Windrow
2500L
Operator's Manual MY18

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GA8700828 REV 1
MAY 2020
FROM SERIAL #503466

GOLDACRES

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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 Unless previously withdrawn, Goldacres quotations are open for acceptance within the period stated therein or, when no period is stated, with 14 days only of the quotation date.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.

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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

Chapter 2

SAFETY

Safety Information

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 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 operators have read and fully understand the operator's 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.

Passengers

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

Warnings

- 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 damaged or missing decals on the equipment and that any damaged or missing decals are replaced prior to operation.
- Goldacres equipment either 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.
- Inspect the equipment thoroughly for damage and wear before operation.
- 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.
- 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 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.
- 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.
- Lubricate the equipment as per recommended requirements before operating.
- Make sure that the equipment complies with all relevant road regulations when transporting.
- Flush chemicals from equipment immediately after use.
- 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.
- Any unauthorized modifications to this equipment may affect its function and create a serious safety risk.
- Keep clear of overhead obstructions – especially power lines as contact can be fatal.
- Never attempt to clean parts, or nozzles, by blowing with mouth.

Continued over page

Safety Information

- Never attempt to siphon chemicals, or substances, by sucking.
- It is imperative that the tow 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 trailer does not exceed the braking and carrying capacity as specified by the tow 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 Chapter 8 'Operation' for more information.
- Consideration should be given to both the carrying capacity of the trailer and the gradient of the terrain when determining the speed at which the tow vehicle can be driven safely.
- Ensure equipment is securely fastened or attached to machine at all times.
- Never stand within the radius of the boom wings.
- Never work under any hydraulically raised boom.

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.
- Ensure that all bolts are tightened and secured before operation.
- Always ensure that the boom is securely supported when travelling.
- Where fitted, care should be taken to never overfill the diaphragm pump with oil or operate at speeds exceeding 540 rpm.
- Do not exceed the maximum spraying pressure of 8 Bar.

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.

Personal Protective Equipment (PPE)

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

- Exposure to loud noise over an extended period can cause permanent hearing impairment or loss. 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.

CAUTION: Always refer to the chemical manufacturers label for guidelines on the appropriate PPE to use with the chemical/s you are using.

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

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

Poisons Information Centres - Call 131 126 (AU)

Cuts, Stabs & Punctures

When Servicing machine, be mindful of sharp edges on parts such as trimmed cable ties, hose clamps, cut reinforced hose and the edges of plates and brackets as they could cause cut, stab or puncture injuries.

Crush Hazard

Never attempt to maintain axles, wheels or components within the vicinity of the wheels with the tow vehicle running or in motion.

Pinch Hazard

When operating moving components such as the boom, access ladder or other components, keep fingers and hands away from potential pinch points.

Burn Hazard

- Avoid contact around all hydraulic lines when at operating temperature

Entanglement Hazard

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.

Continued over page

Safety Information

Stored Energy Hazard

Even when the machine is not operating, energy can be stored in components such as hydraulic accumulators, air tanks, tyres, hoses, springs and boom cables. Hydraulically supported components such as the boom center are also a source of stored energy. Before working on the machine, ensure that these parts are relieved of their energy in a safe manner.

Overhead Hazard

BOOM LIFT OR TILT COULD STRIKE POWER LINES. Keep clear of overhead obstructions – especially power lines as contact can be fatal.

Do NOT walk on machine platform when near power lines.

Airborne Particles

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

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.

Be mindful of the location of pressurised lines in the vicinity of the work area when using equipment such as grinders, oxy torches and welders. The two main risks are that this equipment may easily cut through the lines or the local heat generated near the lines may cause them to rupture.

Ensure that all fittings and lines are fully/tightly secured before re-pressurizing after repairs.

Lifting Machine

Before raising the machine off the ground:

✓ Ensure that the boom is in its closed position.
✓ Park up on a flat, level and firm area.

✓ Empty the spray tank where possible.
✓ Chock all wheels that remain on the ground.
✓ Securely lift the machine using a jack and support the machine on work stands.

× Do not work under the machine when supported solely by a jack.
× Do not support the sprayer using materials that may crumble.

Changing Wheels & Tyres

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.
✓ Be proactive and continually check the condition of your tyres.
× Do not weld, heat or modify the rim.

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.
- This machine is designed for a maximum speed of 50 km/h. This speed must only be used on suitable terrain conditions. All components i.e. tyres, brakes, suspension, steering and chassis are designed and built to this maximum speed.
- 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 sprayer may become unstable when turning at excessive speed or when operating on excessively steep terrain.

Continued over page

Safety Information

Collision Prevention & 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.
- The machine can only be taken on public roads during daylight hours.
- 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 a falling if a person has "climbed" onto 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.

Safe Chemical Usage

The safe use of Agricultural (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.

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.

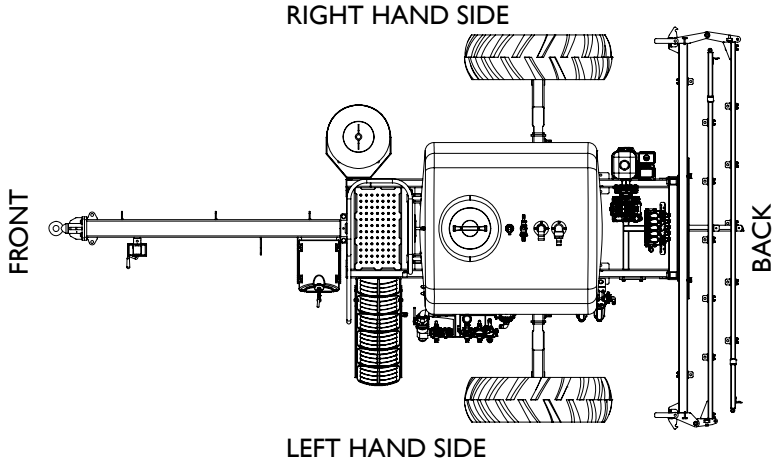
Regularly review safety decals with operators. It is very important to ensure that all new machine components and replacement parts include current hazard identification decals.

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

Chapter 3

GENERAL INFORMATION & SPECIFICATIONS

Machine Orientation



General

Chassis

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

Paint Codes

Wheels: N23 Neutral Grey
Steel work: G13 Dark Green
Australian Standards AS2700

Tank

All tanks are constructed from UV resistant polyethylene. Polyethylene tanks have a very high chemical resistance. Due to the rotational moulding process, there can be variance in the overall dimensions of the tank which in turn results in 5-10% variation in 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. The Supermix agitator has an approximate capacity of 300 - 1300 L/min depending of the pump size and operating pressure. For further information refer to Chapter 10 'Lubrication & Maintenance'.

Spray Controller

In cab section control with electric pressure regulation is fitted as standard, some sprayers are supplied with a Raven SCS450 automatic rate controller. Automatic rate controllers will maintain a user defined application rate automatically as the 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 Chapter 6 'Calibration' of this manual.

Continued over page

General

Boom Nozzle Control

Motorised boom valves for control of boom section on/off function 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.

Filtration

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

As standard, these 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)

Spray Pump

An optional Udor positive displacement and oil backed diaphragm pump can be fitted. The normal operating range is from 1 - 8 bar which is sufficient for efficient nozzle performance. A Honda GX200 petrol motor drives the pump through a 6:1 reduction gearbox.

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
- 12 V Chemical Transfer Pumps
- Direct Chemical Injection Modules

Booms

The sprayer can be fitted with a variety of boom sizes including 9, 10 and 12 metre width options.

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 user's 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 or below 5 degrees Celsius.

Each individual 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.

Hand Wash Tank

A fresh water hand wash tank is located on the left hand side of the machine under the left hand access ladder. It has a bottle with a hand pump that can be filled with a liquid hand cleaner. The main tank can be filled with fresh water for operator use.

Ladder

The ladders are to be used to access to the platform and plumbing fittings on top of the tank. Always face the ladder and retain three points of contact with the ladder at all times when ascending and descending. The ladders should be stowed while the sprayer is operating to avoid personal injury or equipment damage.

Axles

Windrow sprayers are fitted with width adjustable rigid axles. They have 1.2 meters of under axle ground clearance.

The axle can be adjusted from 3 meters to 3.5 meters track width in 100 mm increments.

For further information on the axle refer to Chapter 7 'Pre-Operation' and Chapter 10 'Lubrication & Maintenance'.

Wheels & 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.

DETERMINING 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 and tyres please refer to Chapter 10 'Lubrication & Maintenance'.

NOTE: If a tyre is replaced with a different brand or size, please contact the supplier for correct air pressures to suit the load carrying capacity of this machine.

NOTE: PSI = Kpa x 0.145
EXAMPLE: 240 Kpa x 0.145 = 34.8 PSI

TYRE SIZE	PLY	RATED PRESSURE (KPa)	RATED CAPACITY (Kg)	CYCLIC LOADING PRESSURE (KPa)
14.9 x 24	8	180	1600	234

Dimensions

The following information is provided as a guide only.

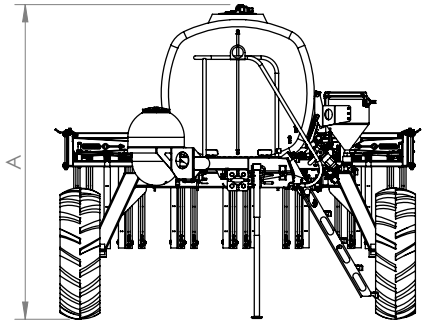
Variations in dimensions may occur without notification.

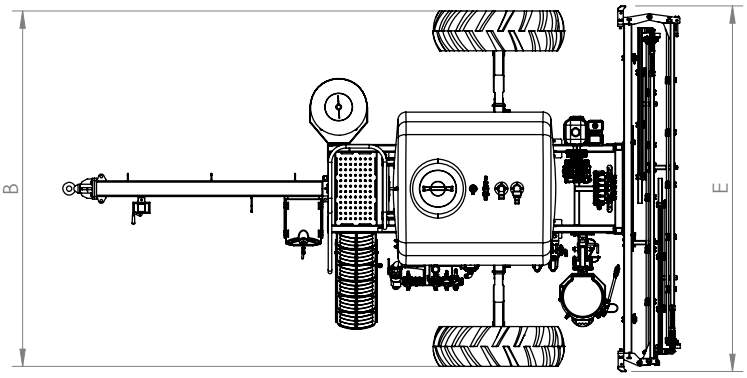
To ensure that the dimensions are accurate for your sprayer, it is recommended that you measure your sprayer individually.

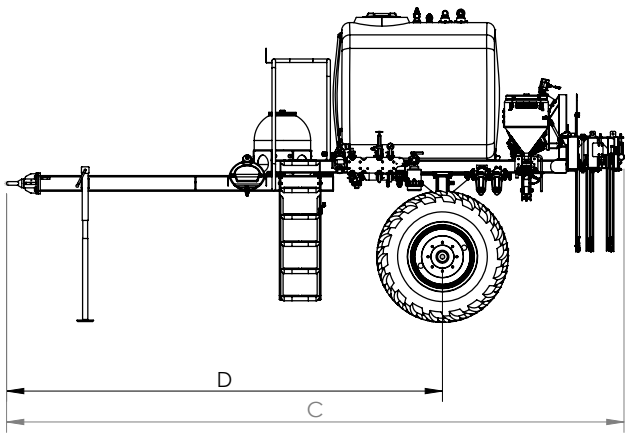
MODEL	BOOM SIZE	A HEIGHT	B WIDTH	C LENGTH	D WHEEL-BASE	E BOOM WIDTH
2509	9m	3000	3400	6150	4110	3500
2510	10m	3000	3400	6150	4110	3500
2512	12m	3000	3400	6150	4110	3500

NOTE: Dimension B (width excluding booms) stated above assumes the axles are adjusted to minimum width.

