster nut
6. When the boom is in the required position tighten both locknuts to hold in place.
7. Follow this process for both inner booms.

NOTE: It is important that both wings are adjusted the same. If one wing is adjusted further forward or back than the other, the boom may not sit level.



Outer Boom Wing Alignment - Working Position

1. When adjustment of the inner booms is complete the outer booms can now be aligned.

2. 24-30m TriTech booms must be 30-50mm and 33-36m booms must be 50mm forward of the inner booms. Use a string line to assist with achieving the correct measurements.

3. To align the outer booms, the cable adjusters and boom stopper bolt are used. To pull the outer boom forward, wind in the boom stopper bolt. The turnbuckle that is connected to the cable damper springs at the front of the boom must also be shortened to maintain cable tension. At the same time the rear turnbuckle must be lengthened.

4. To adjust the outer boom rearward, wind out the boom stopper bolt. The rear turnbuckle must be shortened and the turnbuckle at the front lengthened.

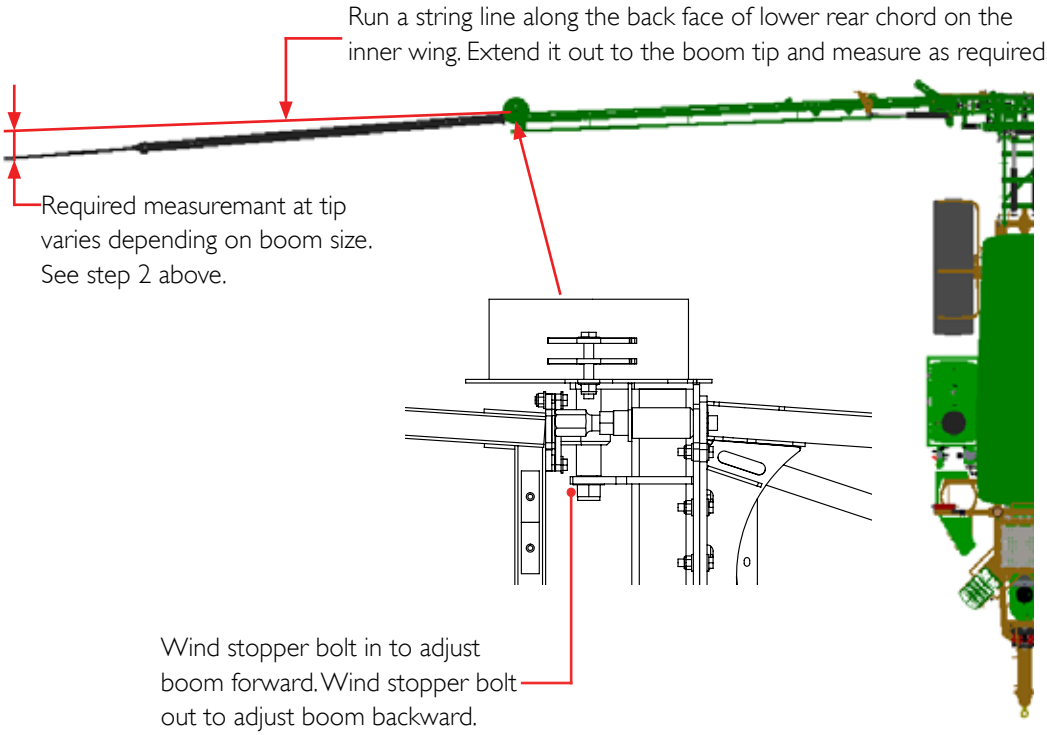
5. Once correct alignment has been achieved the cable spring tension must be set so there is a **3mm gap** between the coils.

NOTE: It is advised that all threads are lubricated prior to making adjustments.

NOTE: If cable adjustments run out on the turnbuckles, it is advised that you should contact your dealer and purchase new cables.

NOTE: It is important that both wings are adjusted the same. If one wing is adjusted further forward or back than the other, the boom may not sit level.

NOTE: The rear cable is used for folding only, and must not be tight when the boom is unfolded.

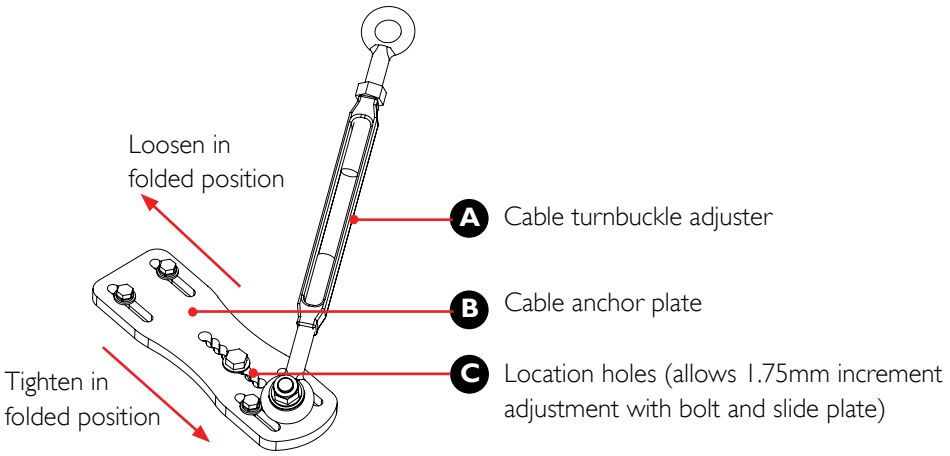


Outer Boom Wing Alignment - Folded Position

Alignment of Outer Aluminium Boom - Folded Position

- The eyebolt cable adjuster aligns the outer boom arm in the working position; the adjustment plate is designed to adjust the outer boom arm in the folded position.
- The eyebolt adjuster will follow the same orientation as the boom when folding and unfolding. For example, when the boom is in the operating position the eyebolt adjuster should be horizontal in line with the boom. With the boom folded, the eyebolt adjuster should be pointing forward in a raised position, again following the line of the boom.
- Fold in the boom. If the outer boom arm does not come in all the way against the inner boom arm and contact the bump stop then the adjustment plate will need to be moved out. If the outer boom arm contacts the bump stop too early and places too much tension on the cable then the adjustment plate needs to be moved inwards.
- To adjust the plate the boom has to be in the working position. Have someone pull back on the outer boom arm to release the tension on the cable whilst you make adjustments to the plate. When adjustment is completed ensure the outer boom arm is released carefully so it does not spring forward dangerously. Re-adjust the cable eyebolt to realign the outer boom arm whilst still in the working position before folding the boom and re-checking the alignment in the folded position.
- Repeat the procedure if necessary until the outer boom arm assumes the correct alignment in both the working and folded positions. When this has been achieved install the bolts (C) and tighten.
- Spring tension may be altered slightly when this plate is moved. Check there is a 3mm gap in the spring coils and adjust if required.

NOTE: If the outer boom arm contacts the bump stop too early and too much tension is placed on the cable, then the hydraulic cylinder may fail to bring both arms all the way in, or damage the boom arms and cable



Tri-tech Vertical Boom Alignment - Working Position

When the boom is in the working position, the inner and outer boom should be level or slightly increasing in height from the centre section to give a consistent and even spray application height. A new boom may be susceptible to stretching or sagging as the components are worn in. Several adjustment may be required in the first 12months of operation until the boom settles.

Inner Booms

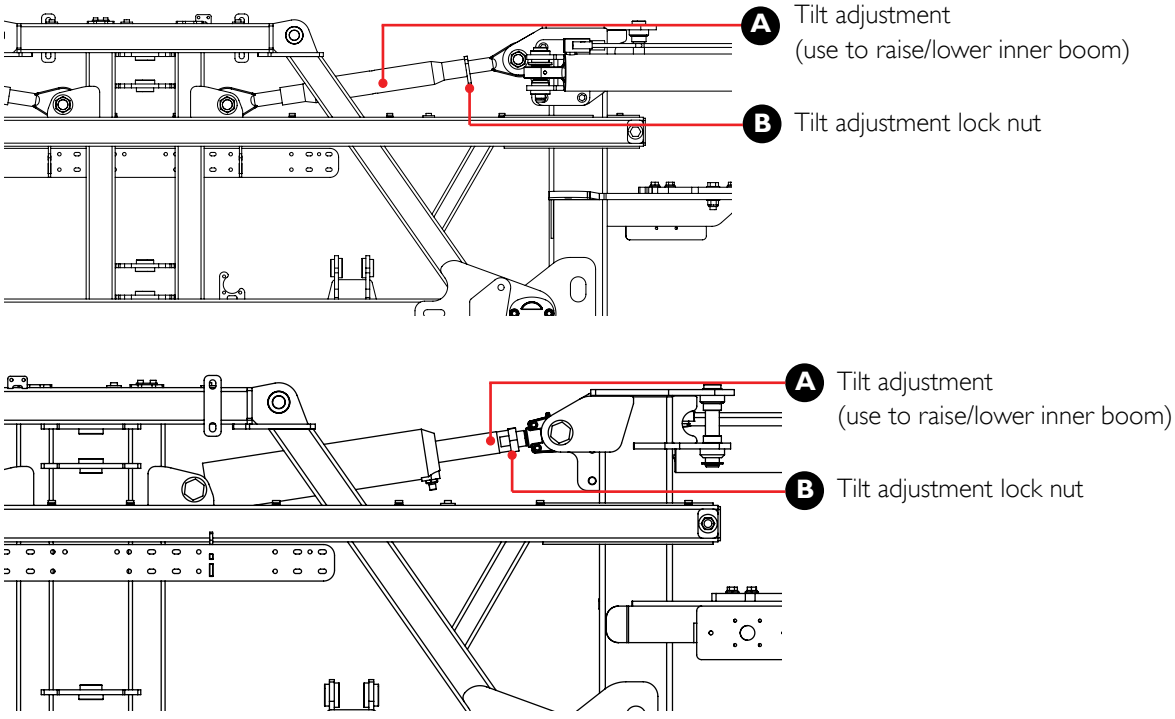
- The boom centre section must be level with the chassis before any boom adjustments are made. The centre of the centre section should line up with the centre of the paralift when look from the rear. This can be done by either shortening or lengthening the centre section adjuster bolt at the top delta links, or by adding weight discs to the cable drums.
- The inner booms must be adjusted first so they are the same height as the centre section or slightly increasing in height from the centre section (to allow for boom stretch) .These adjustments are made by lengthening or shortening the tilt adjusters on the tilt cylinder..
- To lengthen or shorten the tilt adjusters, the weight of both the booms will need to be supported.
- When any adjustments are completed. Ensure the lock nuts are tight.

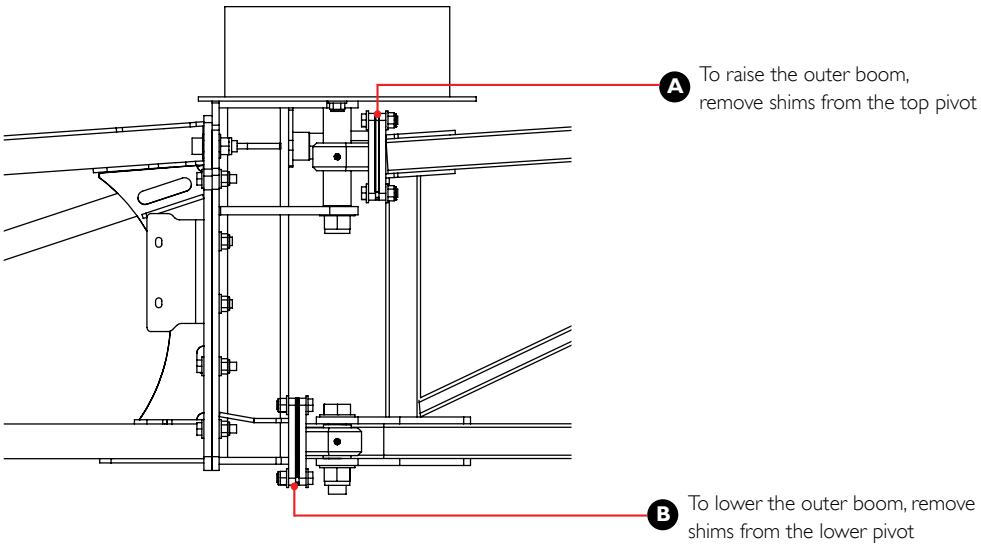
Outer Booms

- The height of the outer booms in the working position are adjusted by adding or removing shims at the cable drum.
- The cable drum mounts are assembled in manufacturing with 6-7 shims at the upper and lower bearing blocks.
- If the outer boom hangs lower than the inner boom, remove shims from the upper mount until the booms are level. If the outer boom is too high remove shims from the lower bearing block. Retension the retaining bolts to 65Nm when all adjustments are complete.
- The boom cables may need to be loosened to enable easier removal of the shims.

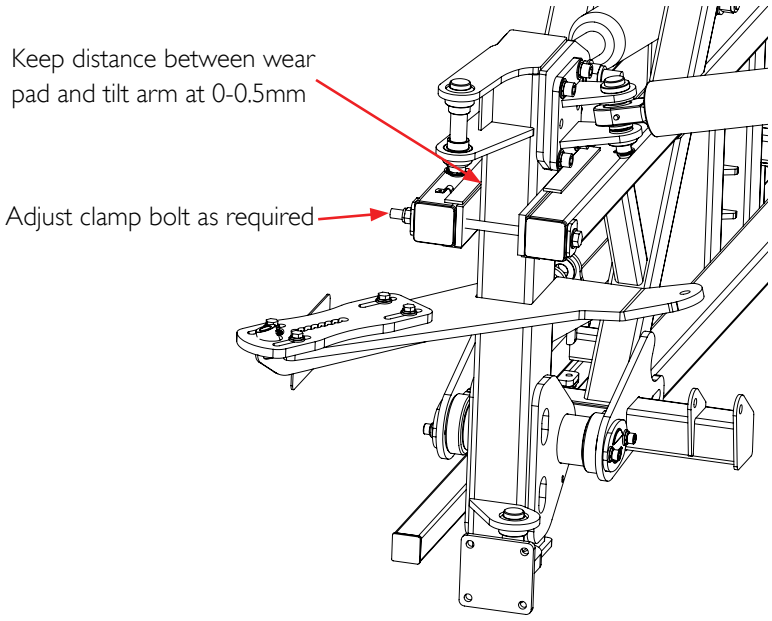
24-30m booms:
1 shim added = 10-20mm @ boom end

33-36m booms:
1 shim added = 20-30mm @ boom end





The tilt arm guide arms are fitted with wear strips. It is important that these strips are maintained and that the gap between them and the tilt arm is kept between 0-0.5mm either side. This ensures the tilt arm cannot twist, prolonging the life of the product.



Vertical Boom Alignment - Folded Position

When the booms are folded up in the transport position, the full weight of the booms must be supported by the inner boom. The outer aluminium boom may sit on the boom rest rubber but must not support any weight.

Inner Booms

- If the boom sits level in the working position but when folded up, one side is lower than the other, there is one adjustment that can be made.
- Shims can be placed at the bottom boom mount of the lowest boom - refer to diagram A. This will lift the boom in the open position.
- If the boom is not level in the working position, the most likely cause if this is an out of balance boom. Refer to previous boom adjust information.

NOTE: This process should not be required as once they are set in manufacturing, they should not change

When the booms are folded up in the transport position, the outer boom must saddle onto the inner boom. If this alignment of out the outer boom will not saddle correctly and will not be supported in transport.

The boom support saddle is bolted to the outer boom and when folded, couples to the inner boom. This saddle must slide onto the inner boom freely to prevent damage to the booms.

NOTE: This process will be require in the first 6 months of operation as the booms stretch an ware in.

Outer Booms

- If the outer boom hangs too low in the folded position shims must be added to the cable drum pivots. To raise the outer boom, add shims to both the upper and lower pivots. This adjusts the angle of the pivot axis causing the outer boom to fold up higher. By adding shims to both the upper and lower pivots, the outer boom height is not affected in the working position.
- To lower the outer boom in the folded position, remove shims from both the upper and lower pivots.
- 1 x 1mm shim at the upper and lower pivots equals approximately 15mm change in height.