NOTE: Dimensions shown are in millimeters.







Chapter 4

CABIN

Not Applicable

Chapter 5

DRIVETRAIN

Not Applicable

Chapter 6

CALIBRATION

Manual Rate Control - Calibration

Spraying is a complex task, that is affected by many variables. It is the responsibility of the operator to be familiar 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.

As the sprayer is moving, the ground speed and flow rate must be considered to achieve the desired application rate per area. Flow adjustments are made via the control box in the cabin.

As the ground speed increases, the flow to the booms required to maintain the application volume needs to be increased. Increasing the flow 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 must be decreased to maintain a constant application rate.

Refer to your nozzle charts for more specific details on determining the variables required to meet your desired application rate.

Auto Rate Control - Calibration

Spraying is a complex task, that is affected by many variables. It is the responsibility of the operator to be familiar 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.

The Raven system comprises a console, flow meter, 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 flow meter 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 bypass and thus the volume being applied via the boom is controlled.

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:

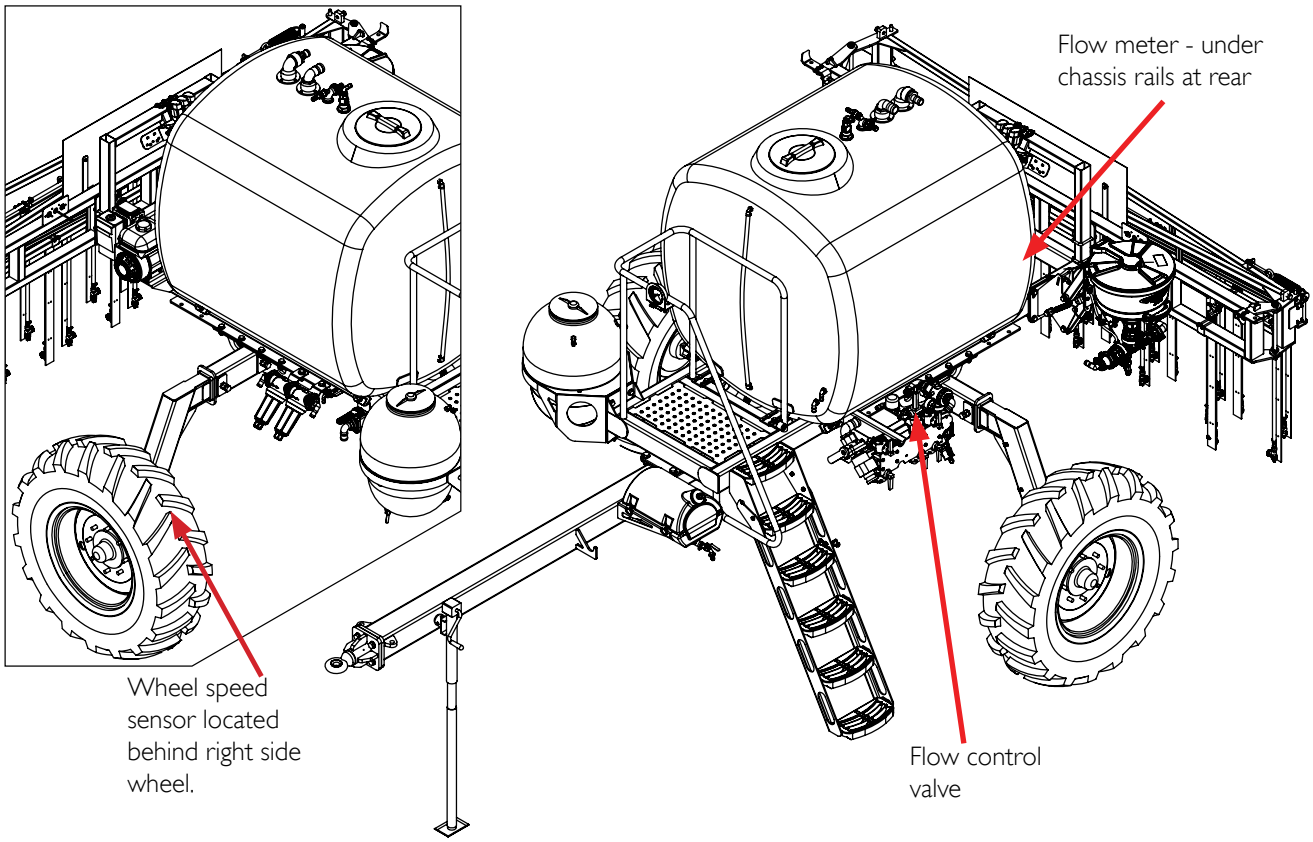
PARAMETER	VALUE	UNIT
Boom Cal 1		cm
Boom Cal 2		cm
Boom Cal 3		cm
Boom Cal 4		cm
Boom Cal 5		cm
Speed Cal		-
Meter Cal		-
Valve Cal		-
Rate 1		L/Ha
Rate 2		L/Ha
Pump Cal (1)		RPM

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

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

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

Auto Rate Control - Key Component Locations



Auto Rate Control Calibration - Flow Control Valve

The flow control valve is located behind the EZ control station and 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 flow 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, dependant on system pressure.

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

Auto Rate Control Calibration - Flow Meter

If the sprayed volume from the controller does not match the tank volume that was sprayed out, then the flow meter will need to be checked and a new updated figure input into the 'Meter Cal' in the Raven controller.

- On the flow meter on the sprayer, there will be a calibration number attached to it on a white sticker. 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 flow meter should be checked at the start of every spraying season and periodically during the season.
- The simplest way to check the accuracy of the flow meter is to fill the tank to a previously determined volume mark (usually top fill marking). while making sure the tank is level.
- On the Raven controller, make sure the 'Total Volume' reads '0'.

Continued over page

Auto Rate Control Calibration - Flow Meter

- Perform a self test, choose a high speed and high rate so that the tank will empty relatively quickly but make sure the pressure does not exceed 60 PSI.
- When the tank is empty, on the Raven controller press 'Total Volume' to read what the Raven flow meter has output to the boom. Record the reading.
- Check the volume of the tank to see what has been sprayed out to the boom. Record the reading.
- Compare the reading from the controller with the known volume from the tank. If there is a relatively large discrepancy (i.e. more than 50 litres out of a 2500 litre tank), the flow meter should be removed from the sprayer, disassembled and the condition of the turbine checked and cleaned. It should be able to spin freely.
- The flow meter should then be reassembled and replaced on the sprayer. Perform the volume check again and if there is still a discrepancy, the 'Meter Cal' value can be changed

  i.e. If volume from the controller reads 2600 litres instead of 2500 litres and the original Meter Cal value is 185, then:

New 'Meter Cal' value = (185 x 2600) / 2500 = 192

Every sprayer should be calibrated regularly to ensure minimal error in the application rate. A nozzle selection chart indicates what application rates are to be expected. Variations due to nozzle wear, ground speed error and pressure irregularities can all add up to result in large application rate errors.

Auto Rate Control Calibration - Speed sensors

Raven automatic rate controllers can utilise a speed reading from:

- 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 then the calibration and sensor condition must be checked (see Chapter 11 'Troubleshooting').

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 'Auto Rate Control Calibration - Raven SCS450' section 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 'Auto Rate Control Calibration - Raven SCS450' section for further information on console setup.

Auto Rate Control Calibration - Raven SCS 450

INITIAL CONSOLE PROGRAMMING

After the console has been installed and turned on it will require a one-time initial programming. For more detailed information about console features and operation consult the Raven SCS 450 Installation and Service manual.

STEP 1: Unit of measure options will be displayed. Set your unit of measure by pressing [CE] repeatedly until the desired unit is displayed (SI is the metric unit in volume per hectare) and then press [ENTER].

STEP 2: Now choose your speed sensor type by pressing [CE] repeatedly to cycle the two options and then press [ENTER].

SP 1 - Wheel-Drive or Drive-Shaft Speed Sensor

SP 2 - Radar Speed Sensor

STEP 3: The console will now ask for the valve type. Press [ENTER] to accept 'C-SD-Standard Valve' for this sprayer.

IMPORTANT: Steps 1-3 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 while holding [CE] to reset and clear all memory. To see what has been programmed, press and hold [SELF TEST] for about 5 seconds until the programmed information is displayed (flashing and toggling).

STEP 4: Press [BOOM CAL] then [ENTER]. Enter boom section 1 width in centimeters and press [ENTER].

e.g. 6 m = 600 cm. Press [6] , [0] , [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 (0.5 m) spacings becomes 12 x 0.5 m = 6 metres.

STEP 5: Press [1] (up arrow) to select boom section 2 (B-02) Enter section width in centimeters and then press [ENTER].

STEP 6: Enter values for remaining boom sections using [1] (up arrow) and [2] (down arrow) to select them. If a boom section is not needed, enter the width value as '0'.

STEP 7: Press [SPEED CAL] then [ENTER]. Enter speed CAL in decimeters e.g. 477 (1 metre = 10 decimeters) then press [ENTER].

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 which best simulates average wheel diameter between full and empty loading 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 SCS450 console with 4 wheel magnets (2 red and 2 black) - use the measured distance converted to decimeters for the speed CAL entry (1 metre = 10 decimeters).

For SCS450 console with 2 wheel magnets (1 red and 1 black) - use the measured distance converted to decimeters and then multiplied by 2 for the speed CAL entry (1 metre = 10 decimeters).

STEP 8: Press [METER CAL] then [ENTER]
Enter Meter Cal for litres. Press [ENTER] (e.g. 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 9:
Press [VALVE CAL] then [ENTER]
Enter '2123'
Press [ENTER]

STEP 10:
Press [RATE 1] then [ENTER]
Enter Rate 1 in litres per hectare e.g. 60.
Press [ENTER]

STEP 11:
Press [RATE 2] then [ENTER]
Enter Rate 2 in litres per hectare e.g. 75.
Press [ENTER]

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

Continued over page

Auto Rate Control Calibration - Raven SCS 450

STEP 12: OPTIONAL
Press [VOL/TANK] then [ENTER]
Enter the volume in the tank in litres at start of spraying e.g. 3000.
Press [ENTER]

STEP 12: OPTIONAL
Press [TIME] then [ENTER]
Enter the time of the day e.g. 10:30.
Press [ENTER]

STEP 14: HYDRAULIC DRIVE SPRAY PUMP ONLY
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 SCS450 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]

STEP 2: Enter speed (i.e. 12.0 for 12 km/h)

STEP 3: Press [ENTER]

STEP 4: 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 when performing a self-test.

Nozzle Calibration

As part of your daily sprayer calibration, Goldacres recommends you carry out a simple "jug test" to ensure the spray nozzles you are using are delivering the correct amount of chemical, as stated in your nozzle supplier's rate chart.

Jug Test

The method of carrying out the "jug test" is described below.

You will need:

- A calibrated measuring container that can measure the medium in litres, in 10 ml increments e.g. 0.45 L.
- A timing device that counts seconds.
- A pressure gauge mounted at the nozzle tip to verify the system pressure being delivered at the nozzle. Goldacres part number GA5077983 will enable mounting of a suitable gauge to the nozzle body bayonet fitting (not including gauge).

PROCEDURE:

1. Check the plumbing system for kinked or obstructed hoses and repair or replace any hoses that might restrict the normal flow of the liquid.
2. Start your sprayer and initiate a 'self test' procedure on your rate controller console. Set the application rate and speed to the values given in your rate chart that match your desired spray output.
3. Then place the jug under one of the nozzles, for exactly 1 minute and 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 nozzle supplier rate chart. Variation should be no more than plus or minus 10 %.

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

- Cleaning the nozzles using the method recommended by the nozzle supplier.
- Replacing the nozzles.
- TeeJet advise that nozzles that flow greater than +10% of their stated volume are 'worn out' and should be replaced.
- Cleaning nozzle filters.

NOTE: Uneven volumes from individual nozzles will result in variations in the application rate across the width of the boom. Spray efficiency will be reduced. **Crop damage may result.**

If you have any further questions, Goldacres recommends that you contact your nozzle supplier or your Goldacres dealer for additional information.

Download your free copy of 'A user's guide to spray nozzles' from the TeeJet website. Also 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 or Lechler web site: www.lechler.de

Chapter 7

PRE-OPERATION

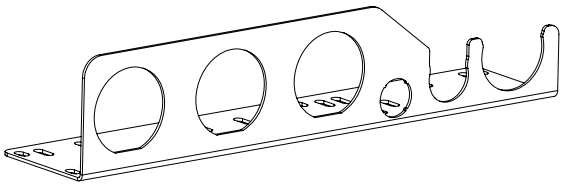
Drawbar Connections

The standard drawbar connections are as shown below. It is important that the dielectric grease (supplied with each sprayer) is applied to electrical connections prior to connection. This keeps the electrical terminals in good condition by preventing corrosion. Electrical conductivity is also maximised which prevents hard-to-diagnose electrical failures.

Raven SCS450 male & female connectors

Raven male and female speed sensor connections

Tail light connection



Cable mount plate for tractor

Safety chains

Tractor Connection

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

TRACTOR TO SPRAYER CONNECTION

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 50 mm. 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.

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

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

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.

5. Ensure that all safety guards and chains are in place

6. Where optioned, fit the spray controller and any other switch boxes supplied in tractor cabin. Make sure that all controllers and switch boxes are securely mounted.

7. Where optioned, connect any power leads from Raven Console directly to battery.

8. Where optioned, connect drawbar connections for the console, speed sensor and tail lights.

NOTE: Some dielectric grease should be applied to the electrical connections at the drawbar.

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

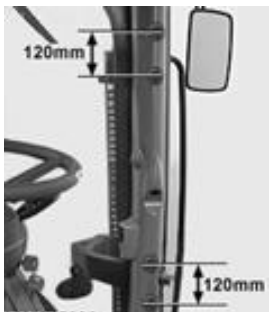
Console Mounting

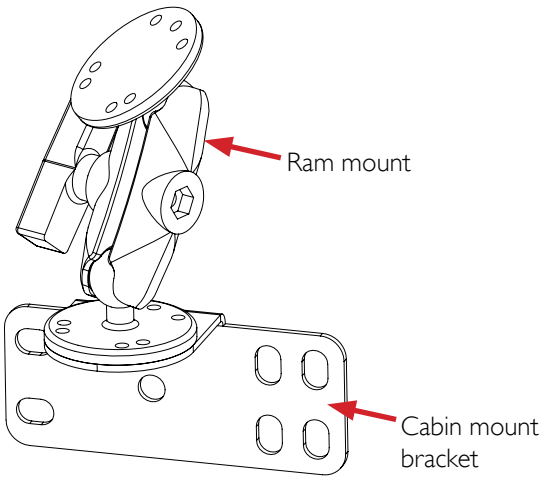
The mounting of the consoles within the cabin of your tractor is a critical part of the set up process. It is important that the consoles are mounted in the cabin in such a way that it cannot cause harm to the operator under any circumstance while also being mounted in a user friendly way.

When the sprayer is removed from the tractor, and the consoles are to remain fitted, please ensure that all consoles 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.

If 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 the pillar.





ABOVE: Some tractors may have pre-drilled mounting holes on the pillar which can be used with the cabin mount bracket (GA4522930) to mount the rate control console.

Console Connection - Raven SCS450

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

CONSOLE POWER WIRING

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

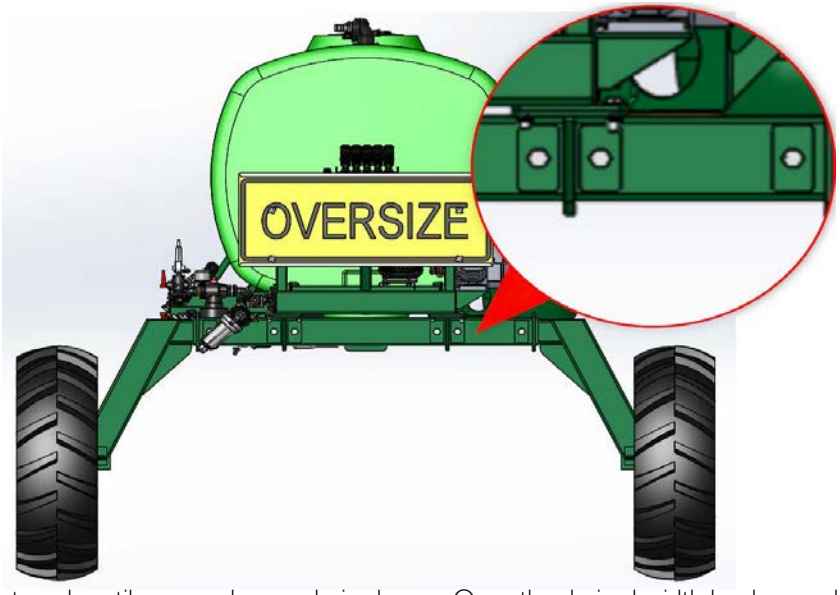
NOTE: The negative should be connected last to prevent the chance of a short.

Axle Adjustment

Once the tractor to sprayer connection is complete you will now need to set your desired wheel width.

WARNING: Make sure the brake of the Tow vehicle is engaged and the drive wheels are chocked to prevent the vehicle moving.

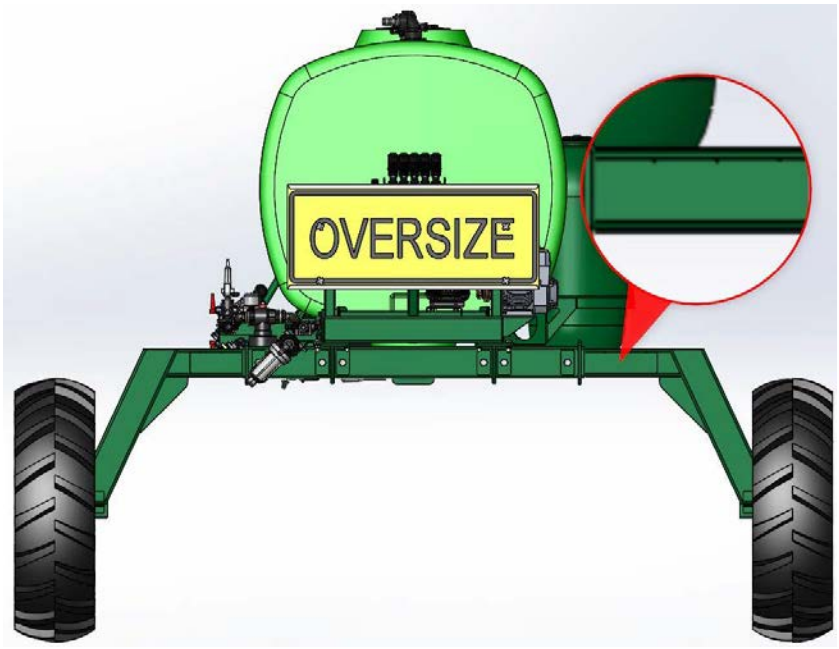
Using lifting device, lift one side of the machine and loosen the 3 clamping bolts located along the backside of the axle.



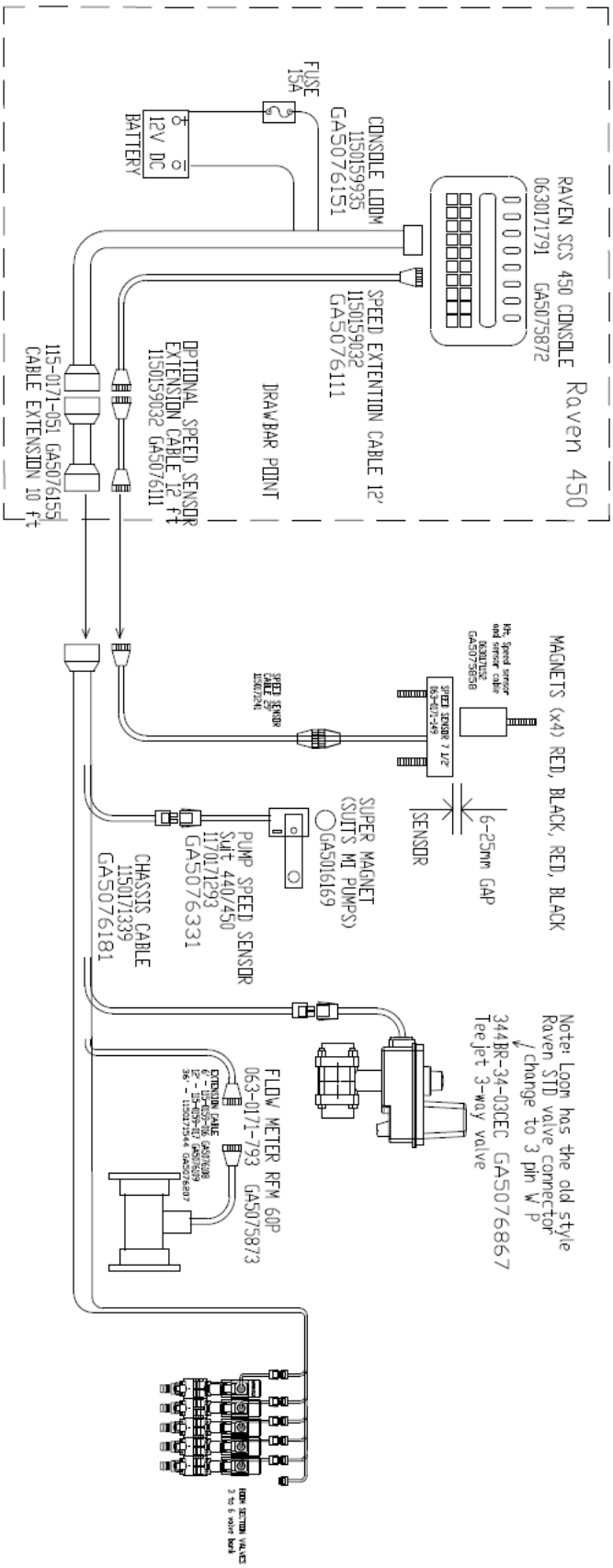
Slide the axle outwards until you reach your desired width.