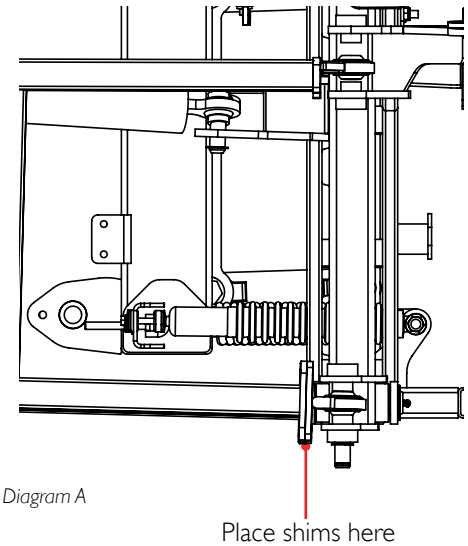


Diagram A

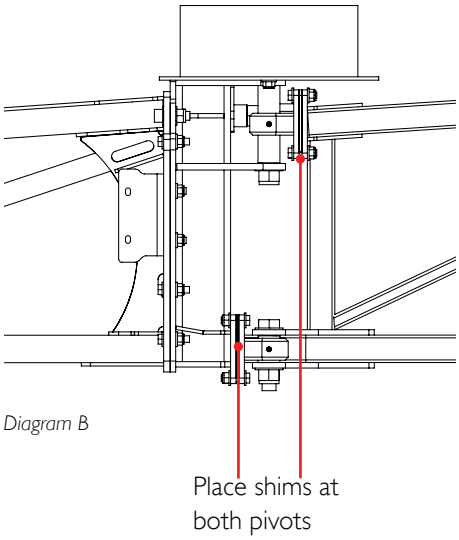
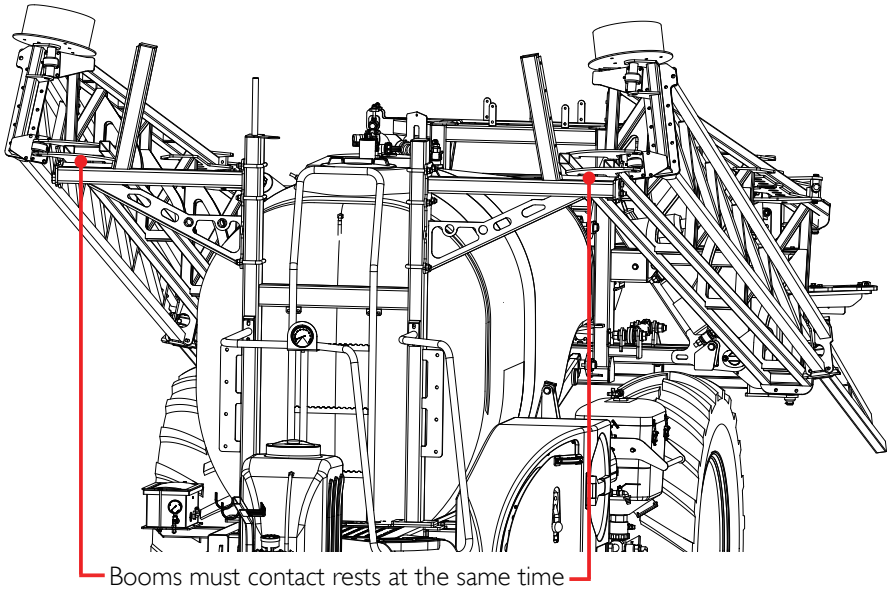


Diagram B


Booms must contact rests at the same time

Three Dimensional Breakaway - TriTech

Initial Setup

1. Open the boom fully into the working position and lower to a good working height.

2. Close the ball valves on the two hydraulic lift cylinders for safety purposes.

3. The lower pivot plates need to be in line with each other. (fig A)

4. If the rose end is removed for any reason, anti seize should be applied to the thread before it is screwed into the boom tip. The rose end should be screwed into the breakaway tip so that it measures 52mm from the boom tip face plate to the centre of the rose end (fig B). Apply loctite 243 thread lock to the grub screw and fasten.

5. The small hole in the sprocket must align with the hole in the side of the pivot plate. This is adjusted by tightening or loosening the turnbuckle (fig C). To adjust the turnbuckle;
   A) Pull the boom tip back until the large hole in the sprocket aligns with the hole in the pivot side plate, put a pin through the holes and release the tip.
   B) Make adjustments to turnbuckle.
   C) Pull tip back and remove the pin. Release the tip and check alignment of small hole in sprocket with pivot plate.
   D) Repeat steps A-C until the small hole in the sprocket and hole in the side plate align.

6. The spring tension must be adjusted so there is a 1-2mm gap between the coils. This applies the ideal amount of resistance when breaking away. The spring tension can be adjusted by tightening or loosening the eye bolt.

Maintenance

There are several things that need to be done to ensure that the breakaway will be functioning properly.

1. There are two main things that are critical to the breakaway functioning correctly. The small hole in the sprocket needs to align with the hole in the side of the pivot plate (see step 5) and the spring tension. Check these on a regular basis and adjust as required.

2. The spring will stretch over time and will loose tension. A spring is worn and should be replaced when there is no tension on the spring and it doesn't fully retract.

3. To ensure the smooth and longlasting operation of the breakaway mechanism, they must be lubricated on a regular basis. The sprocket pivot, chain and lower rose joints should be oiled with a wet lubricant every 8 hours. The upper rose joint should be greased every 8 hours.

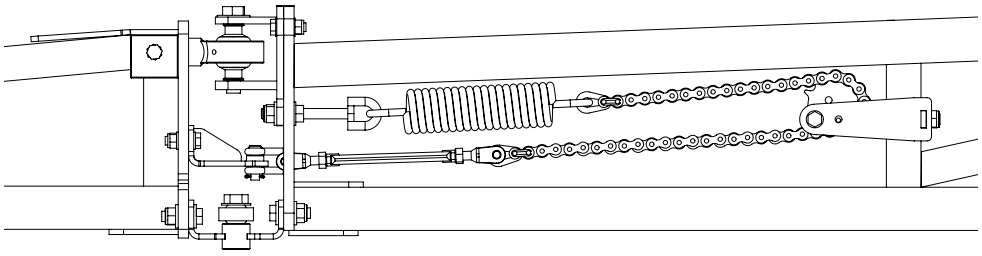


Figure A

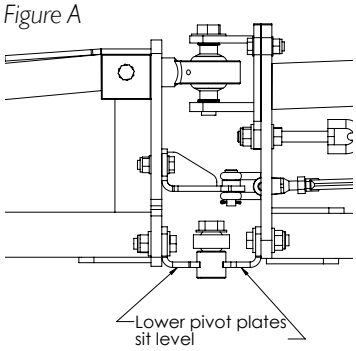


Figure B

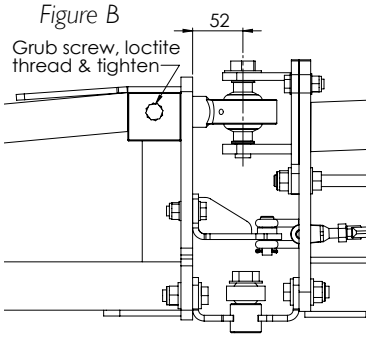
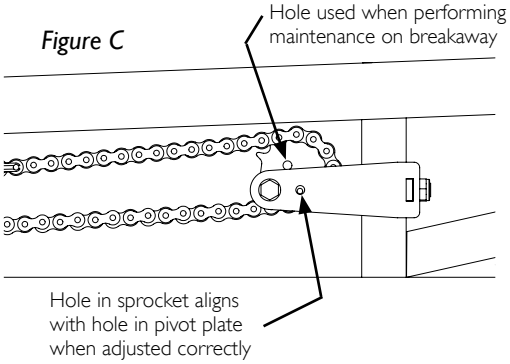


Figure C



Hydraulic Yaw Suspension (TriTech Boom Only)

About

Large booms, and booms fitted with Weedseeker sensors, may have hydraulic yaw suspension fitted. This is a system that replaces the yaw springs and dampers with hydraulic cylinders and nitrogen filled accumulators. This system maintains a more rigid ride in the centre section therefore limiting small variations in the yaw on heavier booms.

The hydraulic yaw system is a closed hydraulic circuit. The base of the right hand yaw cylinder is connected via hydraulic hoses to the rod end of the left hand cylinder with a nitrogen charged (70 bar) accumulator which is connected via a "T" piece into the cross over hose. The base of the left hand cylinder is connected via hydraulic hose to the rod end of the right hand cylinder with a nitrogen charged (70 bar) accumulator which is connected via a "T" piece into the cross over hose.

If the boom yaws to the left, the right hand cylinder will try to compress. This will push oil out of the base of the right hand cylinder into the rod end of the left hand cylinder also into the accumulator against the 70 bar precharge pressure. Because the hydraulic yaw is a closed circuit the oil movement is restricted by the precharge pressure in the accumulator. This precharge pressure is what restricts the boom yaw movement trying to hold the boom centralised. If the boom yaws to the right the opposite action occurs.

The circuit precharge needs to be monitored and maintained. Gauges on the centre section display the closed loop hydraulic yaw pressure. This pressure should be maintained at 100 bar.

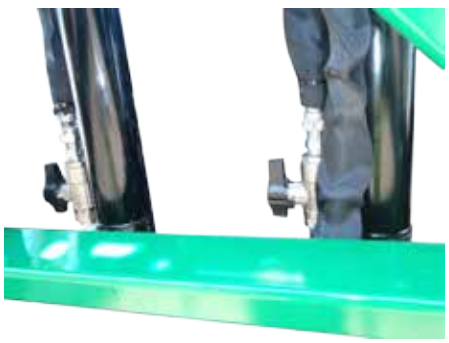
NOTE: When the hydraulic yaw system is installed or any components are replaced, the closed loop hydraulic circuit needs to be bled of any air. The maximum pressure needs to be set, the system charged and the booms aligned.

Bleeding the Circuit

1. Park the machine on a flat level surface, engage the parking brake and chock the sprayer wheels.
2. Open the boom into the working position and lower to the minimum working height. (Ensure there is ample room in front and behind the boom as it will be required to oscillate.)
3. Isolate the boom lift cylinders by rotating the paralift cylinder ball valves to the OFF position.
4. Remove the pressure gauges from the quick connect port on the accumulators.
5. Connect the bleed hose (supplied in the sprayer kit) to quick connect ports on the accumulators.
6. Couple the pioneer connectors to an external hydraulic source, such as a tractor.
7. Using the external hydraulic source, oscillate the boom back and forth ensuring to hold the boom at its extremities for approximately 30 seconds. Start by activating the hydraulic source in one direction. The boom will oscillate forward and stop when the hydraulic cylinder is fully extended. Hold the hydraulic supply in position for at least 30 seconds to ensure that the hydraulic cylinder is fully extended. Move the hydraulic source in the opposite direction until the opposite cylinder is fully extended, again hold in position for 30 seconds to ensure the cylinder is fully extended. Repeat this at least 15-20 times to bleed any air from the system.
8. When oscillations are complete move the boom into a perfect centred position.

Setting the Pressure Reducing Valve

1. Park the machine on a flat level surface, engage the parking brake and chock the sprayer wheels.
2. Open the boom into the working position and lower to the minimum working height.
3. Isolate the boom lift cylinders by rotating the paralift cylinder valves to the off position.



4. Open the hydraulic yaw "charge" ball valves.

5. Identify the pressure reducing valve.

6. Loosen the adjustment lock nut and turn the set screw counter clockwise 3 rotations.

7. This will generate minimum hydraulic oil pressure in the sprayer hydraulic circuit.

8. With the hydraulic circuit engaged turn the set screw IN (clockwise) until the hydraulic yaw pressure gauges indicate 100 bar (1500 psi). If the pressure is exceeded the closed loop circuit must be "cracked" to bleed off any excess pressure. The Tilt Out can be used to generate pressure in the hydraulic system.

CAUTION: Take care when working with hydraulic oil under pressure. Ensure that excess oil is drained into a container.

9. Once the set screw is set to the correct pressure, tighten the lock nut. Ensure that the set screw is held firmly in position to prevent the pressure fluctuating.

10. When the pressure is correctly set, charge the circuit as per the instructions following.

Charging the System

1. Park the machine on a flat level surface, engage the park brake and chock the sprayer wheels.

2. Open the boom into the working position and lower to the minimum working height.

3. Isolate the boom lift cylinders by rotating the paralift cylinder valves to the off position.

4. Open the hydraulic yaw "charge" ball valves.

5. Activate the boom lift circuit and maintain constant pressure for 30-60 seconds. This will generate maximum hydraulic oil pressure in the sprayer hydraulic circuit.

NOTE: The pressure reducing valve in the circuit limits the main hydraulic pressure to 100 bar (1500 psi) entering the hydraulic circuit.

6. After 30-60 seconds release the lift circuit and isolate the hydraulic yaw "charge" ball valves by rotating them to OFF position. The pressure gauges in the hydraulic yaw circuit should be reading 100 bar (1500 psi).

7. Ensure that the boom is sitting level or aligned correctly. If one side of the yaw is sitting forward of the other "open" the "charge" ball valve and push the boom around to align it and even the cylinders out, once aligned "close" the "charge" ball valves. Check the pressure gauges are still at 100 bar (1500 psi).

Bi-fold (TriTech Boom Only)

The following are boom adjustments that are specific to Bi-fold booms. All other adjustments on a bi-fold boom can be made as stated above for a regular boom.

Alignment of Outer Aluminium Boom - Working Position

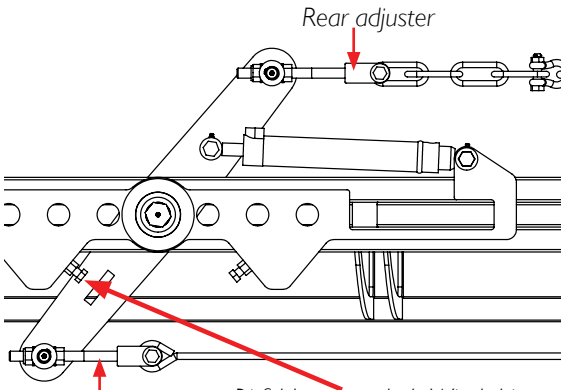
1. When adjustment of the inner booms is complete the outer booms can now be aligned.
2. 24-30m TriTech booms must be 30-50mm and 33-36m booms must be 50mm forward of the inner booms.
3. To align the outer booms, the cables must be adjusted. To move the boom forward the front adjuster bolt must be shortened. At the same time the rear cable adjuster bolt must be lengthened.
4. To adjust the outer boom rearward the rear cable adjuster must be shortened and the front adjuster bolt lengthened.
5. If the there is insufficient travel in the Bi-fold cylinder to completely unfold the outer boom, the Bi-fold stopper bolt will require adjustment. Wind the bolt in to allow the cylinder to travel more and fold out the wing further. Make small adjustments when winding the bolt and fold the outer wing each time to check the adjustments made.

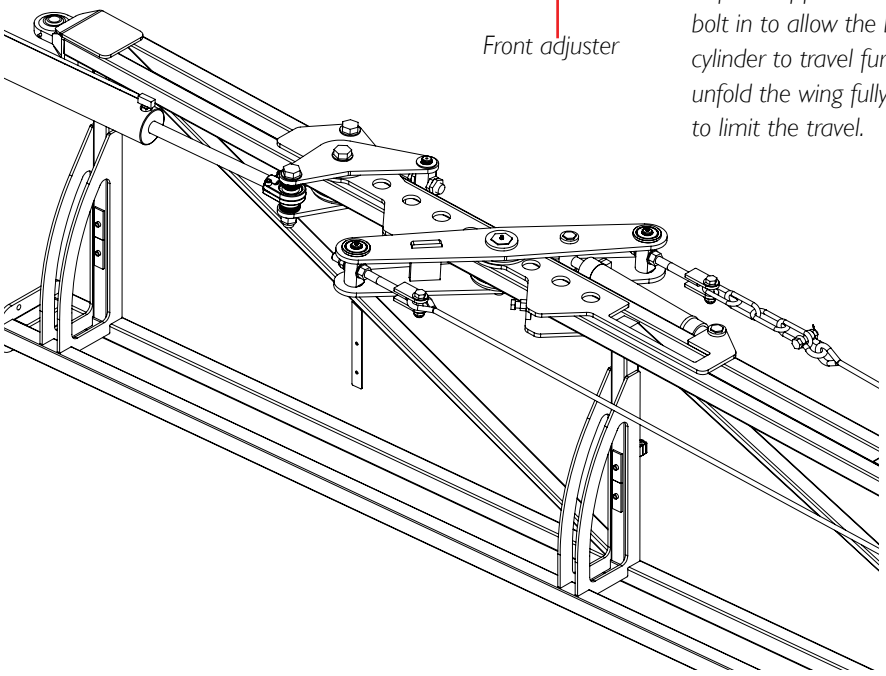
   The bolt must be in contact with the fold pivot plate stop when the wing is in the working position.

NOTE: The cable should be tensioned so that there is a 50mm deflection in the cable when a force of 15kg is applied to it.

NOTE: It is advised that all threads are lubricated prior to making adjustments

NOTE: If cable adjustments run out, a new cable should be purchased as the old one has stretched beyond specification.





Alignment of Outer Aluminium Boom - Folded Position (With Bi-fold)

1. When the outer boom folds up into the transport position it must saddle firmly against the inner boom. If it is too loose, the outer boom may be damaged in transport.

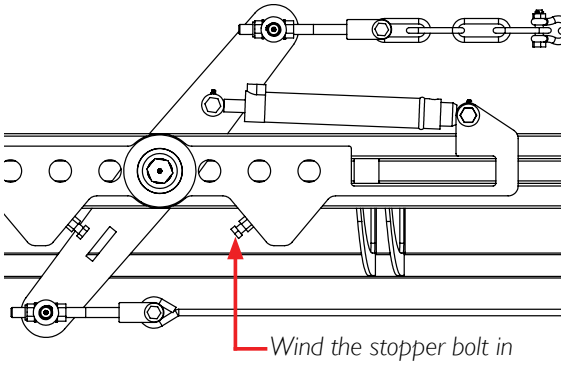
2. To increase to fold pressure of the outer boom, the Bi-fold stopper bolt must be shortened. This will increase the travel of the bi-fold cylinder allowing the outer boom to fold around tighter.

3. If the outer boom folds up too tight damage can also be caused to be boom.

4. To loosen the fold pressure, the Bi-fold arm stopper bolt must be screwed out, reducing fold travel of the outer boom.

NOTE: It is advised that all threads are lubricated prior to making adjustments

NOTE: If cable adjustments run out, a new cable should be purchased as the old one has stretched beyond specification.



Wind the stopper bolt in to make the outer boom fold in tighter. Wind it out to decrease the fold travel of the outer boom.

Hydraulic Adjustments

The pressure in the Bi-fold circuit will vary depending on what size boom is fitted, up to a maximum pressure of 1700 psi.

Boom Size	Bi-fold pressure
24m	1500 psi
28m	1550 psi
30m	1600 psi
33m	1650 psi
36m	1700 psi

The Bi-fold pressure is shown on the gauges located on the Dash Panel in front of the cabin.

The Bi-fold pressure is adjusted at the spool block (for more information on the spool block, see the lubrication and maintenance chapter).

Bi-fold pressure reducing valve

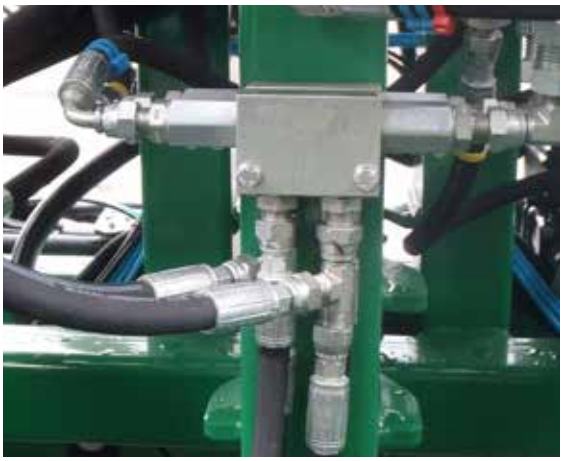
With the boom fully folded out, check the Bi-fold pressure on the gauges on the dash panel. Note if the pressure needs to be increased or decreased. Bi-fold the boom so that the outers only are folded in. The Bi-fold pressure should now be reading zero.

To adjust, the Bi-fold pressure reducing valve located on the spool block should be wound in or out. Winding the knob in will increase the pressure, winding it out will decrease pressure. When adjusting the pressure, make only small changes. Fold the boom out and check the pressure reading on the gauges. If not reading correct, Bi-fold the boom in again and make another adjustment. Always make adjustments while the boom is Bi-folded in and re-check when the boom is fully folded out. When the correct pressure is reached, tighten the lock nut on the pressure adjusting screw on the spool block.

WARNING: Working with hydraulics can be very dangerous. While operating the boom, all people and objects should be clear of the boom wing fold radius. Nobody should be on or near the centre section, while hydraulic functions are operated.

If the Bi-fold losses pressure while operating, the check valves may be leaking. If they are leaking, they should be replaced. (check valves shown below).

The check valve for the right hand side is located closest to the paralift, with the left side check valve on top of it.



Boom centre section

Chapter 8

TROUBLESHOOTING

General

The following troubleshooting information is provided as a reference when your sprayer is not functioning correctly.

To ensure that you receive the best possible service, it is recommended that you exhaust all applicable troubleshooting solutions shown in this chapter prior to calling your dealer, or Goldacres, for service advice

Parts information and schematics can be found in the parts manual supplied.

NOTE: Not all options mentioned below will be fitted to your sprayer from the factory.

Diaphragm Pump

Problem	Common Causes	Common Solution
Pressure and flow rate are too low	Pump	Check suction line for air leaks
		Suction filter may be blocked
		Check pump speed. 400 - 540 RPM
		Check oil for colour change. If the oil appears milky, a diaphragm will be damaged and needs to be replaced
		Check valves in pump
		Turn the pressure station ball valve to off, if the pressure increases on the pump gauge there is a problem with the control valve
		Measure the flow per minute coming out of one nozzle and check the nozzle chart for the corresponding flow
		Check the regulator valve is rotating the full 90 degrees when manually increasing or decreasing
		Check tank sump and suction line blockages
	Excessive bypass on pressure manifold	Verify console calibration settings
	Supply to pump is restricted	Check the pressure relief valve setting on pressure manifold
	Spray mode swicth in wrong position	Switch from induction mode to spray mode
Pressure and flow rate are too high	Bypass line is restricted or blocked	Verify console calibration settings Check for restriction in bypass line Check pump speed is not too fast. Check if Bypass valve is turned on
The pressure on my gauge is higher than the nozzle flow indicates	Blocked filters of nozzles	Check and clean all pressure and nozzle filters
	Flow loss due to resistance in lines, valves and filters.	Re-calibrate console to allow for pressure loss

Problem	Common Causes	Common Solution
The flow rate is correct but my pressure is too low or high.	Nozzles	Check nozzle chart for correct nozzle size.
Pressure fluctuation	Air leak on suction side of pump	Check suction pump for air leaks.
	Incorrect pump speed	Adjust pump speed so it is between 400 -540rpm
	Faulty pump valves	Replace pump valves
Pump pressure pulsating	Air accumulator pressure is incorrect (if fitted)	Reset the pressure in air accumulator
	Air accumulator diaphragm has a leak (if fitted)	Replace air accumulator diaphragm
	Incorrect pump speed	Adjust pump speed so it is between 400 - 540rpm
	Air leak on suction side of pump	Check pump suction for air leaks
Pump oil is becoming milky	Cracked diaphragm	Replace all diaphragms
Pump is noisy	Low oil level	Refill or replace oil
	Damaged pump valves	Replace pump valves & all bearing
	Pump suction line has air leak or is restricted	Clean suction filter and check for leaks in suction lines
	Air accumulator pressure set incorrectly	Recharge air accumulator to specified pressure
	Insufficient lubrication on PTO shaft	Grease PTO shaft
Pump housing or mounting cracked.	Extremely cold weather can cause liquid in the pump to freeze	Check for ice in the pump and let defrost if required
	PTO shaft not sliding freely or incorrect length	Check PTO shaft length and lubricate

PTO Shaft

Problem	Common Causes	Common Solution
Damaged universal joint?	The shaft is too long	Shorten shaft
	PTO shaft is inadequately lubricated	Lubricate PTO shaft and uni joints
PTO shaft bent or excessively vibrating?	PTO shaft is too short	Replace PTO shaft

Flow Meter and Controller

Problem	Common Causes	Common Solution
Application rate is inaccurate, unstable or zero	Incorrect console calibration	Re-calibrate console
	Inconsistent ground speed reading	Check cabling
	Inconsistent flow meter reading	Replace flow meter
	Faulty control valve.	Replace control valve
		Check by using manual inc/dec flow control
Speed sensor display is inaccurate, unstable or zero	Incorrect speed calibration	Re-calibrate console speed
	Faulty cable	Test cable as per instructions following
Volume display is inaccurate, unstable, zero or not changing	Meter calibration is incorrect	Reset meter calibration
	Flow meter cable pins are corroded	Replace flow meter plugs & pins
	Flow meter is pointing the wrong way	Disconnect flow meter and reinstall in the correct orientation
	Faulty cable	Manually test the cable
Flow meter appears not to be working	Flow meter is seized or blocked	Remove and clean any foreign materials so the turbine spins freely
	Faulty cable	Test cable as per instructions following
	Calibration figure is incorrect	Reset meter calibration
Application rate or pressure will not alter	Regulator valve will not turn	Test valve manually and replace if required
Control valve has failed	Faulty cable Faulty valve	Replace control valve
		Temporary solutions: Close the Bypass line ball valve in front of the control valve. Adjust the pressure relief valve until the desired spraying pressure is shown on the pressure gauge.
If the flow meter fails to give accurate readings, the following procedures should occur: • Adjust the spraying pressure by putting the flow control switch into manual and using the increase decrease switch to adjust to the desired pressure as shown on the pressure gauge on the sprayer • Drive the sprayer at a constant speed in order to apply the required application volume as determined by the nozzle selection chart • The sprayer should then be operated to empty the tank. Once the sprayer is empty of chemical, partially fill the tank with fresh water so that test can be performed in order to correct the problem. Repair or replace the flow meter as soon as possible.		
Console is not working	No power supply	Check loom connection at the back of the console
		Check connection to battery terminals
		heck the fuse in the back of the console is not blown
		With a multi meter, check the voltage potential across pins 1(-) and 16(+) on the 16 pin plug going into the console (should be at least 12v)

Controller screen fail:

If the Raven console fails so that it is not able to control the boom valves, and control valve, the following procedures should be adhered to:

Boom Valves

1. Disconnect console from console cable.
2. Remove Cap from boom valves.
3. Remove Shaft locking Screw.
4. Wind plunger shaft anti-clockwise to open valve.

To start and stop spraying through the nozzles, start and stop the pump.

NOTE: If the sprayer is fitted with Rapid fire, then the air valves located on the centre section can be operated by turning the small screw on the top of the solenoid (circled). The nozzles will now turn on. For more information on overriding the rapid fire solenoids, see the "Optional Accessories" chapter "Rapid Fire" section.

NOTE: Care should be taken because there is no agitation while the nozzles are not spraying.

Control Valve

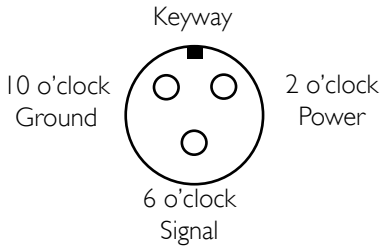
- Remove electric motor from three way fast close valve, and manually rotate valve until desired spraying pressure is achieved.
- Drive the sprayer at a constant speed in order to apply the required application volume as determined by the nozzle selection chart.

The sprayer should then be able to be operated in order to empty the tank. Once the sprayer is empty of chemical, partially fill the tank with fresh water (no chemical) so that testing can be performed in order to correct the problem. Repair or replace the console as soon as possible.

Testing the speed sensor cable:

1. Change speed cal number to 1000 with the [Speed Cal] key
2. Press [distance] key
3. With a jumper wire (ie: paper clip) short between 6 o'clock and 10 o'clock sockets with a "short" then "no short" motion. Each time contact is made the [distance] total should move up in increments of 1 or more.
4. If the distance does not count up, perform test at the next connector closer to the console. If this next test works, the previous section of cable must be faulty and should be replaced.
5. Perform above voltage checks
6. Change [speed cal] number back to previous number

NOTE: Speed sensor is not repairable and will need to be replaced if faulty.



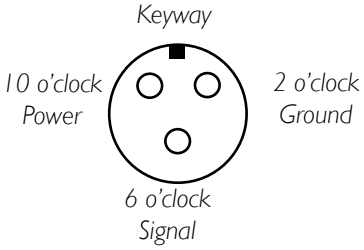
Voltage readings

10 o'clock to 6 o'clock (+5v DC)

10 o'clock to 2 o'clock (+5v DC)

Instructions for Testing Flow Meter Cable:

1. Change meter cal number to 1 with the [Meter Cal] key
2. Press [total volume] key and place boom switches ON
3. With a jumper wire (ie: paper clip) short between 6 o'clock and 2 o'clock sockets with a "short" then "no short" motion. Each time contact is made the [total volume] should move up in increments of 1 or more.
4. If total volume does not count up, perform test at the next connector closer to the console. If this next test works, the previous section of cable must be faulty and should be replaced.
5. Perform above voltage checks
6. Change [meter cal] number back to previous number



Voltage readings

2 o'clock to 6 o'clock (+5v DC)

2 o'clock to 10 o'clock (+5v DC)

Chem Probe

Problem	Common Causes	Common Solution
Chem probe is not working or is working too slow	Air leak in the vacuum system	Check all hose clamps and fittings are tight
	Lack of pressure to venturi in top of tank	Check there are no kinked hoses and the water pressure is about 100psi

To isolate the area of possible air leak:

Step 1: Check the operation of the chemical probe. If this will transfer water at a minimum of 30lt/min then this part of the system is okay.
If not check for air leaks at:

- Cam lever fitting at the probe.
- Hose fittings.
- Venturi – the venturi can suck air (less vacuum) where the black drop-pipe connects to the orange venturi.
- The venturi may also suck air where the 'lay flat' hose joins the bottom of the black PVC drop pipe.

Step 2: If probe works correctly but envirodrum will not operate, check for air leaks in envirodrum fitting (this must be thoroughly cleaned after each use) and check interior pipes in the envirodrum for air leaks or damage.

IN SUMMARY:
First: Check the flow of water into venturi.

Then:
1. Check the probe only.
3. Check probe and envirodrum section.

- Tests must be done with water because the speed of the transfer is affected by the increased viscosity of the chemical.

Spray Nozzles

Problem	Common Causes	Common Solution
Streaky pattern coming from nozzle	Nozzle tip blockages.	Check for blockages by removing the nozzle, rinsing thoroughly with water and cleaning with compressed air. DO NOT clean by blowing into nozzle with mouth.
	Nozzle worn or damaged.	Visually inspect nozzle for damage or wear, conduct a jug test if necessary.
No spray coming from nozzle	Nozzle tip blockages.	Check for blockages by removing the nozzle, rinsing thoroughly with water and cleaning with compressed air.
	Check valve blockages.	Remove the check valve and clean as required.

Transcal

Problem	Common Causes	Common Solution
Transcal is not working or is working too slow?	Air leak in the vacuum system	Check all hose clamps and fittings are tight
	The volume of water supplied to the Venturi	Check there are no kinked hoses and the water pressure is about 100psi
The Transcal tank has deformed and sucked in?	Residual vacuum left in tank when it is not in use. This is especially important when spraying in warm weather or when the sprayer is parked overnight.	When use of the Transcal is complete, make sure the venturi probe tap is turned off and let the tank vent.
The sight tube on the Transcal is not giving a true indication of the tank level?	Probe or envirodrum couplers turned on	Ensure the tap on the Probe or Envirodrum coupler is turned off before evaluating the tank level.
To isolate the area of possible air leak:	See below	

Step 1: First check the operation of the chemical probe only. That is by-pass the Transcal tank. If this will transfer water at a minimum of 30lt/min then this part of the system is okay.
If not check for air leaks at:

- Cam lever fitting at the probe.
- Hose fittings.
- Venturi – the venturi can suck air (less vacuum) where the black drop-pipe connects to the orange venturi.
- The venturi may also suck air where the 'lay flat' hose joins the bottom of the black PVC drop pipe.

Step 2: Check Transcal tank. If the probe is working successfully but the Transcal tank system won't work then the air leak areas to check are:

- The Tank lid. This lid may tighten against the metal bracket above the tank and not the tank itself. Also the top of the tank needs to be clean and smooth for the lid to seal. Also check the lid for cracks and condition of the seal.
- Fitting at the base of the Transcal tank.
- Any hoses and connectors.

Step 3: If probe works correctly and Transcal tank works correctly when using suction probe but envirodrum will not operate, check for air leaks in envirodrum fitting (this must be thoroughly cleaned after each use) and check interior pipes in the envirodrum for air leaks or damage.

IN SUMMARY:
First: Check the flow of water into venturi.

Then:
1. Check the probe only.
2. Check the probe and Transcal.
3. Check Transcal and envirodrum section.

- Tests must be done with water because the speed of the transfer is affected by the increased viscosity of the chemical.
- The old foot valve at the bottom of the drop pipe caused some problems, and this has been replaced by 'lay flat' tube on all new sprayers. GoldAcres can supply a service kit to retro-fit old sprayers to the new 'lay flat' tube.
- When fitting lay flat do not distort the drop pipe when tightening clamp or an air leak can develop. It will not be possible to fit the back nut to the venturi when lay flat is fitted.

Do not remove drop pipe from venturi except for resealing.

TriTech Boom

Problem	Common Causes	Common Solution
Inner and outer wing are not inline with each other when the boom is unfolded	Boom cables are not adjusted correctly	Adjust boom cables to realign booms
	Stopper bolt holding out the boom	Adjust the boom stopper bolt
Booms will not fully fold to the boom rests	Insufficient lubrication	Lubricate all boom pivots
	Fold cylinder mounts have moved	Adjust fold cylinder mounts
Boom unfold unevenly	Air trapped in the phasing cylinders	Unfold booms completely and hold switch for a few seconds. This will purge any air out of the phasing cylinder
Outer boom does not line up with the inner wing when unfolded	Incorrect boom adjustment	Fold the boom out and note the position the outer boom is in. Fold the boom in to transport position and note position outer boom is in. Follow the table below to adjust boom so it sits level in the out (work) position and to have the bottom chords sitting parallel in the folded (transport) position.
Booms are showing signs of bending components and welds cracking	Folding or unfolding of booms is too fast	Reduce the hydraulic flow to the folding cylinders
	Folding or unfolding of booms while the sprayer is still moving	Do not fold or unfold the boom while the sprayer is still moving
	Tilt operation	If the tilt operation is too fast, reduce the oil flow to the tilt cylinders.

The shim adjustment at the cable drum will affect the position of the outer boom when un-folded and when in the folded position. Use the table below to add or remove shims.

The table shows the position of the boom and the adjustment necessary to get them level.

Outer wing position (Un-folded)	**Outer wing position (Folded)**	**Top pivot shim adjustment**	**Bottom pivot shim adjustment**
UP	UP	NIL	REMOVE SHIMS
UP	DOWN	ADD SHIMS	NIL
LEVEL	UP	REMOVE SHIMS	REMOVE SHIMS
DOWN	DOWN	NIL	ADD SHIMS
DOWN	UP	REMOVE SHIMS	NIL
LEVEL	DOWN	ADD SHIMS	ADD

Plumbing

Problem	Common Causes	Common Solution
Boom valves fail to open.	Insufficient power.	Check all wiring and connections to ensure there is 12 volts at the valves.
	System pressure greater than 150 PSI.	Reduce the system pressure
Boom valves fail to close.	Insufficient power.	Check all wiring and connections to ensure there is 12 volts at the valves.
	Foreign objects blocking plunger from seating.	Clean the inside of the boom valves.
No water at boom.	No Tier valve entered or is at 0	

Induction Hopper

Problem	Common Causes	Common Solution
Induction hopper is not performing as well as it should	Insufficient flow to venturi in the hopper bottom	Check the pressure supplied to the hopper bottom is around 550kpa (80psi).
	Air leaks on induction system	Check all hoses, clamps, and cam lever fittings are sealed

Hydraulic and Pneumatic

Problem	Common Causes	Common Solution
No hydraulic pressure.	Low hydraulic oil level	Check the oil level in the hydraulic reservoir and top up if necessary
	Fill pump is engaged	Switch the hydraulic fill pump off
The air bags are not inflating	Low system pressure	The bags will not inflate until the pressure in the system is above 75 PSI, check system pressure.
	Compressor not working properly	Check that the compressor is working correctly
Vehicle sits unevenly	Incorrectly adjusted ride height valves.	Adjust the ride height valves as per the instructions in the Lubrication and Maintenance chapter.