Take notice of the markings along the backside of the axle slider (100mm Increments) Maximun overall width is 3.5 meters.

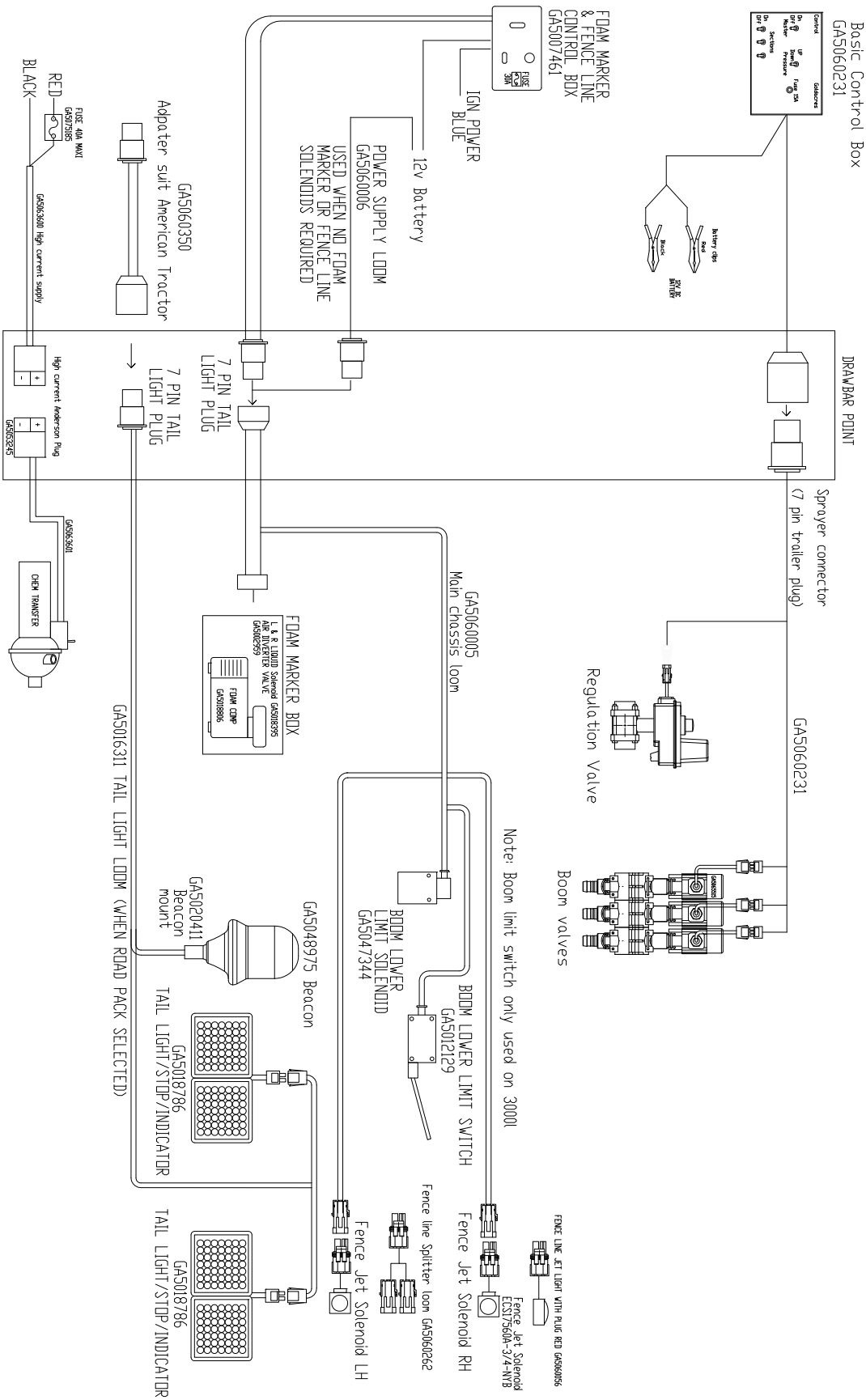
Once the desired width has been achieved, tighten the axle clamping bolts and lock nuts.



Wiring Schematic - Raven SCS450



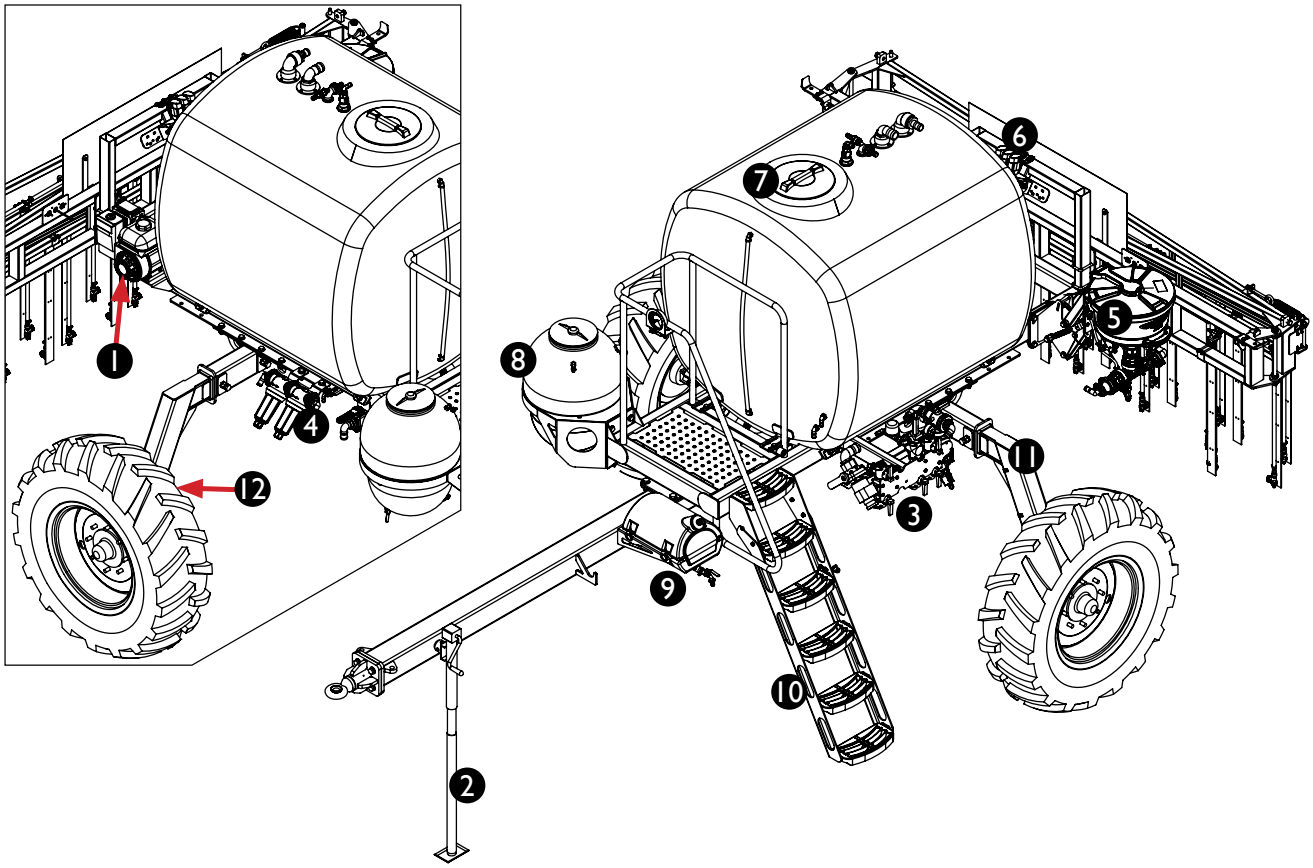
Wiring Schematic - Manual Rate Control



Chapter 8

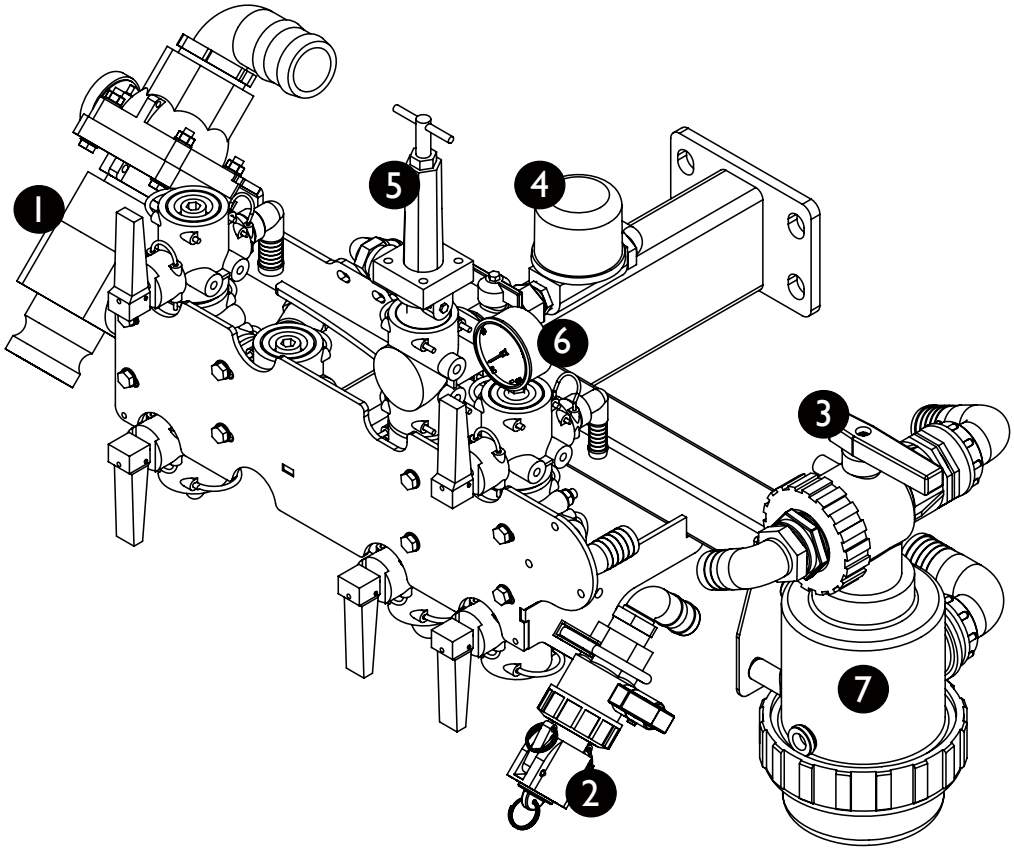
OPERATION

Key Features



NUMBER	FEATURE
1.	Motor & spray pump (Optional)
2.	Jack
3.	EZ control fill & pressure manifold
4.	Dual pressure filters
5.	Chemical induction hopper (Optional)
6.	Boom valves
7.	Main tank lid
8.	Flush water tank
9.	Hand wash tank
10.	Platform access ladder (Folding)
11.	Adjustable width axles
12.	Wheel speed sensor (Behind wheel)

EZ Control



NUMBER	FEATURE
1.	Main tank fill
2.	Chemical probe coupling
3.	Suction filter valve
4.	Flow control valve
5.	Pressure relief valve
6.	Manifold pressure gauge
7.	Suction filter

EZ Control Functions

EXTERNAL WATER DELIVERY	USE
Main tank rinse nozzles	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.
Fresh water fill	Used to fill the rinse water tank.