Tanks, chassis and wheels

Problem	Common Causes	Common Solution
The drawbar of the sprayer has become noisy and loose?	Worn, or missing, plastic insert in towing eye	Replace plastic insert

Chapter 9

LUBRICATION & MAINTENANCE

Maintenance schedule

Frequency	Maintenance tasks
8hr	Check pump oil level & condition
8hr	Check tyre pressure
8hr	Check wheel nuts are torqued correctly to 320 ft/lb
8hr	Grease tilt arm pivot pins
8hr	Grease cable drum bearing block pivots
8hr	Clean pressure and suction filters if blocked
8hr	Clean airbag and foam marker compressor air filter
8hr	Clean direct chemical injection air filter *(where fitted)*
8hr	Grease pump PTO shaft universal joint nipples
25hr	Grease cable adjuster pivots
25hr	Grease wheel bearings
50hr	Grease pump PTO shaft inside safety cover
50hr	Grease boom mount rose ends
50hr	Grease all delta links on centre section
50hr	Grease paralift arm rose ends
50hr	Towing eye
50hr	Grease boom lifting cylinders
50hr	Check Rapid fire oil, re-fill if required.
150hr	Check wheel bearings for sideways movement
300 - 350hrs	Change pump oil
3 months	Check bolts on axle bearing caps
3 months	Check the condition of the brakes extensively
3 months	Grease jack
3 months	Grease braked axle cam shaft bearing lightly
Yearly	Clean wheel bearings, inspect, re-grease and set rolling torque
Yearly	Carry out a complete decontamination of the sprayer
Yearly	Check pump air accumulator pressure is at an equal pressure to the spraying pressure

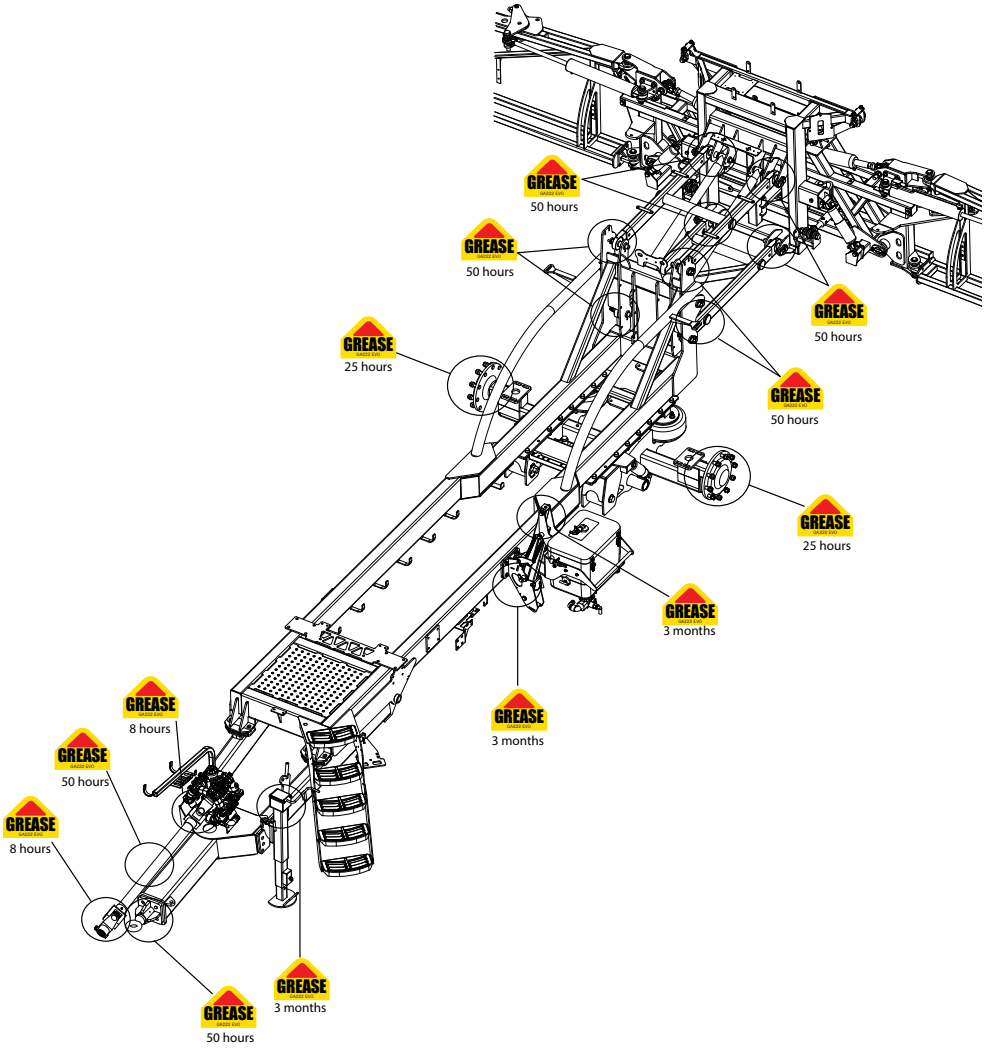
Lubrication

Goldacres recommend that a quality multi purpose grease should be used when lubricating your equipment.

An SAE 30W40 engine oil should be used in the diaphragm pump.

The pictures below outline key lubrication points. Please note the pictures do not show hydraulic cylinders, all hydraulic cylinders (excluding wing tilt cylinder) have grease points at the clevis'.

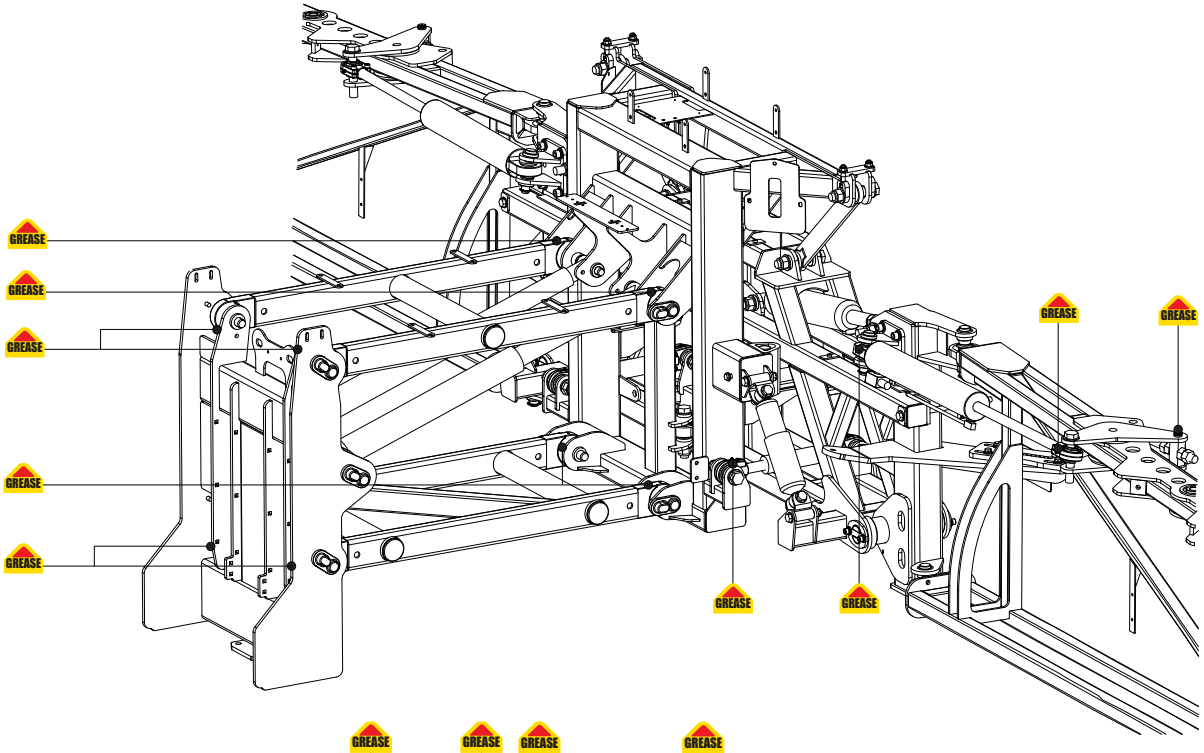
Chassis and PTO shaft grease points

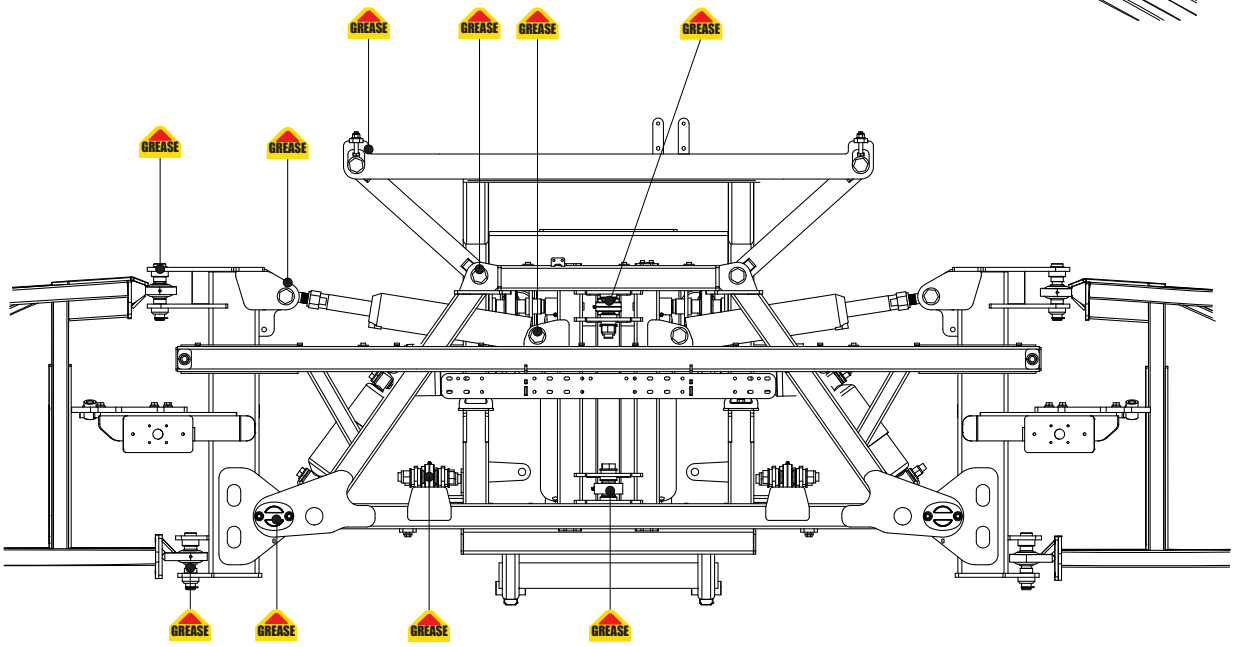


Location	Grease Interval
PTO Shaft universal joints	8 hourly
Wheel bearings	25 hourly
Hitch	50 hourly
PTO telescopic shaft	50 hourly
Paralift arm rose ends	50 hourly
Jack	3 monthly
Induction hopper pivots	3 monthly

NOTE: *The drawing above does not show hydraulic cylinders. Each hydraulic cylinder has a grease nipple located at each end. These points should be greased on a 8 hourly basis.*

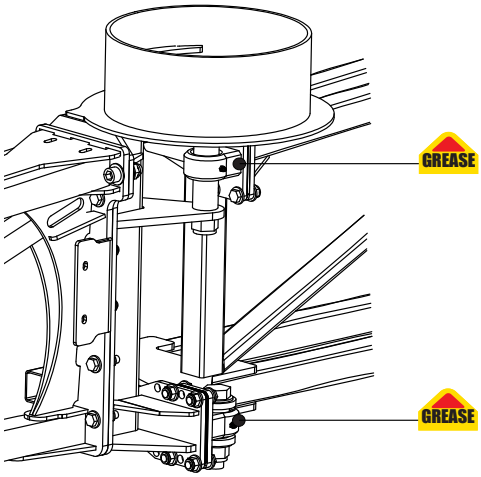
Boom centre section grease points





Location	Grease Interval
Boom rose ends	8 hourly
Hydraulic cylinder ends (wing tilt, lift, fold, hydraulic yaw)	8 hourly
Tilt pins	8 hourly
Diagonal delta link pins	8 hourly
Lineal delta link pins	8 hourly
Paralift pins	8 hourly
Centre Leveling hydraulic cylinder	8 hourly

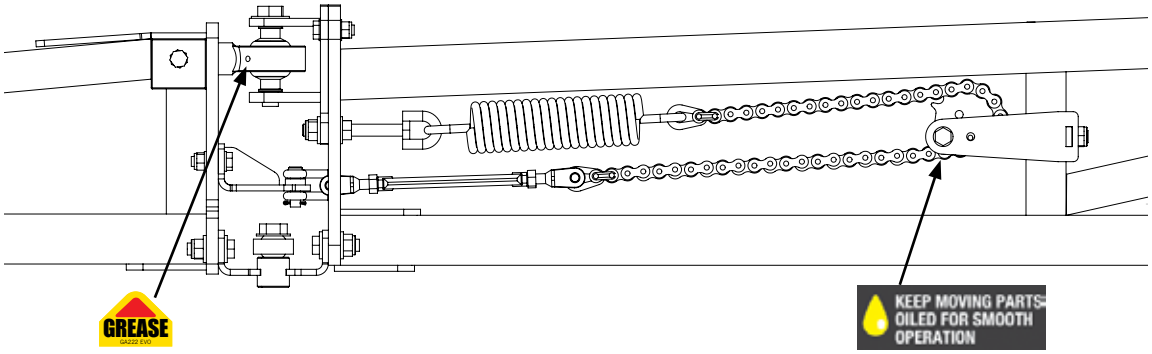
Cable drum grease points



Location	Grease Interval
Cable drum bearing block pivots	8 hourly

NOTE: *The drawing above does not show hydraulic cylinders. Each hydraulic cylinder has a grease nipple located at each end. These points should be greased on a 8 hourly basis.*

3D breakaway lubrication points



Location	Grease,Oil Interval
Pivot points on 3D breakaway	8 hourly

Maintenance

Pressure relief valve

The pressure relief valve provides relief when the pressure exceeds a pre-determined value. Altering the adjusting stem will affect the setting at which the relief valve will come into operation. Turning the stem clockwise will increase the pressure relief setting. Goldacres pre-sets the pressure to approximately 110psi and this should not be altered. To check or alter this setting, turn the pump 'OFF' and turn relief valve counter clockwise. Turn the solenoids 'OFF', and then close all control manifold ball valves so that all flow passes through the relief valve. Run the pump at maximum operating speed (540 RPM) and slowly turn the relief valve clockwise until the pressure is achieved. Tighten the nut on the adjusting stem so that this setting is maintained. If the relief setting is too low, excessive flow will be allowed to bypass back to the tank and it will limit the maximum obtainable pressure.

Pump

8 Hours

Check pump oil level and condition:

50 Hrs

Pump oil should be changed after the first of 50 hours of operation.

Pump oil level should be between the two level makers on the oil reservoir. If the oil level continually gets low or is turning milky, there is possibly a split in a diaphragm. The oil will need to be drained and all the diaphragms replaced. Use SAE 30W40 oil. Rotate the pump manually (by hand) to remove any air locks while filling. Do not over fill.

Grease pump PTO shaft: Shaft universal nipples and telescope nipple must be greased every 8 Hrs. The cover must be greased every 40 Hrs to ensure it spins freely on the shaft.

300-350 Hrs

Change Pump oil: Pump oil should be changed every 300-350 Hrs. Use SAE 30W40 oil. On an RO160 or RO320 pump the drain plug in between the two pump mounts underneath the pump. An RO250 has the drain plug on the drive shaft face below the shaft.

Seasonally

Check pump air accumulator (where fitted). The air pressure in the air accumulator must be maintained to the correct pressure (approx half of the spray pressure). If the accumulator constantly loses pressure, the valve or diaphragm may need replacing. To recharge the accumulator, charge it to approx half of the spray pressure then run the pump at normal operating RPM. Looking at the pressure gauge, release some pressure until there is as little pulsation as possible. This will ensure a very even and constant pressure delivery.

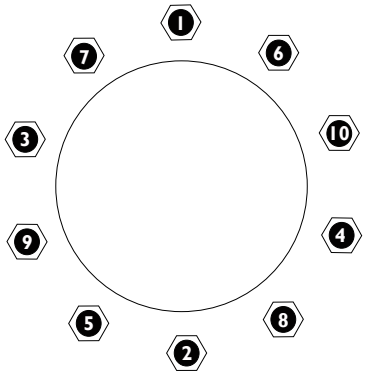
Chassis, wheels, tyres and axles

8 Hrs

Check tyre pressure: It is very important to maintain correct tyre pressures to optimize sprayer stability and the load rating. To determine the required tyre pressure, refer to the tyre specification chart in the general information section of the operator manual. If the tyre has a constant leak, the valve may be loose or need replacing, or the tyre may have a puncher.

Check wheel nuts are torqued correctly:

Wheel nuts must be checked every 8 Hrs and re-torqued to 320 ft lb if required. Follow the sequence below to ensure an even torque distribution.



25 Hrs

Grease wheel bearings: Grease is applied to the ADR axle via a grease nipple on the front of the hub.

150 Hrs

Check wheel bearings for sideways movement: To check the wheel bearings for free play, jack up that side of the sprayer until the wheel can spin freely. Rock the wheel from side to side. If the is any movement the bearings will need to be tightened or replaced.

3 months
Grease jack: There are two grease nipples on the Prairie Evolution jack. One on the winding mechanism and one on the jack swing pivot. Both need to be greased every three months to ensure easy operation.

Check bolts on axle bearing caps:
Bearing cap must be regularly checked and tightened if required. If dust is able to enter the axle bearings it could cause the bearings to fail. If the gasket on the dust cap is damaged or not sealing properly it must be replaced.

Checking brakes & servicing of braked axles:

Brake maintenance and adjustments
The brakes should be tested before using for the first time and after the first laden journey.

Check the actuator and return spring mountings, check the actuator stroke and return travel and check they operate and release correctly.

Tighten the screws and nuts (covers, fulcrum, etc), check the cotter pins, pins, circlips, etc.

Check for hydraulic fluid and air leaks.

Checking brake clearance and wear

Check and test the brakes before intensive use and every 3 months:

Check the brake wear and the clearance between the brake linings and the drum visually through the inspection hole in the dust cover at the rear of the drum. It is probable that the linings are worn when the actuator travel has increased significantly.

Check the thickness of the brake linings (minimum allowable 5mm)

The brake shoes should be replaced as soon as the minimum lining thickness is reached.

Check that the brakes are clean. Clean them if necessary. Do not clean with compressed air.

Lubricate brake cam shaft bearings with grease, lightly to avoid grease deposits on the brake linings and drums.

Adjusting brakes with fixed levers
Take up the slack when the actuator stroke reaches about two thirds of the maximum travel.

To take up the slack, turn the lever by one or more splines, ensuring that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorization from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole).

For braking systems with a yoke, the yoke must remain parallel with the axle especially when the brakes are fully applied. This means that the stroke of the levers on the brakes at each side must be identical.

Adjusting brakes with adjustable levers
Take up the slack when the actuator stroke reaches about two thirds of the maximum stroke. To take up the slack, turn the adjustment screw on the lever to adjust the relative position of the cam and the lever.

NB. The actuator brakes by pushing the lever to turn it in a particular direction. The screw must be adjusted so that the cam moves in this direction to take up the slack.

The direction in which the screw must be turned depends on the configuration.

Ensure that the brakes are not touching when released (to prevent overheating the brakes).

Never change the linkage position for the actuator on the lever without authorization from the vehicle manufacturer as the vehicle will have been tested with the actuator at this position (the brake operating levers have several holes, always use the original hole)

Seasonally
Clean wheel bearings, inspect, re-grease and set bearing pre-load:

If the axle bearings have become worn or damaged and need replacing, the following procedure should be followed. Remove the wheel as per instructions.

Remove the bolts from the bearing dust cap and clean out as much grease as possible.

Remove the split pin and castle nut and washer.

Slide the outer bearing and hub off the axle. Bearing puller may be required. Remove the inner bearing.

If the seal is also to be replaced, remove it as well.

Clean all existing grease from the axle and the hub and wash in solvent.

Insert new rear seal.

Pack the two new bearings with grease prior to fitting on the axle. Ensure grease has penetrated completely through the bearing.

Slide new inner bearing onto shaft.

Place hub back onto axle and fill cavity with grease.

Insert new outer bearing.

Fit washer and do nut up firm.

Perform the pre-load test on the hub to determine how tight to set the nut.

Grease the hub until grease emerges from the seal.

The pre-load needs to be 12kg. This test is performed by tying string or rope to a stud and wrapping it around the outside of all the studs. With a set of tension scales connected to the rope, pull the scales. The hub should begin to rotate at 12kg. Tighten or loosen the nut to achieve the required setting. Fit split pin and bolt the bearing dust cap in place.

Removing a wheel from the sprayer:

- The sprayer must be hitched to the appropriate towing vehicle.
- The engine of the towing vehicle must be turned off and the park brake applied.
- Chock the wheel(s) that is/are not to be removed with an appropriate item to prevent the sprayer from moving.
- With a wheel nut wrench, loosen all the wheel nuts on the wheel that you wish to remove (Do not remove wheel nuts until the tyre is off the ground).
- Place a jack on level, firm and stable foundation under the sprayer axle and between the two axle bolts near the wheel to be removed. The jack may need to have a large piece of timber or steel placed under it so that the jack will not sink.
- Use the jack to raise the sprayer axle such that the wheel is off the ground.
- Place an auxiliary jack block under the sprayer so that if the jack fails the sprayer will not fall.
- Remove all wheel nuts and remove wheel from sprayer. Be careful that the wheel does not fall on any person and cause bodily harm.
- Ensure that the sprayer is stable when being left for an extended period of time.

Replacing a wheel onto the sprayer:

- Make sure the sprayer is stable when supported with the jack and the jack block in place and hitched to the appropriate towing vehicle.
- Make sure the wheel is in a satisfactory condition to use and that the tyre is inflated to the correct tyre pressure.
- Clean the surface between the wheel and the hub.
- Carefully lift repaired/new wheel up so that the holes in the rim centre go over the wheel studs on the wheel hub.
- Carefully put the wheel nuts on and tighten them finger tight.
- With a wheel nut wrench tighten wheel nuts alternately and evenly to a torque rating of 320ft lb.
- Remove the jack block from under the sprayer.
- Carefully lower the sprayer slowly with the jack until the tyre touches the ground.
- Retighten the wheel nuts to the required torque rating.
- Let the jack completely down so that all weight is taken off the jack and remove jack (and any supports placed under the jack) from under the sprayer.
- Remove wheel chocks that were placed to the

front and rear of the opposite wheel (to prevent it from moving).

- Check tyre pressure before moving sprayer.
- Retighten wheel nuts to the required torque rating: One hour after fitting the tyre, before filling main spray tank, after the first tank load.

Booms

8 Hrs
Grease tilt arm pivot pins.
Grease cable drum bearing block pivots.

25 Hrs
Grease cable adjuster pivots:

50 Hrs
Grease boom mount rose ends.
Grease all delta links on centre section.
Grease paralift arm rose ends.

Adjusting boom ride height switch on paralift booms:
The ride height switch is used to adjust the minimum boom height. The switch is located on the bottom of the left hand side of the boom paralift.

To adjust the switch:

1. Loosen the two adjustment knobs on ride height bracket
2. By lowering the switch the minimum boom height is increased.
3. Each notch gives approximately 100mm of boom height adjustment.
4. Once adjusted tighten knobs. The hydraulic cylinders must have 50mm of travel remaining.

Filters

WARNING: Always wear gloves if removing or cleaning filters.

If in-line filters have been fitted to replace nozzle filters, always unfold and lower the boom before attempting to unscrew any filter.

It is essential to maintain all filters and filter screens in good condition. Filter screens that are not regularly cleaned can severely impede liquid flow and delivery pressure. If the screens are in anyway damaged, they can allow foreign material into the pumping system which can result in damage to the pump, solenoids, valves and cause blockages in nozzle tips. Also, if the screens are not properly fitted, air can enter the pumping lines which will reduce pump performance.

Filter screens are best cleaned with a soft brush in clean water or by compressed air after washing.

WARNING: Read and heed the chemical label regarding protective clothing when cleaning any filter.

To clean the suction filter:

1. Wear gloves and other recommended protective clothing.
2. Ensure that the pump is turned 'OFF' and the pump three-way ball valve is turned 'OFF' to prevent flow to the filter.
3. Carefully unscrew filter nut and remove bowl.
4. Remove screen and clean.
5. Check for damage to screen, bowl, body and O-ring.
6. Place screen back in position.
7. Make sure O-ring is in position for proper seal.
8. Replace bowl and screw nut on.
9. Do not over-tighten nut.

To clean pressure filter:

1. Wear gloves and other recommended protective clothing.
2. Ensure that the pump suction is turned 'OFF' and the pump 3-way ball valve is turned 'OFF' to prevent flow to the filter and pump.
3. Ensure that the supermix agitator ball valve is 'OPEN' (will release any residual pressure. Also remove small cap on bottom of pressure filter to relieve pressure)
4. Carefully unscrew filter nut and remove
5. Remove screen and clean.
6. Check for damage to screen, bowl, body and O-ring.
7. Place screen back in position.
8. Make sure O-ring is in position for proper seal.

Hydraulic fold cylinder re-phasing *Continued*

9. Replace bowl and screw nut on.

10. Do not over-tighten nut.

Hydraulic fold cylinder re-phasing

If the sides of the boom do not fold together so that they become out of line, the hydraulic rams will need to be re-phased.

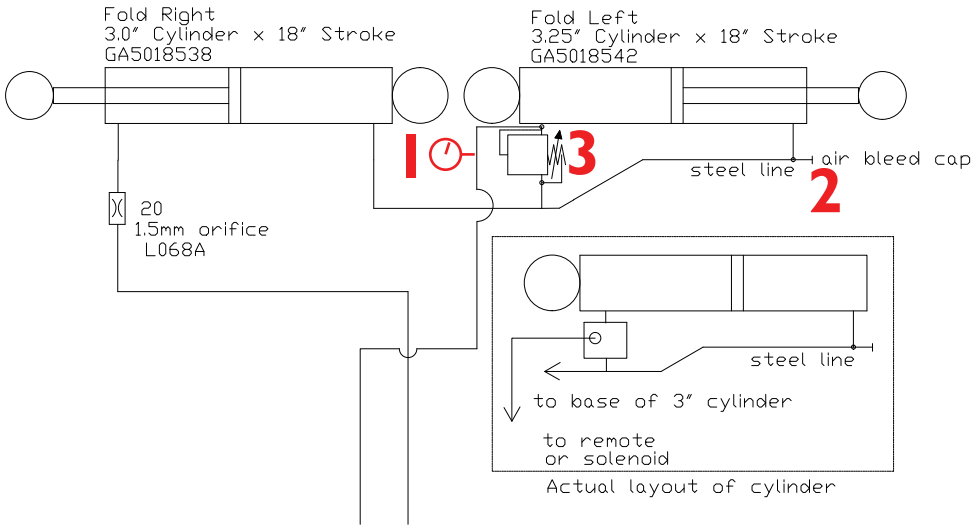
To do this:
Open the boom right out and continue to hold the control lever in that position for 10-15 seconds until the rams are synchronised. The air bleed cap should also be loosened from time to time to remove air from the system.

We recommend that periodical re-phasing of the cylinders is good practice, as this not only ensures that the cylinders are working in tandem, but that any air that may be trapped in the cylinders is also forced out of the hydraulic lines.

Hydraulic fold cylinder phasing relief pressure

To do this:
Before woriking on the machine, ensure the wheels are chocked and that the tractor handbrake is engaged.

Fit a 3500 psi pressure gauge (1) to the hose going to the base of the left hand cylinder. (the hose going into the external phasing block)



Fold the boom out into the working position.

Loosen the bleed cap on the rod end of the left hand cylinder (2). Remove the cap if there is no pressure and drain the port into a bucket or tank. Use of a hose is advised.

Hydraulic fold cylinder phasing relief pressure *Continued*

Press fold out until the boom cylinders are fully extended. The rods should be at least 457mm (18") on both cylinders and even in length.

While holding the fold out button, have someone read the pressure on the gauge.

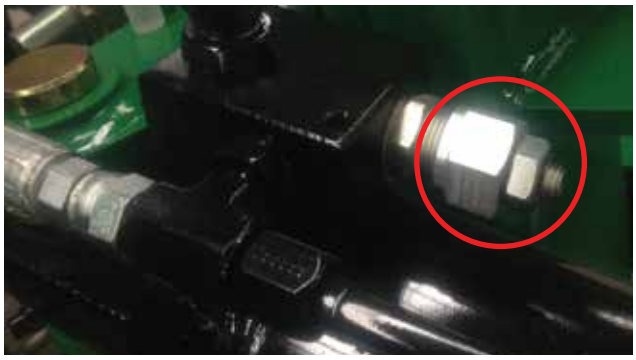
WARNING: DO NOT open or close the boom with any people or objects in the boom wing fold radius. Stay behind the machine out of the reach of the boom wings.

The relief valve (3) on the phasing block must be adjusted so that the pressure gauge reads 2250 psi.

By turning the relief adjuster counter clockwise the pressure will reduce. By turning the relief adjuster clockwise the pressure will increase.

This measure from factory is set to, 7mm of thread exposed. This is the default setting to obtain 2250PSI in the phasing circuit.

When adjusting the relief, make only small adjustments, a 1/4 to a 1/2 turn at a time. Then hold the boom fold out switch and re check the pressure.



When the pressure reading is correct, refit the bleed cap and remove the pressure gauge.

Bleeding the hydraulic fold cylinders

The cylinders should now be bled to remove any air from the system.

To bleed the phasing cylinders, fold the boom out into the working position.

Crack the bleed cap fitted to the rod end of the left hand cylinder. This will only need to be rotated ½ to 1 full turn.

Hold the fold out function while the system is bled. Oil will drain out of the bleed cap and carry any air out of the system with it.

If there is air in the oil it may appear milky. Use a container to catch the oil as it comes out.

Once the oil runs clear and continuous, tighten the bleed cap.

Ensure both fold cylinders have extended fully and are the same length, must be at least 457mm (18").

Cycle the boom through the full fold function a minimum of 5 times.

Re bleed the circuit to ensure all air is removed.

Tighten the bleed cap and ensure the booms fold correctly.

Airbag suspension

The airbag suspension consists of a 12 volt air compressor, one ride height valve, two airbags, shock absorbers, an axle (used as the air reservoir) and the axle frame.

The 12v compressor is powered up when the ignition is switched on. The electrical system is protected by a blade fuse which is located in the ignition relay box in the cabin harness.

Adjusting the system pressure

The compressor has a pressure cut out switch which regulates the pressure to cut in at 70-75psi. The cut out pressure can be adjusted by compressing the contact spring to achieve the required maximum pressure. It is recommended that a cut out pressure of 90-95psi is set.

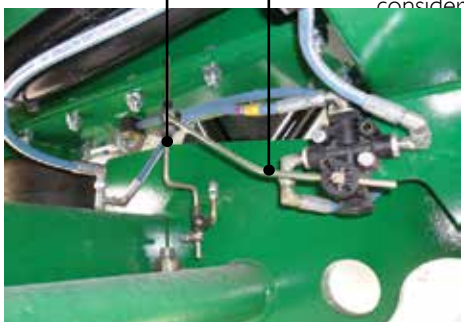
NOTE: The compressor has a recommended duty cycle of 10 minutes. If there is an air leak in the system or the cut out pressure is set too high the compressor may run for an excessive period of time causing the compressor to wear prematurely.

Adjusting the ride height

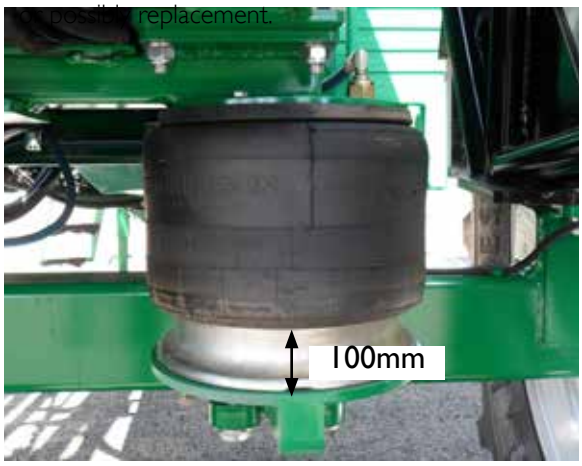
The ride height valve is used regulate the air pressure within the airbags to achieve a consistent ride height.

The ride height valve is located in the inside of the left hand suspension arm.

The ride height can be adjusted by loosening the clamps attached to the upright rod on the ride height valve linkage. Slide the valve arm up or down the upright rod to either raise or lower the ride height. The recommended ride height is 100mm from the fully deflated position. The upright rod must be kept as close to vertical. Should the upright rod be too far forward or backward the ride characteristics will be affected considerably.



The ride height valve has a dead band position where the valve will does not let air in or out of the airbags. Over time the seals in the ride height valve may wear causing this dead band to decrease. If this is the cause the ride height will require readjustment or possible replacement.

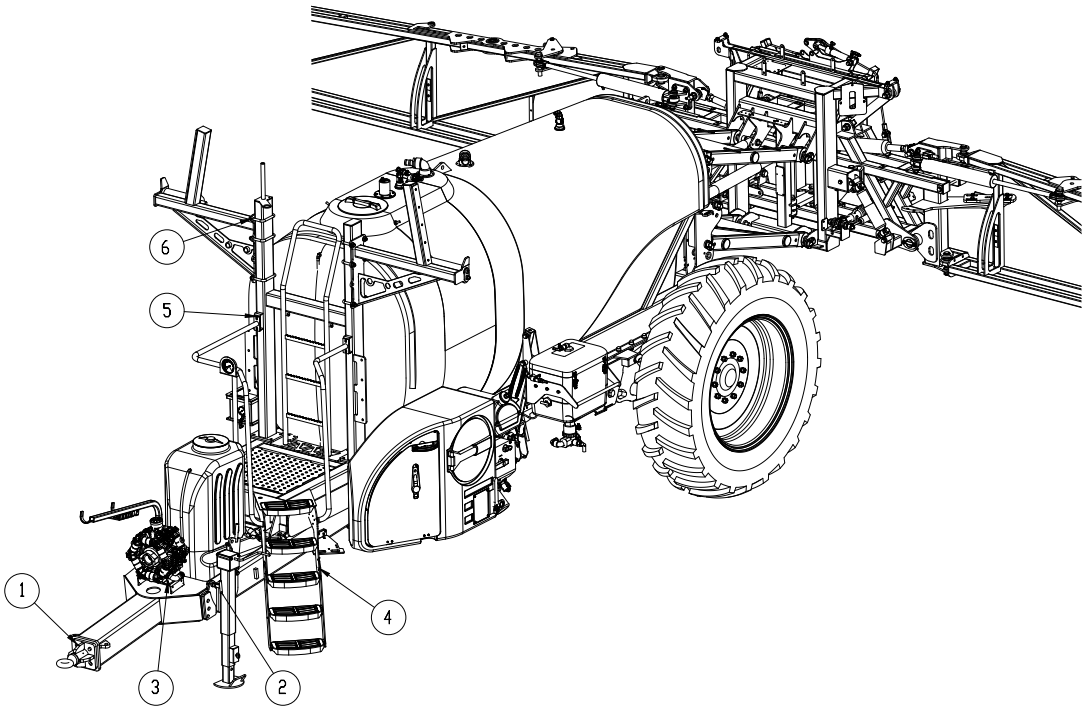


Corrosion Prevention

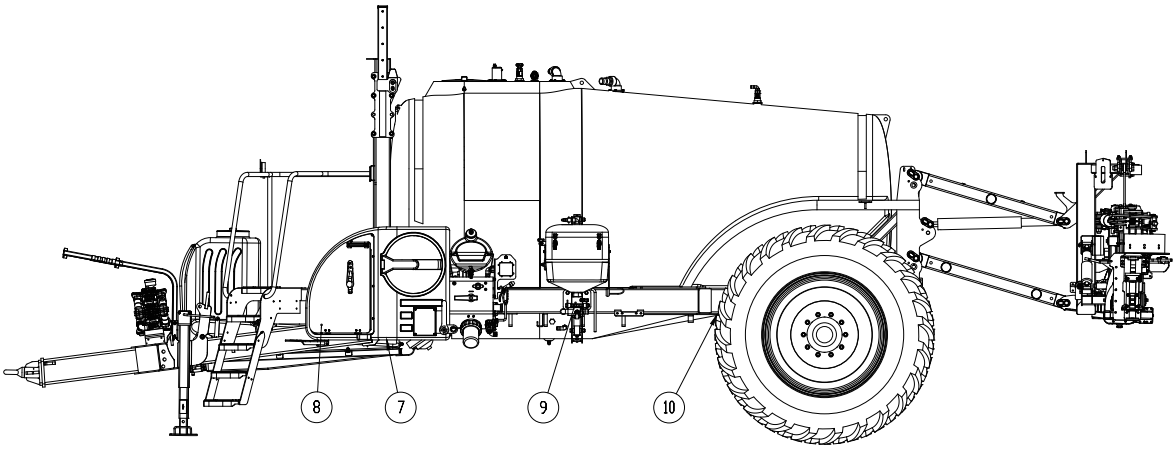
Goldacres are applying G15 anti corrosion spray to all fasteners (bolts, washers and nuts) and zinc plated components at the time of manufacture.