NOTE: These functions are only available when external water is being pumped into the system.

PRESSURE DELIVERY	USE
Hopper	Turn ON to use induction hopper
Venturi	Turn ON to use Transcal or chemical probe
Agitator	Turn ON to activate agitator
Pressure relief	Used to adjust manifold pressure
Manifold pressure gauge	Indicates the manifold pressure

NOTE: These functions only available when the main spray pump is operating - pressuring the system.

Tank Filling

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

The main tank should be filled through the 3" fill point mounted to the side of the EZ control station on the left hand side of the sprayer. 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. Filling progress can be monitored via an optional fill flow meter (see Chapter 12 'Optional Accessories').

WARNING: Water weighs 1 kg 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 equivalent weight of a full tank of water. Exceeding this weight, can lead to sprayer damage.

For example: Liquid nitrogen has a density of 1.28 kg per litre. The tank size might be 2500 L.

2500 L / 1.28 kg = 1953 L

This means that the total volume of liquid Nitrogen allowed in a 2500 L tank is 1953 L.

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

MAIN TANK FILL PROCEDURE

1. Connect the fill hose (not supplied) to the 3" fill cam lock coupling which is mounted to the EZ control station on the left of the sprayer.
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).
3. Turn the fresh water pumping system on (make sure the pressure does not exceed 75 PSI).
4. Turn the EZ control main tank fill handle 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.

EZ Control External Water Delivery Station

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

1. With fresh water coming into the system as per "Main tank fill" instructions, ensure that all flip valves, 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 flip valve as labelled.
3. When filling the foam marker tank, ensure that the foam marker tank is vented.
4. When the required amount of water has been transferred, turn the appropriate flip valve to OFF.
5. When all functions have been performed, turn the external water delivery system OFF.

Rinse Water Tank Fill

The rinse water tank holds approximately 180 litres. Make sure this tank always has sufficient water in it in case a chemical accident occurs and rinse water is needed to wash chemical from any contaminated persons, clothing or components.

RINSE TANK FILL PROCEDURE

1. Start by ensuring that all ball valves on the fill station are turned off.
2. Lift the 'Rinse tank fill' red handle on the EZ control 3-way ball valve to the vertical position. This is the ON position.
3. Connect the fresh water fill hose to the to the 3" fill cam lock coupling.
4. Operate the fresh water pumping system (make sure pressure does not exceed 75 PSI). There should now be flow transferring to the rinse water tank.
5. When the required amount of water has been transferred to the rinse water tank, stop the flow by turning off the external water supply and shut the rinse water tank fill valve by flipping it back down.

Agitation

TO AGITATE WHILE STATIONARY

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

NOTE: Check that the super mix 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 2500 litres in the tank with a 85 L/min pump agitate for 2500/85 = 30 minutes.

TO AGITATE WHILE SPRAYING

Have the bypass ball valve and agitator ball valves OPEN.

NOTE: The bypass ball valve must be open while spraying.

Manual Rate Control - 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 bypass ball valve must be open while spraying.

1. Enter the field, unfold boom and set the boom to desired height above the target and have pump running.
2. Flip all boom section switches ON.
3. Flip master switch ON.
4. Remain stationary until all boom lines have been completely purged with product from the main tank.
5. Flip master switch OFF.
6. Commence travel on primary swathe and flip master switch ON to start spraying. Maintain a constant application rate by adjusting speed and flow rate to balance each other out as calculated in Chapter 6 'Calibration'.
7. To avoid overlap it is recommended that individual boom section switches are used to turn on/off sections as needed.
8. Upon completing the spray task, flip master switch OFF.
9. The booms and pump should be flushed after spraying. See 'Flushing' section later in this chapter.

Manual Rate Control - Spray Controls

IN-CAB SECTION CONTROL WITH ELECTRIC PRESSURE REGULATION

The 2500 L sprayers come fitted standard with a simple electronic control box for spray control. It allows for on/off control of individual boom sections via the individual switches, or on/off control of all boom sections simultaneously via the master switch. The pressure regulation is electrically controlled via the control box too with an increase/decrease switch.

It is important that the console is mounted in the cabin in such a way that it cannot become a projectile in the event of sudden braking or an accident or if the sprayer is disconnected from the towing vehicle. The two bolts at the base of the control box are designed to provide adequate mounting to a bracket within the cabin. The master switch controls all boom valves simultaneously and the individual boom switches provide independent control of the boom valves.

Connect the two 7-pin trailer plugs together in order to be able to control the boom valves.

Connect the battery wires directly to a 12 V battery. Do not connect to any other voltage line. Attach the red wire (positive) to the positive terminal and the black wire (negative) to the negative terminal. Secure the battery wires with plastic cable ties.

Do not tie the battery wires close to the existing battery leads or any other electrical wiring. If using two 12 V batteries e.g. two batteries in parallel, it is best to utilize the power as supplied by both batteries. Connect to positive terminal on battery supplying starter motor and negative terminal on other battery. Otherwise it is best to alternate the battery being used each day so that one battery is not drained completely flat.

The pressure regulating valve is used to alter the maximum spray delivery pressure. Screw in the pressure regulating valve (turn clockwise) to increase the delivery pressure. Unscrew the pressure regulating valve (turn counter clockwise) to decrease the delivery pressure. The pressure regulating valve can also be used as a pressure relief valve if an alternate method of controlling the pressure is used. In this capacity, the relief valve provides relief when the pressure exceeds a pre-determined value.

If the regulating valve is used in this manner, it must be set so that the pressure can not exceed 690 kPa (100 PSI). This is a Goldacres factory preset.

To check or alter this setting, turn the pump off and unscrew the valve right out.

With all solenoids off, or any boom supply valves, 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 screw the relief valve in until the desired pressure is achieved (690 kPa). Tighten the nuts on the adjusting stem so that this setting is maintained. If the relief setting is too low, it causes too much flow to bypass back to the tank and it will limit the maximum obtainable pressure.

Above: In cab section control and pressure regulation control box and harness.

Suction Filter Cleaning

The suction filter tap is plumbed before the filter housing. The suction filter receives fluid from either the rinse water tank or the main spray tank. Therefore, all fluid to be sprayed or flushed through the system passes through this filter.

NOTE: Running the main spray pump dry will damage it. The main spray pump must be OFF when switching from main spray tank to rinse water tank and vice versa.

Filter Removal

For information specific to your circumstances, the spraying equipment being used and the chemicals being applied, consult your agronomist or chemical supplier.

WARNING: Always wear the recommended personal protective equipment and use caution while working with chemicals.

To remove the suction filter bowl, follow the steps below.

NOTE: A quantity of fresh water will need to be in the rinse tank.

1. Set the tap handle in the OFF position.
2. Loosen the nut holding the filter bowl slowly. Take care as some chemical may dribble out.
3. Suction on the filter bowl can be relieved by briefly OPENING the tap for about 2 seconds and then off again. This will cause the filter bowl to drop and become loose. Stand clear of bowl and be sure to catch any chemical coming out in a suitable container.
4. Once chemical has stopped coming out of the filter, unscrew the nut fully to remove the filter bowl. Be careful when removing the bowl as there may still be some chemical in it.
5. Clean the screen and the O-rings, then refit and ensure that O-rings are in place.

Below: The suction filter is mounted to the left hand side of the sprayer.

Pressure Filter Cleaning

There are 2 in-line pressure filters in the spray pressure line that traps the minute particles that are not collected by the main suction filters.

WARNING: Always wear the recommended personal protective equipment and use caution while working with chemicals.

Unscrew the filter body. It may be necessary to use the pressure filter tool (GA4522610). Allow the chemical in the filter to dribble out into a suitable container to avoid environmental contamination and avoid personal contact. Clean or replace the filter screen with the same mesh size as necessary and then refit the filter body.

Above: Dual in-line pressure filters located on left hand side chassis rail next to the induction hopper mount.

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 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.

Always wear the recommended personal protective equipment and use caution while working with chemicals.

BASIC DECONTAMINATION WITH OPTIONAL INDUCTION HOPPER

1. Fill the main spray tank with approximately 1000 L of fresh water.
2. Lower the induction hopper and put the appropriate amount of decontaminating agent into it.
3. Turn on the agitation jet on the hopper and allow it to fill the hopper to the top. Once full, turn the jet off and leave the hopper to sit for a few minutes. This is to ensure that the decontaminating agent fully neutralises any of the chemicals that were in the hopper.
4. Use the venturi to induct the contents of the hopper into the main spray tank.
5. Recirculate the decontaminating agent through the system while the main tank rinse nozzles are running (pressure supplied from the main spray pump e.g. pressure delivery manifold).
6. Turn off all taps to allow the pressure relief valve to blow off and purge the 'relief to tank' line.
7. Operate induction equipment (if fitted), with a quantity of fresh water in order to flush venturi system.
8. Once complete, drain chemical induction hopper delivery hose externally.

NOTE: Lower the hopper and open the lid to allow it to drain completely.

9. Turn on boom recirculation to flush all boom lines back to main tank.
10. Once the main tank has emptied, flush the system again using fresh water to ensure the decontaminating agent is removed from the system.
11. Once the main tank is empty, the hose between the tank and the suction filter also needs to be drained. Close the valve on the Suction Filter.
12. Remove the suction filter bowl and clean as per 'Suction Filter Cleaning' instructions earlier in this chapter.
13. Return switch to main chemical tank. Stand clear of the filter when turning the valve to main chemical tank as chemical will be coming out. Catch all of the chemical in a suitable container so it can be disposed of in the correct manner.

Sprayer Transportation

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.

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 (e.g. tail lights & electric controls etc.)
6. 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.

IMPORTANT: Make sure any ice has thawed before using sprayer.

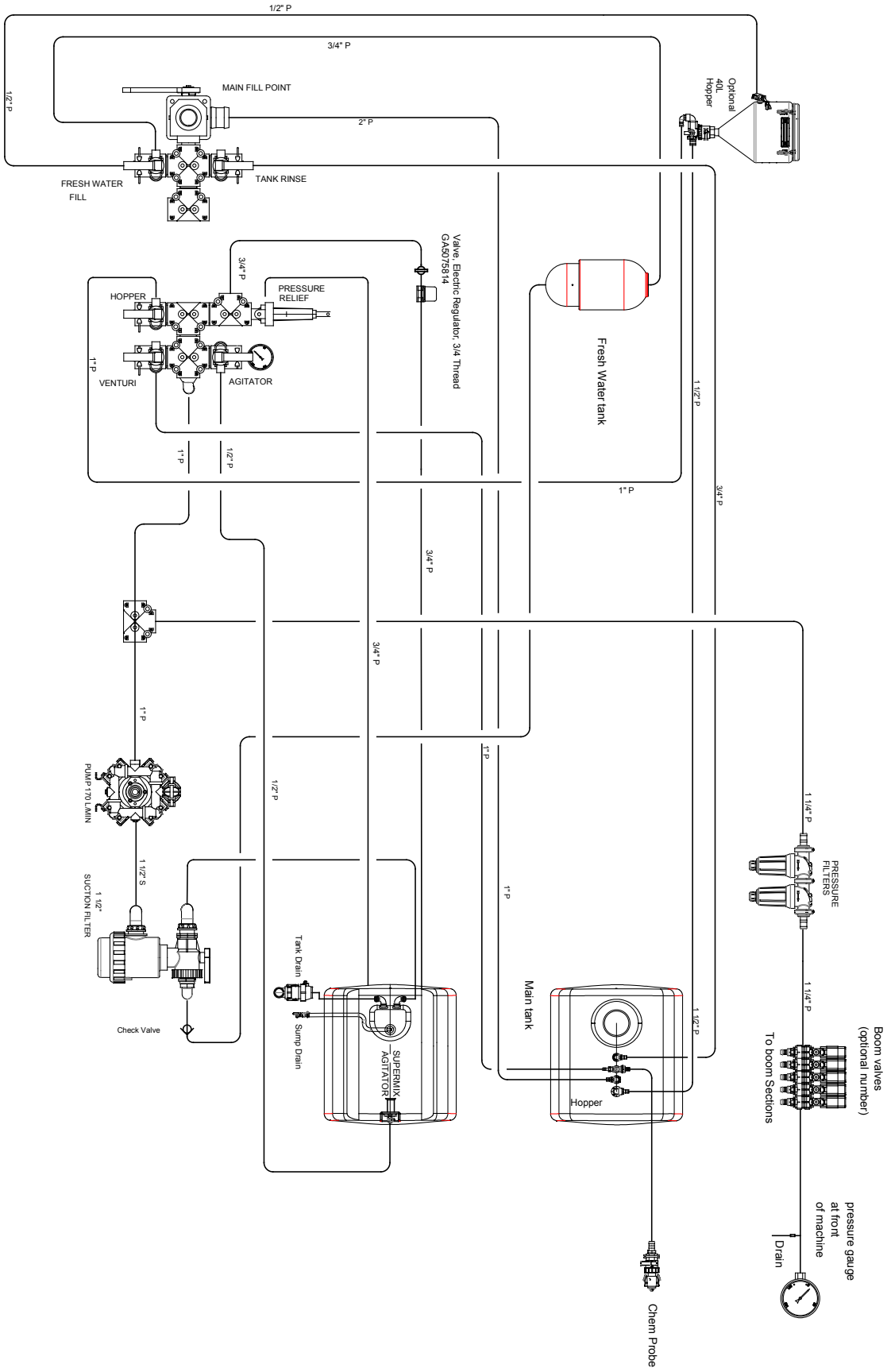
End of Program

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.)

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

Plumbing Schematic - 2500L



Chapter 9

BOOM

General

These machines are fitted with manual folding booms which are available in sizes from 9-12 metres in span. These booms are constructed from rectangular hollow section (RHS) for great strength. The boom wings can be folded in for transport, and jet bodies are mounted on stainless steel brackets behind the boom for protection.

All booms, regardless of their design and operating width, present certain safety hazards in their operation. Please ensure that you have read all safety precautions as included in this manual in Chapter 2 'Safety' and take particular note of the warning below.

WARNING: Never stand within the radius of boom wings. Keep clear of overhead obstructions.

Boom Height

The standard nozzle spacing on Goldacres booms is 500 mm. For this spacing, the optimum height the boom should be from the object to be sprayed with a 110° fan angle nozzle is 500 mm.

There will be adequate spray coverage if the nozzles are higher than this, but potential for spray drift is increased. The spray pattern is affected by many factors not limited to, but including; gravity, pressure, chemical composition and droplet size. Therefore the spray pattern can not extend to the full theoretical coverage. Refer to the TeeJet nozzle selection catalogue for further information on spray application and nozzle technology.

Boom Folding

UNFOLDING

1. Remove the two linch pins from the support brackets holding the wings near the centre.

3. Pull the right boom assembly out first and lock it in the open position with the spring loaded latch.

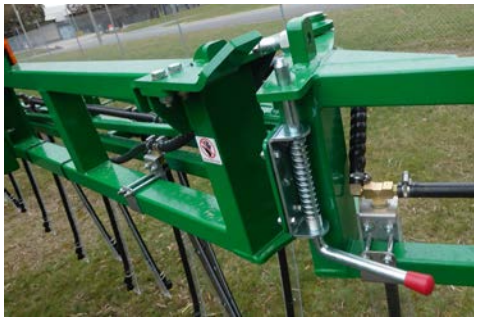
4. Unfold the outer wing all the way until the spring tension holds it open.

5. Repeat steps 2-3 for the left hand side boom.

FOLDING

1. First fold the outer wings in until the spring tension holds them in place.

2. Unlock the spring latch of the left hand side boom and fold it in.



3. Repeat for the right hand side.
4. Insert the two linch pins to secure the booms in the support brackets.

Boom Adjustment

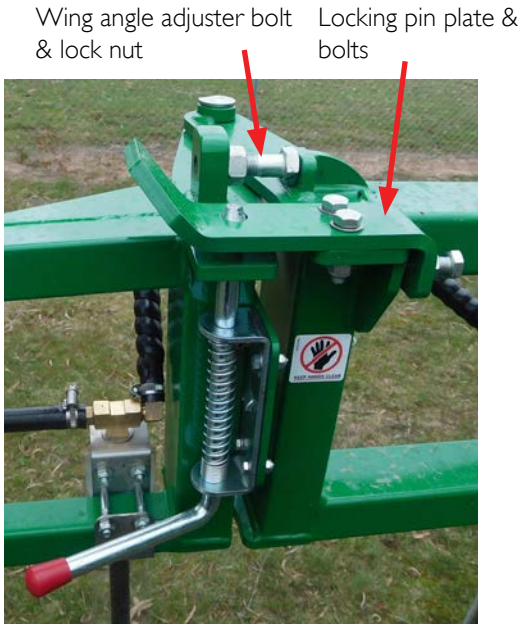
INNER WING

The inner wings should be adjusted to be parallel with the centre section.

Loosen the nuts on the locking pin plate. Then loosen the lock nut on the adjuster bolt.

Hold the inner wing against the adjuster bolt and turn it in or out until the inner wing is parallel with the centre section.

Re-tighten the lock nut on the adjuster bolt. Then re-tighten the bolts on the locking pin plate and check for good alignment with the pin and the hole.

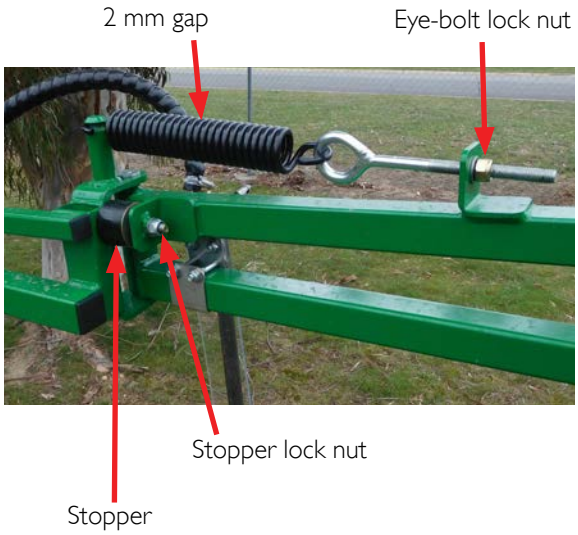


OUTER WING

The inner and outer wings should be adjusted to be parallel with each other.

Use the adjustment nut on the eye bolt to adjust the spring tension. Set it so that there is a 2 mm gap between the each coil.

Loosen the locking nut on the stopper and turn it until the inner and outer wings are parallel in the open position. Re-tighten the lock nut.



Chapter 10

LUBRICATION & MAINTENANCE

Maintenance Schedule

FREQUENCY	MAINTENANCE TASKS
8 hour	Check spray pump & motor oil level & condition
8 hour	Check tyre pressure
8 hour	Check axle width adjustment bolts are tight
8 hour	Check wheel nuts are torqued correctly to 320 ft/lb
8 hour	Clean pressure and suction filters if blocked
25 hour	Grease wheel bearings
50 hour	Grease boom pivots
50 hour	Towing eye
150 hour	Check wheel bearings for sideways movement
300 - 350 hours	Change pump oil
3 months	Check bolts on axle bearing caps
3 months	Grease jack
Yearly	Clean wheel bearings, inspect, re-grease and set rolling torque
Yearly	Carry out a complete decontamination of the sprayer

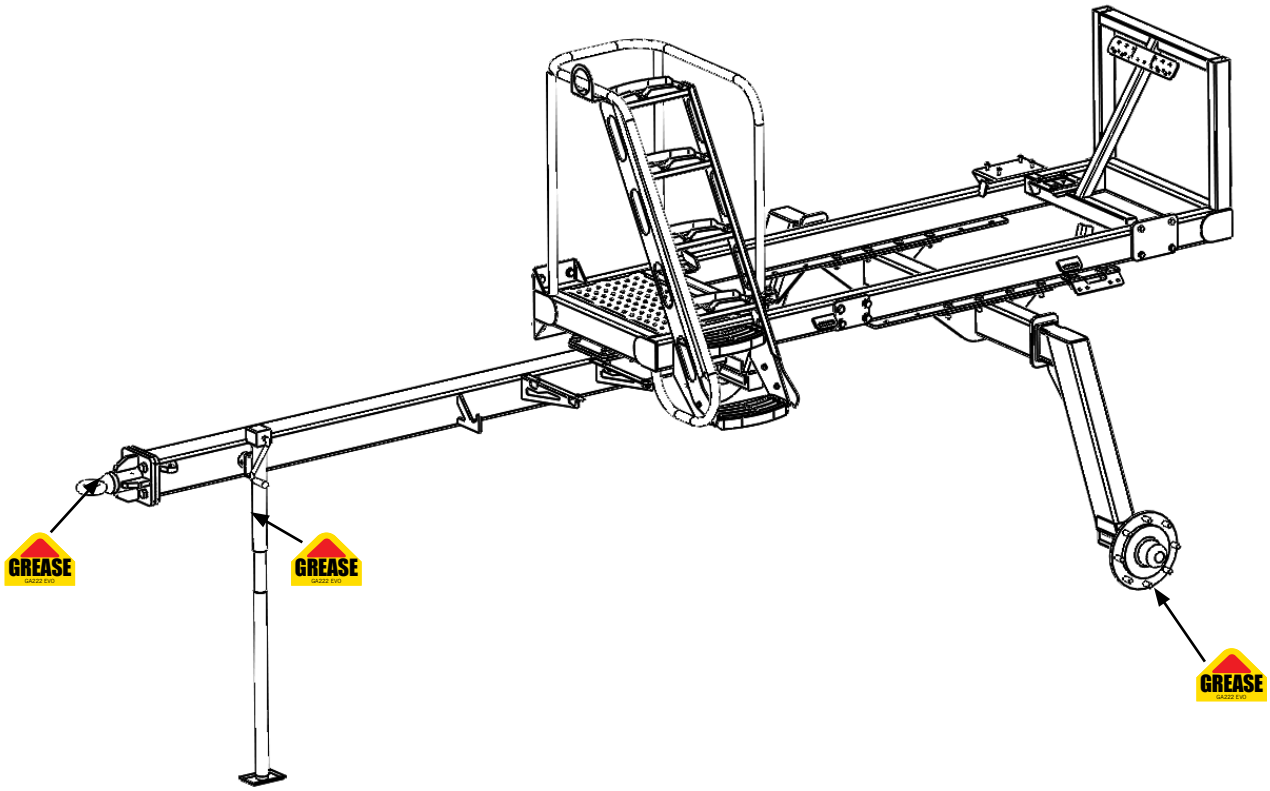
Lubrication

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

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

The following sections outline key lubrication points. All hydraulic cylinders (excluding wing tilt cylinder) have grease points on the clevis ends.