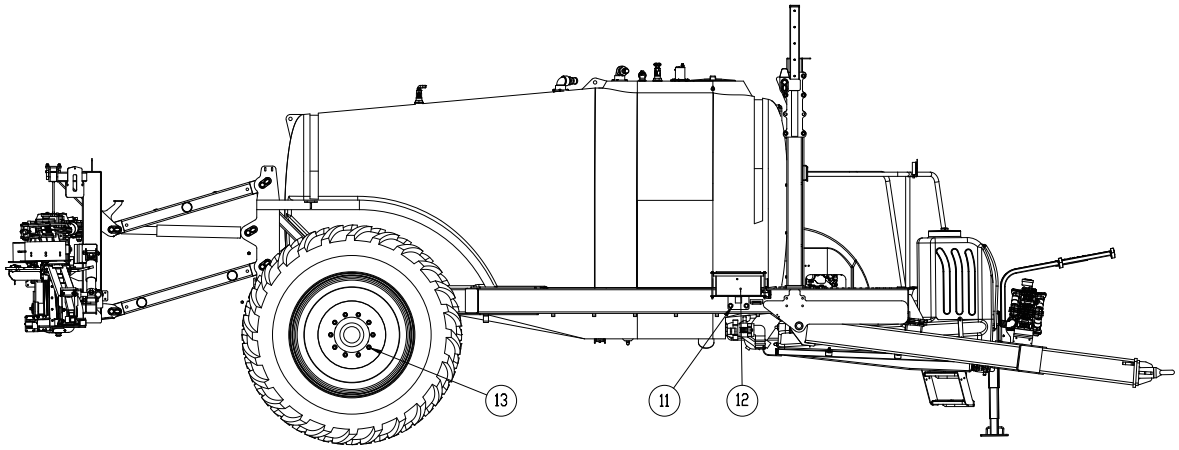
G15 should also be applied to the sprayer pre and post season.

The following is a guide, application to these areas is recommended but not limited to.

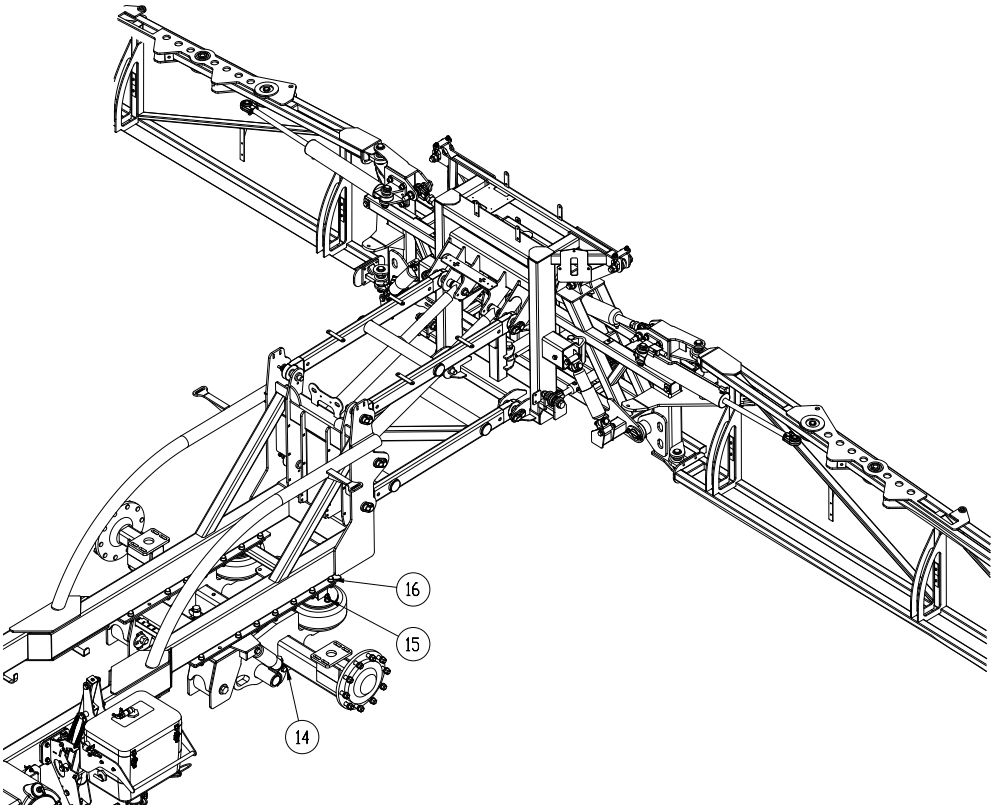


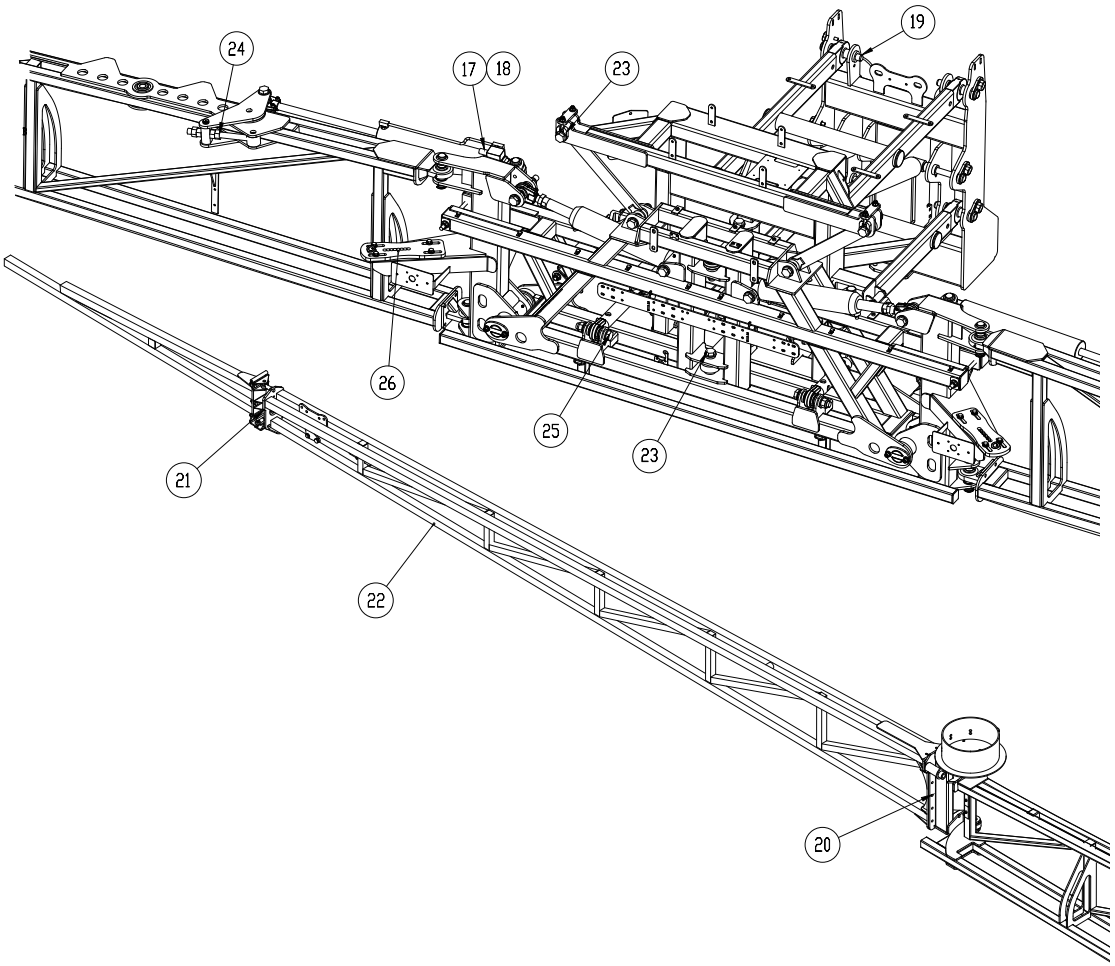
Item	Component
1	Towing eye bolts
2	Jack mounting bolts and locking pins
3	Pump mounting and manifold bolts
4	Steps and hand rails
5	H-Frame and handrails
6	Boom rests





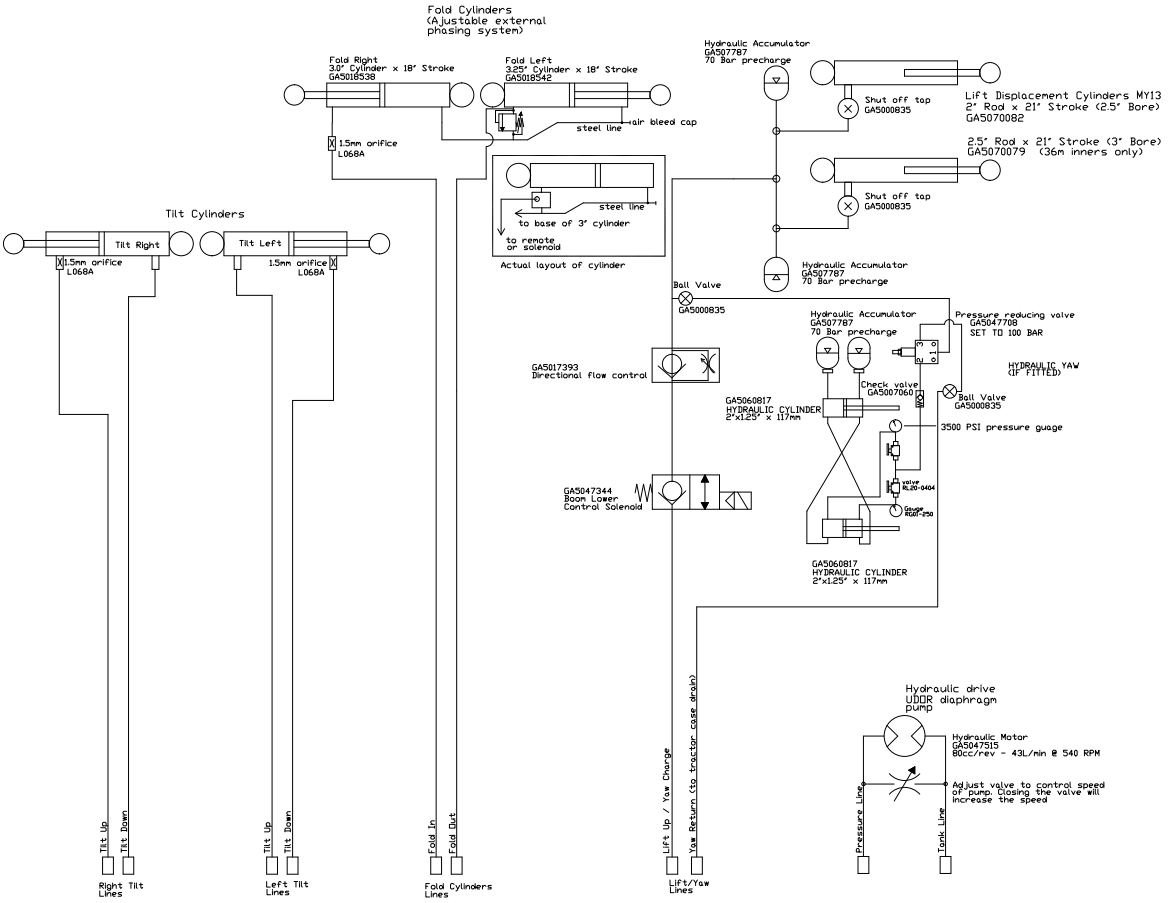
Item	Component
7	LH pod frame mounting bolts
8	LH pod covers
9	Induction hopper bolts and latches
10	Mudguard mounting bolts
11	RH pod frame mounting bolts
12	RH pod covers
13	Wheel nuts
14	Axle retainer bolts
15	Axle airbag frame mounting bolts
16	Airbag hose fittings





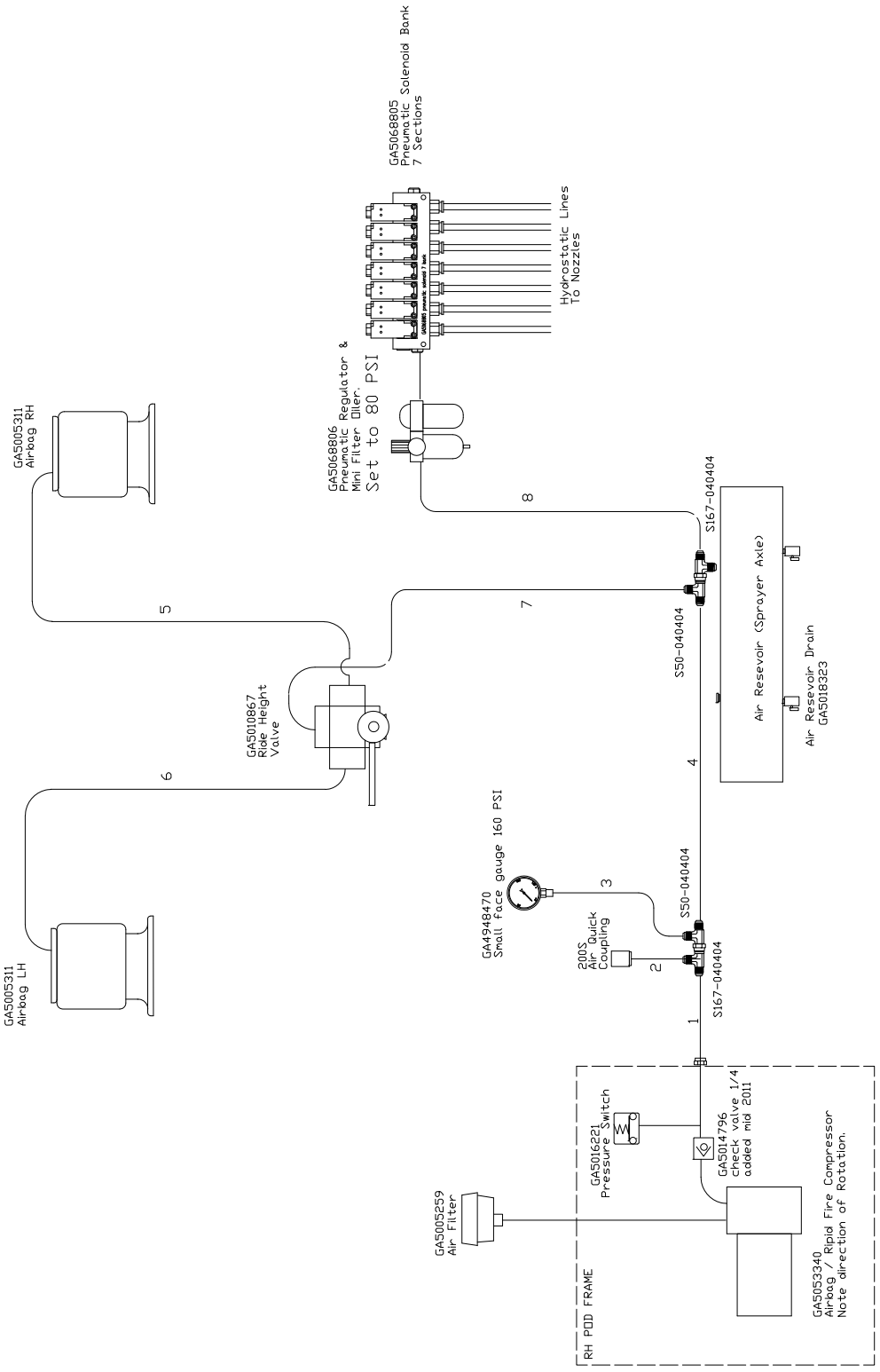
Item	Component
17	Hydraulic cylinder fittings
18	Hydraulic hose crimp fittings on all hoses
19	Centre section paralift rear pins and bolts
20	Cable drum bolts
21	Breakaway hinges & Boom end protectors
22	Nozzle bracket bolts
23	Delta links and bolts
24	Fold cylinder adjuster
25	All hydraulic cylinder mounting bolts
26	Cable adjuster