Lubrication Points - Chassis



LOCATION	GREASE INTERVAL
Wheel bearings	25 hourly
Hitch	50 hourly
Jack	3 monthly
Induction hopper pivots	3 monthly

Lubrication Points - Boom

The boom hinging points all have grease nipples located for the ease of application.

The relevant lubrication points have been pointed out below.

Maintenance - General

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 110 PSI 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 HOURS

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

Pump oil level should be between the two level markers 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 15W40 oil. Rotate the pump manually (by hand) to remove any air locks while filling. Do not over fill.

250 HOURS

Change Pump oil; pump oil should be changed every 250 hours. Use SAE 15W40 oil. The oil drain plug is located between the two pump mounts on the underside.

SEASONALLY

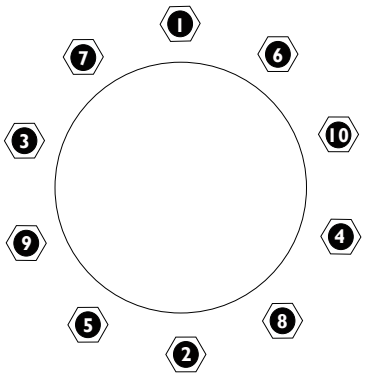
Check pump air accumulator (where fitted). The air pressure in the air accumulator must be maintained to the correct pressure (approximately half of the spray pressure). If the accumulator constantly loses pressure, the valve or diaphragm may need replacing. To recharge the accumulator, charge it to approximately 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 & Axles

8 HOURS

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.

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



Above: Follow this tightening sequence to ensure even wheel nut torque distribution (320 ft/lb).

25 HOURS

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

150 HOURS

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.

Continued over page

Maintenance - General

3 MONTHS

Grease the jack; there are two grease nipples on the sprayer's 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 caps 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.

Changing Wheels

REMOVING A WHEEL

- 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.

REFITTING A WHEEL

- 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 320 ft/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 HOURS

- Grease tilt arm pivot pins.
- Grease cable drum bearing block pivots.

25 HOURS

- Grease cable adjuster pivots.

50 HOURS

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

Maintenance - General

Filters

CAUTION: Read and heed the chemical label warnings regarding PPE before cleaning any filter.

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.

SUCTION FILTER CLEANING

CAUTION: Wear gloves and other recommended protective clothing.

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

PRESSURE FILTER CLEANING

CAUTION: Wear gloves and other recommended protective clothing.

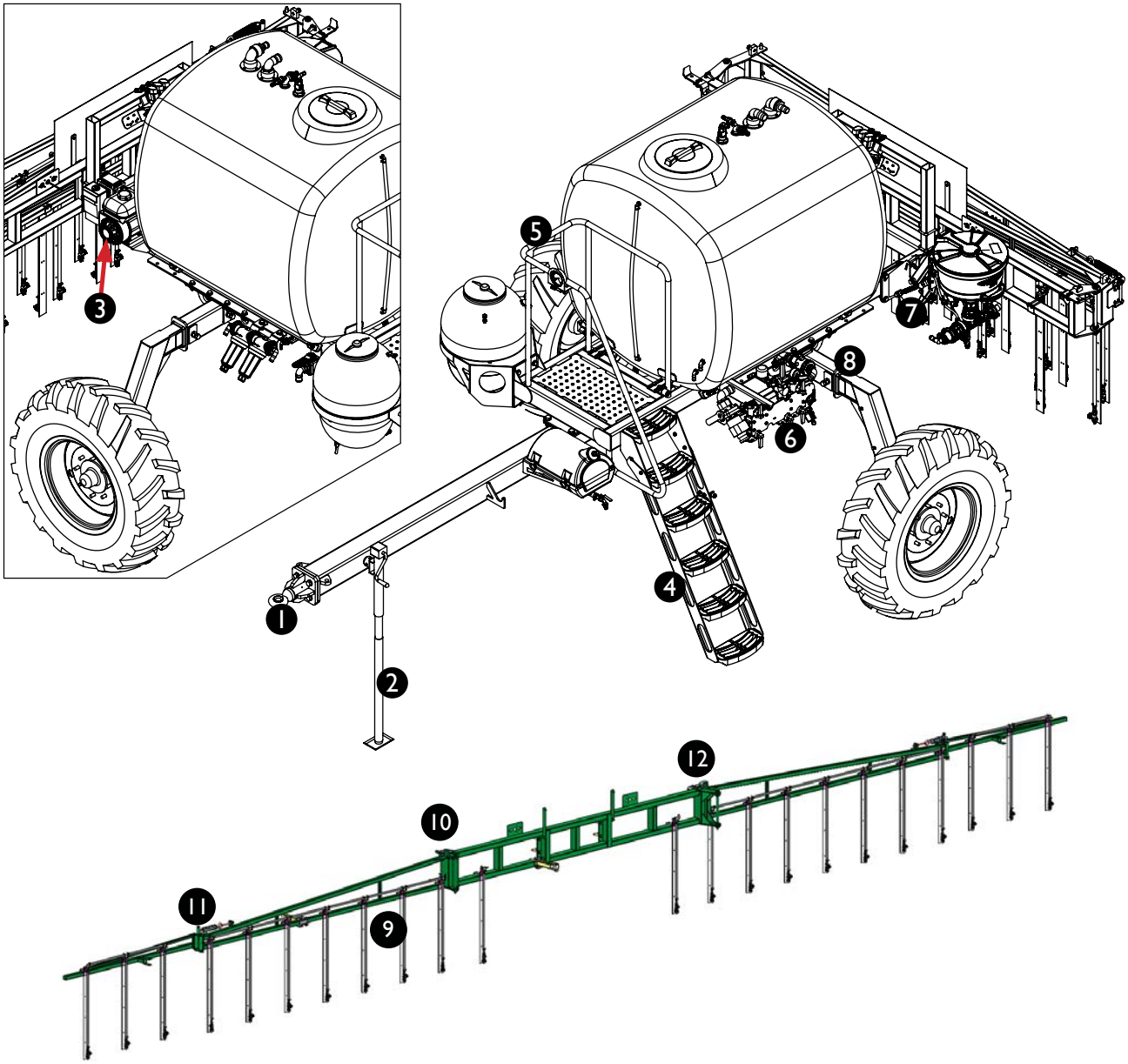
1. Ensure that the pump suction is turned OFF and the pump 3-way ball valve is turned OFF to prevent flow to the filter and pump.
2. Ensure that the supermix agitator ball valve is OPEN (will release any residual pressure. Also remove small cap on bottom of pressure filter to relieve pressure)
3. Carefully unscrew filter nut and remove.
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. Do not over-tighten nut.

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.

Use the following as a guide for areas to spray with corrosion inhibitor. This guide is not necessarily comprehensive and the amount of corrosion protection necessary will ultimately depend on local and operating conditions.



NO.	DESCRIPTION	NO.	DESCRIPTION
1.	Towing eye bolts	7.	Induction hopper bolts & latches
2.	Jack mounting bolts & locking pins	8.	Axle bolts
3.	Spray pump & engine	9.	Nozzle bracket bolts
4.	Stairs	10.	Boom inner hinge
5.	Handrails	11.	Boom outer hinge
6.	LH pod frame mounting bolts	12.	Boom mounting bolts

Chapter 11

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.

Tanks, Chassis & 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

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 550 kPa (80 PSI).
	Air leaks on induction system	Check all hoses, clamps, and cam lever fittings are sealed

Spray 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 the boom valves are switched off.
		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.

Continued over page

Spray Pump

PROBLEM	COMMON CAUSES	COMMON SOLUTION
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
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 - 540 rpm
	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 - 540 rpm
	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
	Pump suction line has air leak or is restricted	Clean suction filter and check for leaks in suction lines
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

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	Enter value greater than 0

Flow Meter & 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 using manual increase/decrease 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	Faulty control valve	Test valve manually and replace if required
Control valve has failed	Faulty cable Faulty valve	Replace control valve
		Temporary solutions: Remove the motor from the 3 way ball valve and manually adjust the flow by turning the shaft with a spanner
Raven Console not working	No power supply	Check loom connection at the back of the console
		Check connection to battery terminals
		Check the fuse in the back of the console
		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)

If the flow meter fails to give accurate readings, the following actions should be taken:

- 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.

Continued over page

Flow Meter & Controller

Use the following procedures to the manually override the boom valves and control valve if the Raven console has failed or is otherwise not able to operate them:

FLOW CONTROL VALVE OVERRIDE

1. Remove electric motor from three way fast close valve, and manually rotate valve until desired spraying pressure is achieved.
2. 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.

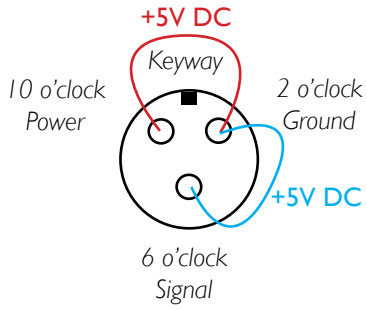
BOOM VALVE OVERRIDE

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

NOTE: There is no agitation while the nozzles are not spraying.

Testing Raven 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 e.g. 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 the voltage checks shown below.
6. Change [Meter Cal] number back to previous number.



Voltage Readings

2 o'clock - 6 o'clock (+5V DC)

10 o'clock - 2 o'clock (+5V DC)

Chemical 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 100 PSI

ISOLATING POSSIBLE AIR LEAKS

Step 1: Check the operation of the chemical probe. If this will transfer water at a minimum of 30 L/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.

SUMMARY

Check the flow of water into venturi.

Then:

1. Check the probe only.

2. Check probe and envirodrum section.

NOTE: Tests must be done with water because the speed of the transfer is affected by chemical viscosities.

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.

Chapter 12

OPTIONAL ACCESSORIES

General Information

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

NOTE: These options may not be fitted to your sprayer unless ordered.

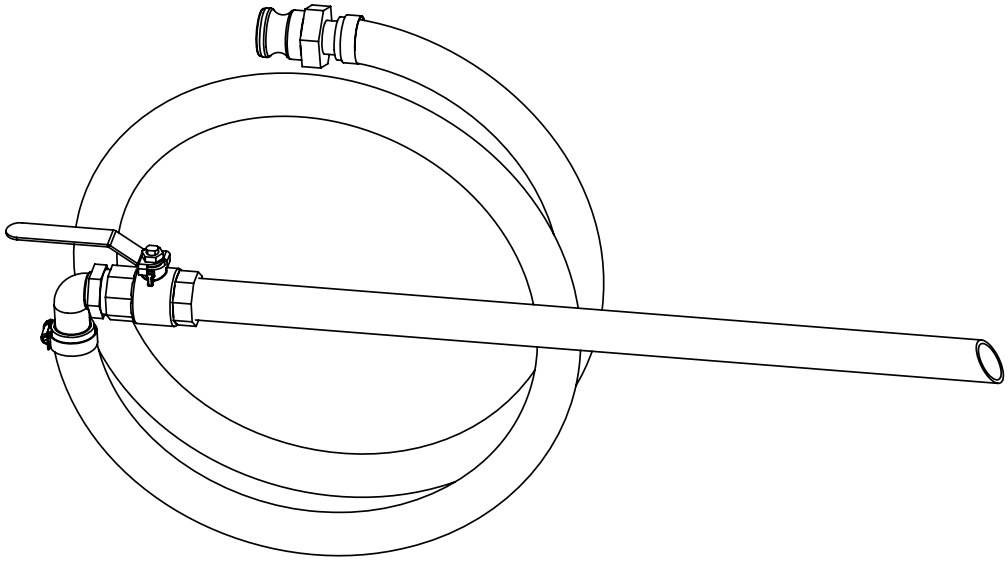
Chemical Induction Probe

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 20-50 % 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 the container, will not restrict the flow of chemical.