Hydraulic schematic



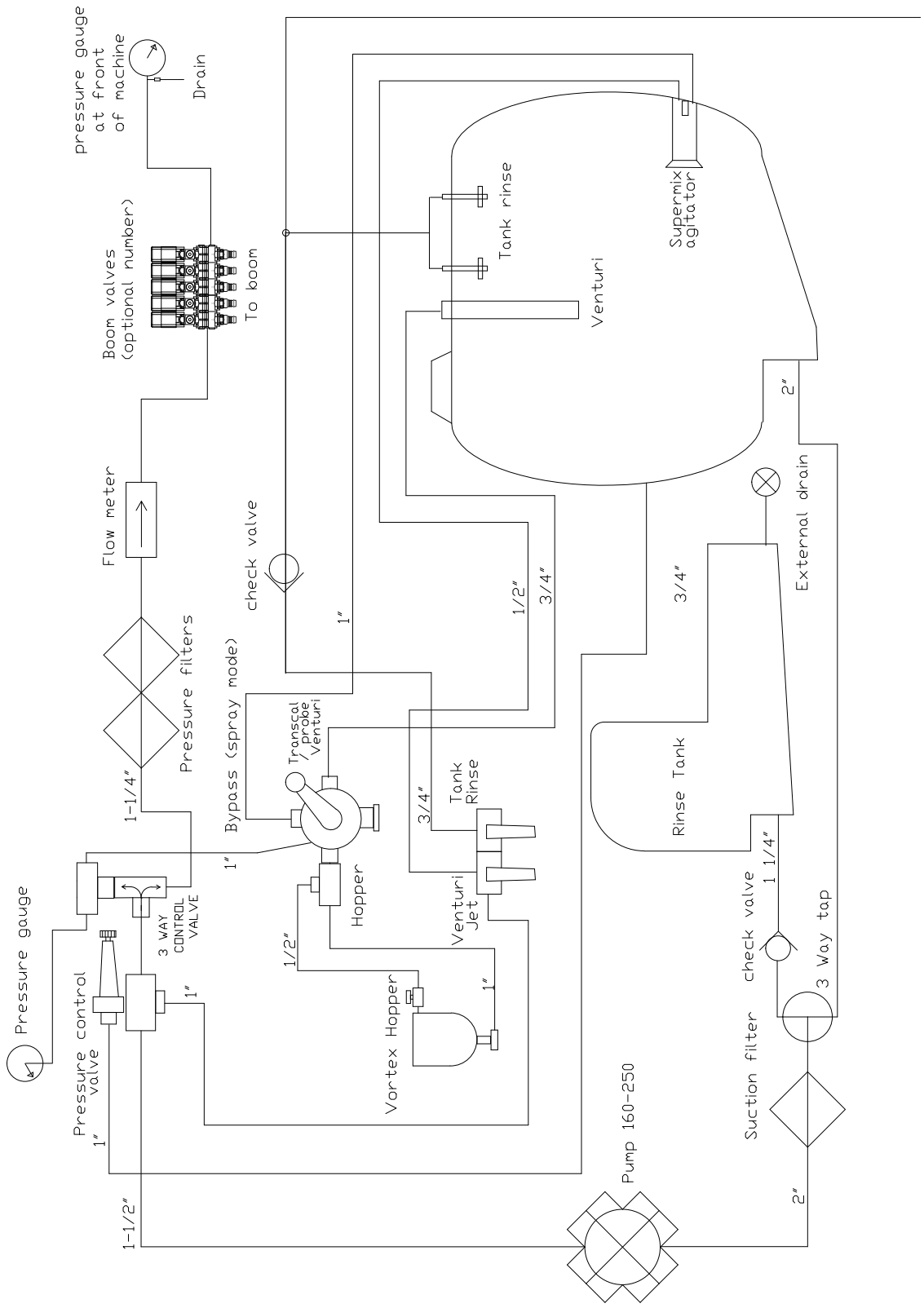
Pneumatic schematic

RapidFire included

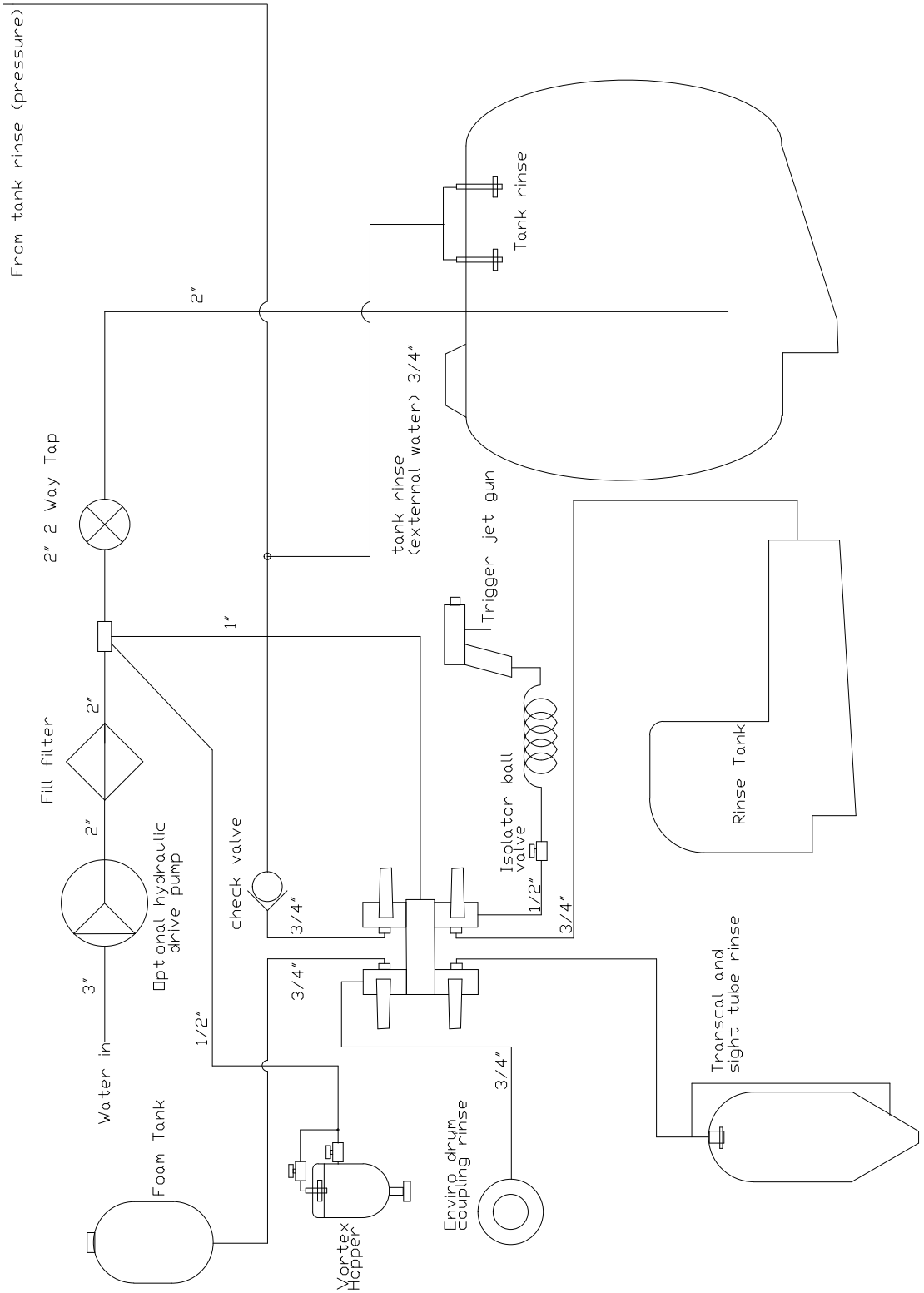


Plumbing schematics

Pressure Delivery



Rinse Water Delivery



Chapter 10

OPTIONAL ACCESSORIES

General Information

The following pages provide information on Goldacres optional accessories available on this equipment.

Please note: These options may not be fitted to your equipment.

Chemical induction probe

Overview

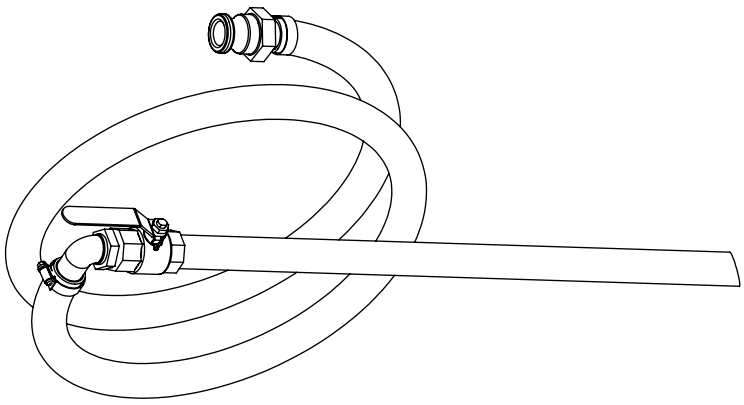
A simple method of transferring chemical into the sprayer tank is via the chemical probe. The chemical probe enables the chemicals to be transferred with minimal exposure to the operator. The probe is used in conjunction with the Venturi filler (located on the top of the tank) which creates the required suction on the pressure side of the pump.

The viscosity of the chemical being transferred will affect the rate of suction flow and hence the amount of time required to transfer the chemical. Water and air have low viscosities whereas molasses is an example of a highly viscous liquid. The higher the viscosity of the liquid, the longer it takes to transfer via the chemical probe. If the viscosity of a chemical is such that it takes too long to transfer, dilute the chemical with water, which will reduce the viscosity, and then transfer the solution.

The chemical should be transferred after about 20% to 50% of the required water quantity has been added to the sprayer tank. This will ensure that agitation takes place when the remaining water is added.

The end of the probe is not flat so that the probe, when placed flat against the bottom of a container, will not restrict the flow of chemical.

Key Features



Operation

WARNING: It is critical that the chemical probe venturi continues to operate for a minimum of 30 seconds following use. This will ensure that no chemical is left in the line prior to the probe being disconnected.

NOTE: This item is intended for the induction of liquid chemicals only.

To operate the chemical probe:

1. Add 20 percent of the tank's volume of clean water to the main spray tank. Initially there needs to be a sufficient amount of water in the tank in order for the pump delivery to create the venturi effect via the venturi filler.
2. Ensure that the red handle on the pump 3-way valve is pointing towards the suction hose coming from the main tank sump.
3. Connect probe via cam lever fitting. Close all ball valves and set pressure to 110psi.
4. 'OPEN' the venturi and agitator valves.
5. Close the bypass and induction hopper valves.
6. Operate the pump at the speed necessary to generate at least 85 psi delivery pressure (as displayed on the pressure gauge mounted on the side pod). Do not run faster than 500 RPM. The higher the pump delivery pressure, the greater the venturi suction and the quicker the probe will transfer the chemical. The delivery pressure should not exceed 100 psi as determined by the pressure relief valve setting.
7. Place probe in chemical.
8. 'OPEN' the valve on the probe.
9. The chemical should be now transferring to the sprayer tank via the venturi filler.
10. When all of the chemical has been transferred, rinse the chemical container with water and transfer the rinsate to the sprayer tank via the probe. This should ensure that the entire chemical is transferred and that the probe, venturi filler and connecting suction hose are cleaned. Induct clean water to rinse probe vacuum hose.
11. When finished, 'CLOSE' the valve on the probe and the venturi valve, 'OPEN' the bypass valve, keep the agitator valve 'OPEN' and disconnect the probe. Once chemical has been transferred into the main spray tank the sprayer should always be agitating until spraying begins.

Transcal

Overview

The Transcal volumetric measuring system is designed to provide a measuring facility without the need for an auxiliary pump and flowmeter. When used in conjunction with the venturi chemical probe, or micromatic fitting, the required volume of chemical can be transferred out of the chemical container into the Transcal tank.

The chemical can then be transferred into the main spray tank via venturi suction by simply turning a valve and there is no undiluted chemical coming into contact with any pump or complex components. The system can be used with most types of chemical containers (including the envirodrum closed transfer system).

NOTE: The calibration markings on the Transcal tank should be used as a guide only.

The Transcal system requires a vacuum to operate. Any air leaks in the tank lid, hoses or cam lever seals will affect the performance or cause total failure to operate.

WARNING: Do not fill Transcal tank past the 45 litre mark.

WARNING: Do not use the Transcal tank to store chemicals when spraying.

WARNING: Do not level tank under vacuum.

Key Features

Operation

NOTE: The Transcal is intended for the induction of liquid chemicals only.

1. Remove the cam lever plug and connect the chemical probe line or the Micromatic coupler to the cam lever fitting.
2. Ensure that the yellow T-handle on the Transcal station is aligned to 'FILL'.
3. Add approximately 10% of the total volume of clean water to the main spray tank.
4. Ensure that the red handle on the pump 3-way valve is pointing towards the suction hose coming from the main tank sump. Close all ball valves and set pressure to 110psi.
5. 'OPEN' the agitator and venturi valves on the pressure delivery station.
6. 'CLOSE' the bypass and induction hopper valves on the pressure delivery station.
7. 'OPEN' the chemical probe valve at the Transcal station.
8. Operate the pump at the speed necessary to generate 85 psi delivery pressure (as displayed on the manifold pressure gauge). Do not run faster than 500 RPM. The higher the pump delivery pressure, the greater the venturi suction and the quicker the probe will transfer the chemical. The delivery pressure should not exceed 110 psi as determined by the pressure relief valve setting.
9. Place the probe in the chemical drum and open the valve on the chemical probe or connect the Micromatic fitting to the outlet on the envirodrum and push the handle down so that it locks into position and opens the valve on the envirodrum.
10. The chemical should now be transferring into the Transcal tank.
11. When the required amount of chemical has been transferred, 'CLOSE' the valve on the chemical probe. Remove it from the chemical drum and then 'OPEN' the valve on the chemical probe again. This will drain residual chemical from hose.

If chemical has been transferred from an envirodrum, push the handle on the Micromatic coupling down slightly and then up. This will make the handle lift up and close the valve on the envirodrum. This should be done when doing successive fills into the Transcal tank. When finished transferring chemical, turn the fitting in order to release it from the envirodrum.

What to do if the Transcal tank is overfilled

CAUTION: Ensure that the appropriate protective clothing is worn, as per the chemical label.

In the event of over-filling the Transcal tank, a small piece of supplied black 25mm hose can be fitted to the ball valve on the bottom of the Transcal to drain away any excess chemical. To perform this you:

1. Turn the Transcal 'T' handle on the Transcal station to 'OFF'.
2. Close the venturi valve on the EZ control pressure delivery station.
3. With the Transcal 'T' handle on the Transcal station to 'OFF', and wearing the appropriate safety clothing, undo the cam lever fittings on the ball valve on the bottom of the Transcal station and remove the black 25mm hose. This is behind the Transcal station cover and can be accessed from underneath.
4. Attach the short length of black drain hose via the cam lever connection.
5. Place an appropriate container under the drain hose.
6. Turn the 'T' handle on the Transcal station to 'EMPTY'.
7. After draining the required amount of chemical, remove the drain hose, replace the vacuum supply hose and resume operating the Transcal. The raw chemical should be returned to the original container.

Transferring chemical from the Transcal tank to the main tank

Once the required amount of chemical is in the Transcal tank, transfer it into the sprayer tank:

1. Ensure that the venturi valve on the pressure delivery station is 'ON'.
2. The Transcal tank needs to be vented when emptying. Remove the chemical probe from the container and open the valve on the chemical probe, or open the Micromatic fitting.
3. Turn the 'T' handle on the Transcal station to 'EMPTY'.
4. The chemical should now transfer into the main spray tank.

When finished:

1. The Transcal tank and probe or Micromatic coupler should be thoroughly rinsed (see rinsing instructions on the pages following).
2. Turn the 'T' handle on the Transcal station 'OFF'.
3. Turn the valve on the probe 'OFF'.
4. Turn the venturi valve 'OFF'.
5. Turn the bypass valve 'ON'.
6. Ensure that the agitator valve is 'ON'.
7. Keep the agitator valve 'ON' until spraying begins.
8. Disconnect the probe or envirodrum line and replace the cam plug in the cam lever fitting.

Transferring chemical without measuring

The chemical can be transferred from the chemical container into the main spray tank (bypassing the Transcal tank) without the chemical being measured (i.e. by emptying full containers). This will reduce the time taken to transfer the chemical.

To do this you:

1. Release the cam lever fitting from the rear of the Transcal station and connect either the probe or the envirodrum line.
2. Place the probe in the chemical drum and open the ball valve on the chemical probe, or connect to the envirodrum and engage the Micromatic handle.
3. Turn the venturi valve on the pressure delivery station 'ON' 85 psi (see previous instructions).
4. The chemical will now transfer from the chemical drum into the main sprayer, bypassing the Transcal.
5. When the required amount of chemical has been transferred, close the ball valve on the chemical probe and remove it from the chemical drum or release the Micromatic fitting.
6. When finished, the probe or Micromatic coupler should be thoroughly rinsed (see following instructions).
7. Turn the venturi valve 'OFF'.
8. Turn the bypass valve 'ON'.
9. Ensure that the agitator valve is 'ON'. The sprayer agitator should be maintained until spraying begins.
10. Disconnect the probe or envirodrum line from the sprayer and re-attach black suction hose to the rear of Transcal station.

Rinsing

Rinse the chemical probe line:

If you're wanting to rinse the Transcal lines after using the chemical probe.

1. Fill a suitable container with fresh water (and any applicable decontaminating agent), at least 50 litres of fresh water should be sucked through for sufficient cleaning.
2. Remove the cam lever plug and connect the chemical probe line to the cam lever socket at the Transcal station.
3. Turn Chemical Probe valve to 'ON'.
4. Place the probe into the container with fresh water and open the valve on the chemical probe.
5. Turn the yellow 'T' 'handle on the Transcal station to 'EMPTY''.
6. Operate the Transcal venturi around 85psi.
7. The fresh water should now transfer to the Transcal tank and then into the main spray tank cleaning the lines from the chemical probe to the Transcal tank and to the main spray tank.

When finished:

- Turn the valve on the chemical probe line 'OFF'.
- Turn the chemical probe valve 'OFF'.
- Turn the yellow 'T' handle 'OFF'.
- Turn the venturi valve 'OFF'.
- Ensure that the agitator valve is 'ON'.

Disconnect the line from the Transcal tank to the probe from the cam lever fitting and replace the cam plug.

Rinsing the envirodrum line

To rinse the Transcal lines after using the Micromatic coupler.

1. Connect the Micromatic coupler to the Micromatic rinsing socket.
2. Connect the envirodrum suction line to the cam lever socket on the sprayer.
3. Turn Chemical Probe valve to 'ON'.
4. Open the 'Envirodrum Coupling Rinse' valve on the external water delivery station so that the fresh water cleans both the Micromatic coupler and the line to the Transcal tank.
5. Turn the venturi 'ON' at 85psi.
6. The fresh water will now rinse through the Micromatic fittings to the Transcal tank and then into the main spray tank.
7. When there has been sufficient cleaning with fresh water (at least 5 minutes of cleaning), close the Envirodrum Coupling Rinse valve.

When finished:

- Turn the chemical probe valve 'OFF'.
- Turn the yellow 'T' handle 'OFF'.
- Turn the venturi valve 'OFF'.
- Ensure that the agitator valve is 'ON'.

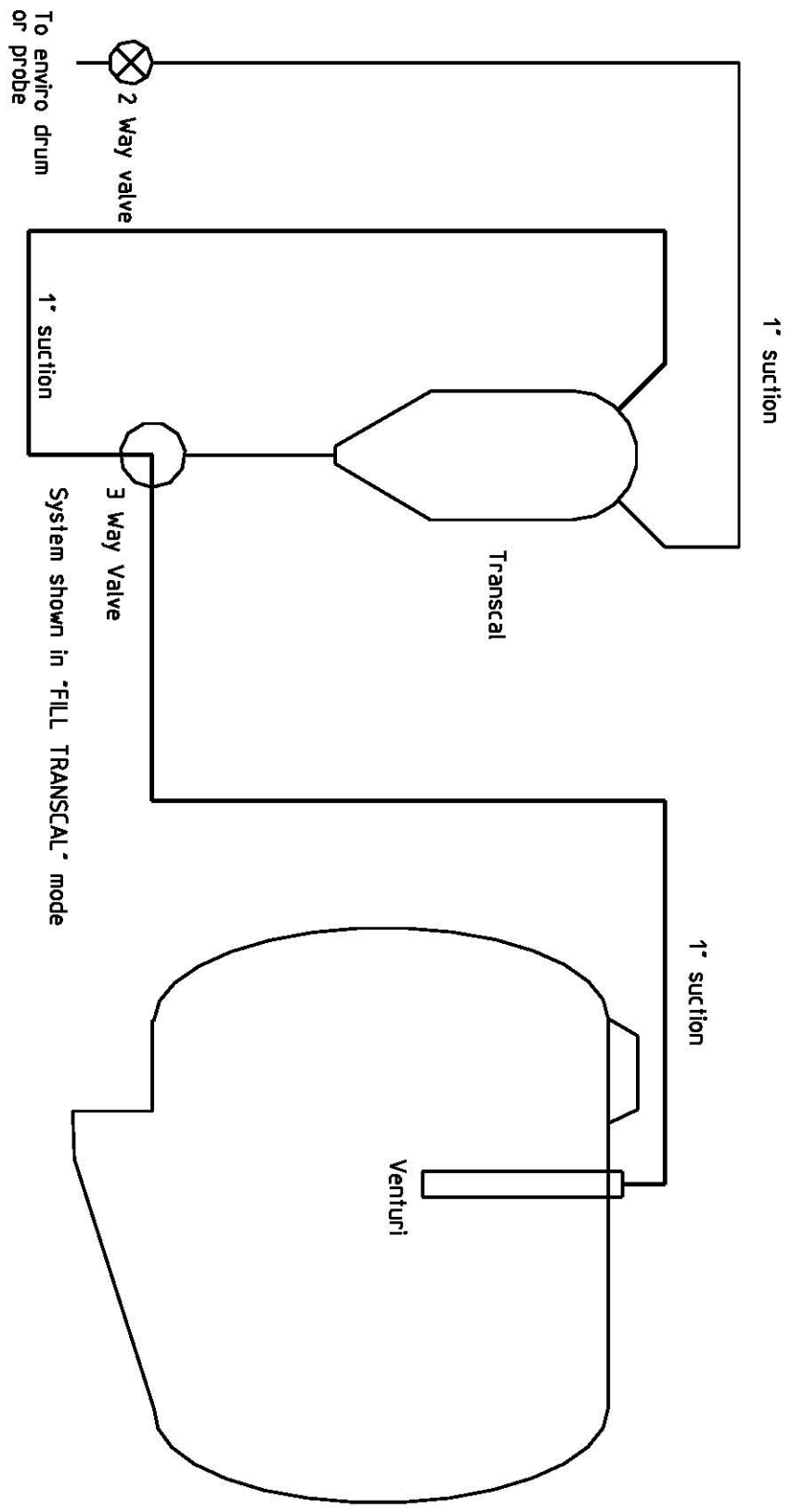
Rinse the Transcal:

1. Continue to have the sprayer pump operating and the Transcal venturi system operating at 85psi.
2. Ensure that the tank is vented by turning the yellow 'T' handle on the Transcal station to 'EMPTY'.
3. Turn the 'Transcal Flush' valve on the external water delivery station 'ON'.
4. The tank and sight tube should be rinsed and the rinsate transferred to the main spray tank.
5. Rinse the Transcal tank for as long as recommended on the chemical label, or at least two minutes.
6. Close the 'Transcal Flush' valve when tank is sufficiently rinsed and the rinsate should all have been transferred to the main spray tank.

To vent tank:

1. Turn off venturi
2. Open probe ball valve
3. Open Transcal ball valve to empty Transcal
4. Vent for 30 seconds then close

Transcal plumbing schematic



Hydraulic fill pump

Key Features

Suction and delivery lines

- Use good quality suction hose and fittings that will not collapse or leak air under suction.
- If pumping water from structures other than a storage tanks, we recommend the use of an appropriate sized floating filter equipped with a check valve.
- It is essential the suction line to the pump is the same size as the suction port (3")

A smaller size delivery line can be used but will reduce pump output.

Setting pump RPM

WARNING: Do not run the pump with the water delivery line closed (deadheaded) for prolonged periods, as pump overheating and seal damage will result. Pump should never be run empty. Always turn off the delivery ball valve slowly as pump damage can occur if it's turned off too quickly.

The hydraulic fill pump requires approximately 40 litres per minute of oil @ 2000 psi.

With open centre tractor hydraulic systems:

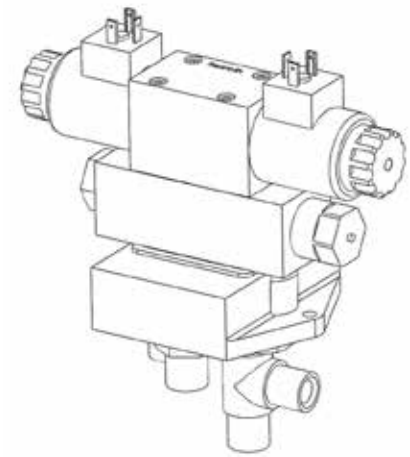
- Before starting the tractor open the oil bypass adjustment screw (as circled in picture above)
- Start the tractor and engage the pump.
- Turn the adjustment screw in to increase the pump RPM'S until it is running just fast enough to prime.
- When properly primed close the water delivery line to dead head the pump Continue adjusting the bypass screw until the water pressure reaches a maximum 3.4 bar.
- Once this is achieved, lock down the bypass screw and reopen the pump water delivery line.

Tractors with closed centre hydraulic systems:

- The oil bypass adjustment screw should be screwed all the way in and locked down (Oil bypass screw circled above).
- The flow control valve on the tractor (hare and tortoise) used to set the hydraulic oil flow.
- Before starting the pump on a closed centre hydraulic system, ensure this screw is fully closed and locked down.
- Set the flow control valve on the tractor to its lowest setting (tortoise).

- Start the tractor and engage the pump.
- Adjust the flow control valve on the tractor until the pump is running just fast enough to prime.
- When properly primed, close the water delivery line to deadhead the pump, Continue to adjust the oil flow until the water pressure reaches a maximum 3.4 bar.
- Once this is achieved re-open the pump water delivery line.

WARNING: If the pump bypass screw is not closed when operated on a closed centre hydraulic system the tractor will pump excessive volumes of oil to compensate. This will cause the hydraulic oil to overheat, which may result in damage to the pump and tractor transmission.



Operation

WARNING: Do not pump flammable or hazardous liquids with hydraulic fill pumps.

IMPORTANT: Before starting the pump for the first time, fill the pump chamber and suction hose with water and ensure the delivery line is open. This will aid in initial pump priming and reduce the likelihood of seal damage. The pump chamber can be filled through either the 1/2" or delivery port on the top of the pump.

NOTES:

- Do not run the pump dry or un-primed for extended periods, otherwise seal damage will result.
- The amount of oil fed to a hydraulic centrifugal pump directly determines its RPM'S and thus the liquid pressure at which the pump operates.
- Excessive oil flow will cause the hydraulic motor to over-rev, resulting in damage to the pump and hydraulic motor. It is imperative to set the correct oil flow to the hydraulic motor every time the pump is connected to the tractor.

Instructions for machines fitted with electric over hydraulic operated fill pumps:

Attach fill hose to quick fill point.

Ensure that the fill pump bypass ball valve is in the "fill pump OFF" position.

Ensure that pump is primed prior to starting.

Activate fill pump with toggle switch located on the EZ control panel.

Slowly turn fill pump bypass ball valve to the "fill pump ON" position. (This valve allows you to regulate the rate of fill with more or less hydraulic flow as required).

Once the required amount of water has been transferred, rotate the ball valve to "fill pump OFF" position and then switch off toggle switch.

Instructions for machines not fitted with electric over hydraulic spool valves

Attach fill hose to quick fill point.

Ensure that the fill pump bypass ball valve is in the "fill pump OFF" position.

Ensure that pump is primed prior to starting.

Activate fill pump by engaging tractor hydraulic remote lever.

Slowly turn fill pump bypass ball valve to the "fill pump ON" position. (This valve allows you to regulate the rate of fill with more or less hydraulic flow as required).

Once the required amount of water has been transferred, rotate the ball valve to "fill pump OFF" position and then disengage tractor remote.

Exacta foam marker

Using the foam marker

STANDARD NEEDLE VALVE SETTINGS

WATER:
Booms 24 metres and larger:
Open the water valve 12 turns.

CONCENTRATE:
Booms 24 metres and larger:
Open the concentrate valve up to 4 turns.

Start with half this amount and open the concentrate in only quarter turn intervals until the correct foam consistency is reached. Allow up to 5 minutes for each needle adjustment to take effect.

To successfully use the exacta foam marking system, it is essential to observe the following points:

1. Make sure that initially all ball valves on the external water delivery station are turned 'OFF'.
2. If filling of the main spray tank is not required at the same time, turn the red handle on the fill ball valve 'OFF'.
3. Connect the fresh water fill hose to the quick-fill coupling.
4. Operate the fresh water pumping system (make sure pressure does not exceed 200 kPa).
5. Take the lid off the foam marker water tank.
6. 'OPEN' the 'foam marker fill' valve. Fill the exacta foam water tank with only clean soft water.
7. Continue to bottom-fill the foam tank until the desired amount has been transferred.
8. When the desired amount of water has been transferred to the foam tank, turn the 'foam marker fill' valve 'OFF'.
9. Re-fit the lid to the foam marker water tank.
10. Turn the fresh water pumping system off.
11. Fill the concentrate tank with only Goldacres foam concentrate.
12. All adjustments of the control valve should be within plus or minus ½ a turn or similar.
13. Always allow sufficient time for the altered foam to come out of the accumulator.
14. If the foam is too runny, close the water valve slightly, if the foam is stiff and has air holes, open the water valve slightly. Loose foam is desirable when spraying in crops where the foam needs to sit on top of the crop in order to be visible. Tight foam is desirable when the foam needs to be visible for an extended period of time and when the spraying conditions are relatively hot and windy.
15. Regularly inspect the foam marker lines, to ensure they are free of foreign matter.
16. Periodically remove and clean the water filter. The foam marker filter is located underneath the foam marker tank. To remove the filter, ensure the appropriate protective clothing is being worn. Close the foam tank ball valve, loosen the brass screen, remove the filter and clean.
17. Periodically check the condition of the one-way valve in the compressor/diverter unit.

WARNING: Ensure that the foam marker water tank lid is srewed on loosely to prevent pressure build up in the tank.

NOTE: If either the water tank or the foam concentrate tank empties, it's possible that flow from the other tank (foam water or foam concentrate) can siphon into the empty tank. To prevent this, as soon as either the foam water tank or foam concentrate tank empties, shut the ball valve at the bottom of both tanks. Re-fill the tanks prior to the next spraying operation. Regularly check valves.

Bleeding the concentrate line when the foam concentrate tank empties:

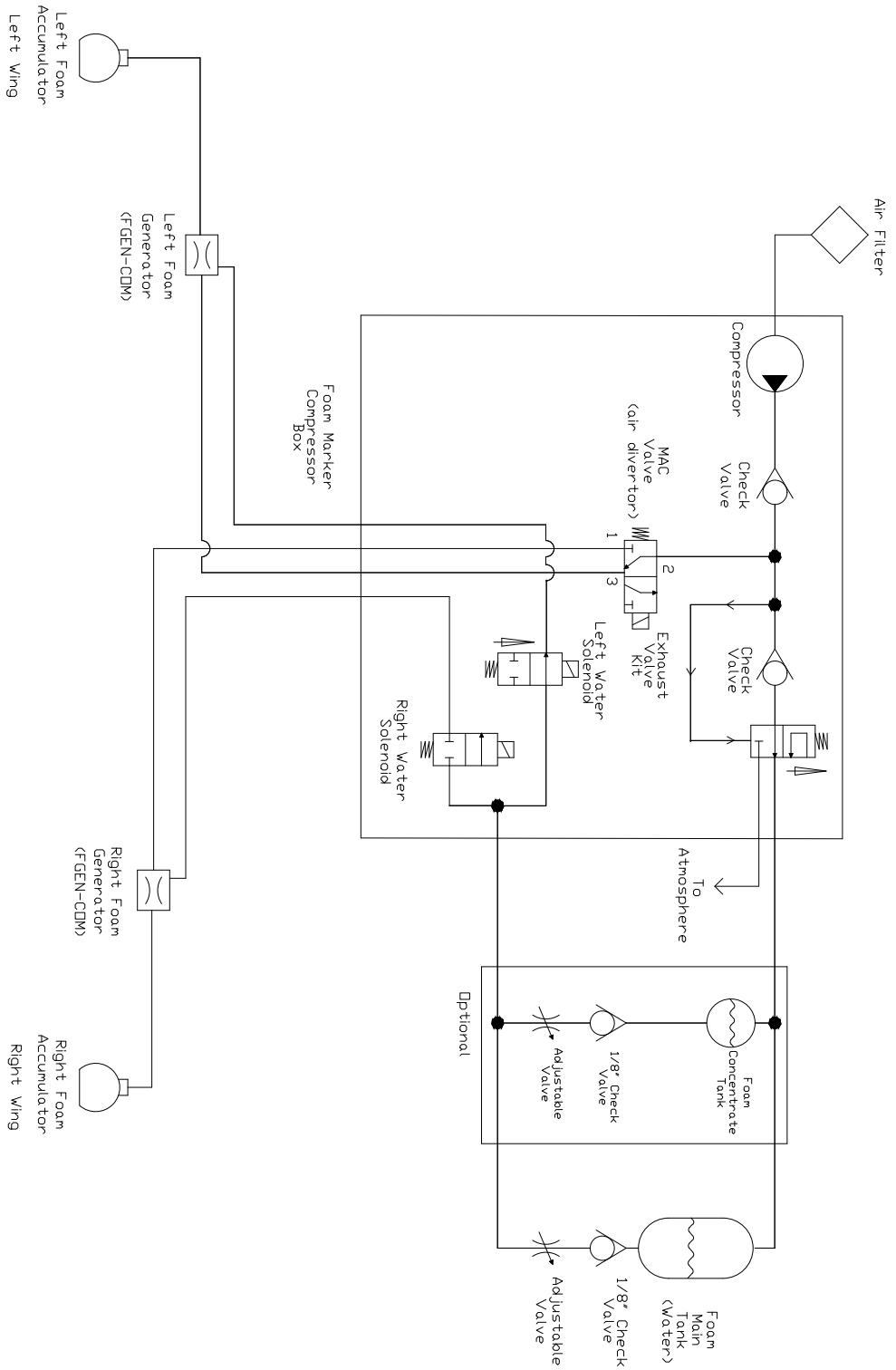
If the foam concentrate tank empties, it will take a few minutes for the concentrate to feed through the lines to the compressor/diverter unit. To reduce this time, the concentrate can be bled to minimize water wastage.

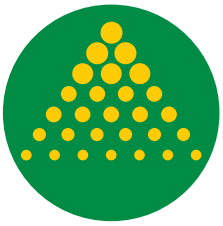
To bleed the foam concentrate:

1. Close the concentrate needle valve ½ turn at a time and record the number of turns until the needle valve is closed.

2. Open the needle valve several turns more than the previous setting.
3. When the concentrate comes through, fully close the concentrate needle valve, and then re-open the valve to the setting recorded from step 1).

Foam marker schematic





GOLDACRES

www.goldacres.com.au