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Chemical Induction Probe

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.

CHEMICAL PROBE OPERATION

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 110 PSI.
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 venturi valve. OPEN the bypass valve. Keep the agitator valve OPEN and disconnect probe.

Once chemical has been transferred into the main spray tank the sprayer should always be agitating until spraying begins.

Chemical Induction Hopper

Overview

The 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. This eliminates chemical attack resulting from high concentrations of chemical coming into contact with spray components.

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 - Drum rinse
2.	Hopper tank valve
3.	Rinse nozzle

Continued over page

Chemical Induction Hopper

Operation

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. Open the hopper flip valve on the pressure manifold side of the EZ control station.
4. Leave the ball valve under the hopper closed and (if required) open the supermix agitator flip valve on the EZ control station.
5. Operate the pump at the speed necessary to generate at least 80 PSI delivery pressure (as displayed on the sprayer pressure gauge). Do not run it faster than 540 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 120 PSI as determined by the pressure relief valve setting.

7. 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.
8. Open the hopper tank ball valve at the bottom of the hopper by turning the red handle up. The chemical should be now transferring to the main spray tank.
9. 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 red handle so that it is horizontal.
- CLOSE the hopper flip valve.
- Ensure that the agitator valve is OPEN. 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

RINSING FROM EXTERNAL SOURCE

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

NOTE: Spray pump must also be operating.

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 fill manifold side 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. Open the hopper flip valve on the pressure manifold side of the EZ control station.
7. Open the hopper tank valve at the bottom of the hopper by turning the red handle up.
8. To rinse the hopper, turn the hopper rinse tap on the top of the hopper ON. Close this valve when the hopper has been rinsed.

When the hopper is empty:

- Turn the hopper tank valve at the bottom of the hopper OFF by turning the red handle so that it is horizontal.
- CLOSE the hopper flip valve.

Continued over page

Auto Rate Control - Raven SCS 450

The Raven SCS 450 Auto Section Controller

- Simple operation
- Low-limit function
- Digital boom pressure read-out
- Supports a variety of flow meters and control valves
- Audible alarms
- Self-test function
- Rate bump features

For more information please see your Raven operation manual.

NOTE: The Raven SCS 450 controller is optional fitment.

Auto Rate Control - 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 bypass ball valve must be open while spraying.

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 operator's 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 swathe 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. Upon completing the spray task, the booms and pump should be flushed after spraying. See 'Flushing' section later in this chapter.

Engine

Where fitted, a Honda GX200 motor is used to drive the spray pump. The motor has a peak power output of 6.5 hp. It may be optioned with an electric starter. This section provides a basic overview of motor features and operation only. For detailed safety, operating and maintenance instructions specific to this motor consult the Honda owner's manual supplied or find a copy online.

Engine Safety

- Understand the of all controls and learn how to stop the engine quickly in case of emergency.
- Do not allow children to operate the engine. Keep children and pets away from the area of operation.
- Your engine's exhaust emits poisonous carbon monoxide. Do not run the engine without adequate ventilation, and never run the engine indoors.
- The engine and exhaust become very hot during operation. Keep engine away from flammable materials and do not place anything on engine while it is running.

Preoperational Safety Check

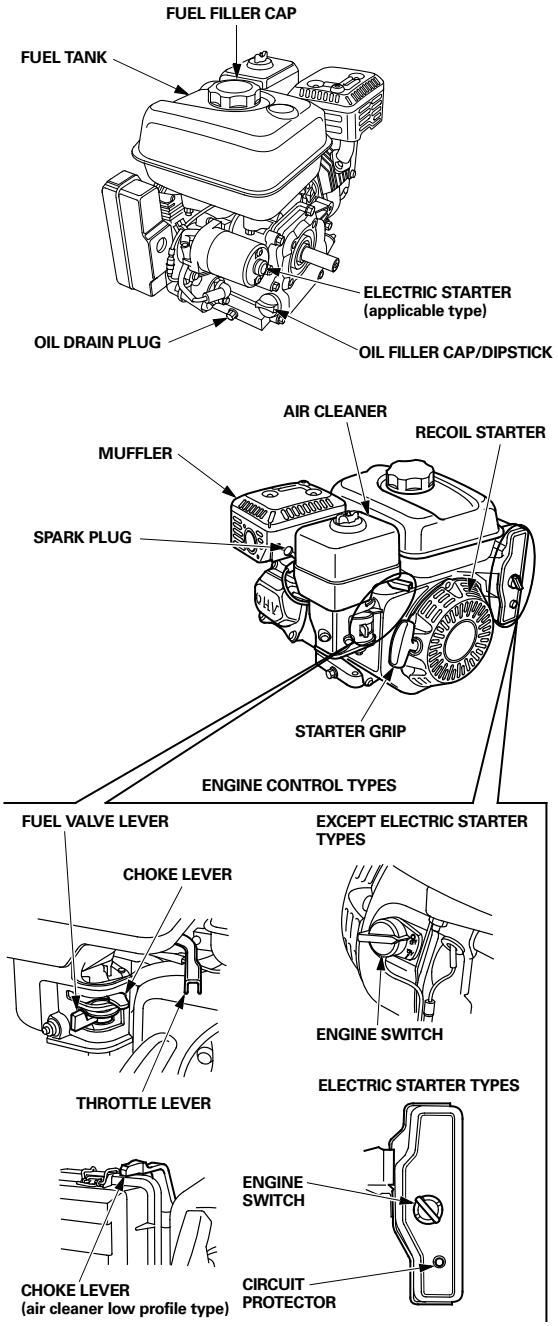
1. Look around the underside of the engine for signs of any oil or fuel leaks.
2. Remove any excessive dirt or debris, especially around the muffler and recoil starter.
3. Look for signs of damage.
4. Check that all shields are in place, and that all nuts, bolts and screws are tightened.

Pre-operational Maintenance Check

1. Check engine oil level. Running with low oil can cause damage.

   Where fitted, the oil alert system will automatically stop the engine before the oil level becomes critically low.

2. Check reduction gearbox oil level. Sufficient oil level is essential to maximise gearbox life.
3. Check air filter element and clean or replace as necessary to allow clear airflow to the carburetor.



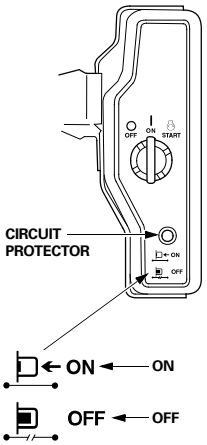
Engine

Circuit Protector

If the motor has been optioned with electric start, then it will also have a circuit protector fitted which protects the battery charging circuit. A short circuit, or a battery connected with reverse polarity, will trip the circuit protector.

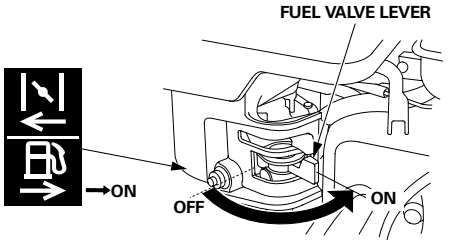
The green indicator inside the circuit protector will pop out to show that the circuit protector has switched off. If this occurs, determine the cause of the problem, and correct it before resetting the circuit protector.

Push the circuit protector button to reset.



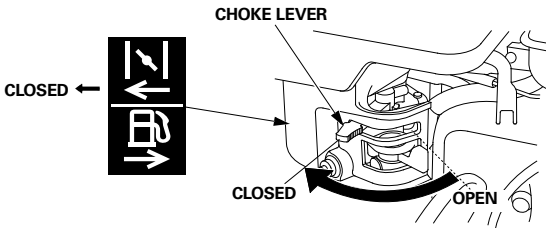
Starting Engine

1. Move the fuel valve lever to the ON position.

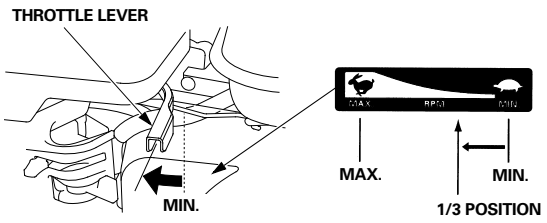


2. If the engine is cold, move the choke lever to the CLOSED position.

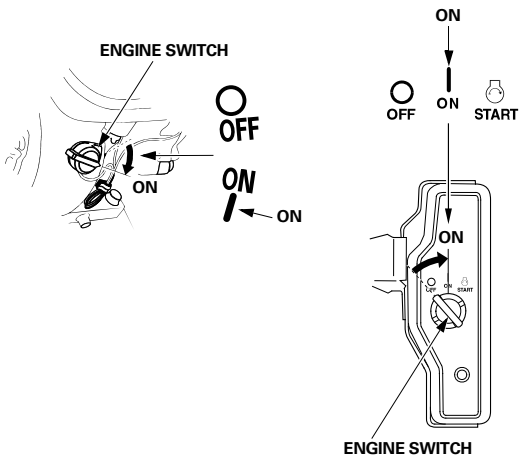
If restarting a warm engine, leave the choke lever in the OPEN position.



3. Move the throttle lever approximately 1/3 of the way from the MIN. position.



4. Turn the engine switch to the ON position.



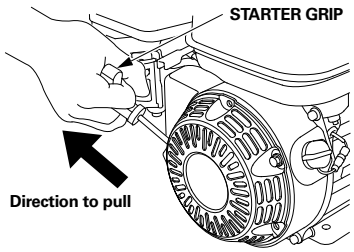
Engine

1. Operate the starter:

RECOIL STARTER

- Pull the starter grip lightly until you feel resistance, then pull briskly in the direction of the arrow as shown below. Return the starter grip gently.

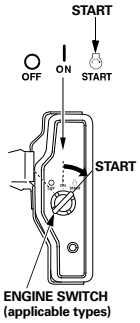
NOTE: Do not allow the starter grip to snap back against the engine. Return it gently to prevent damage to the starter.



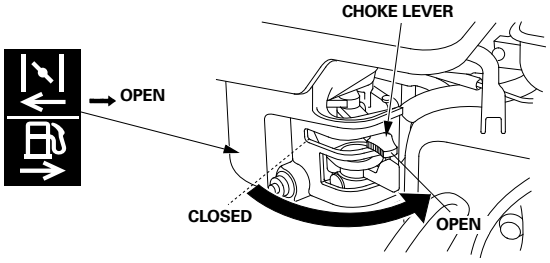
ELECTRIC STARTER

- Turn the key to the START position, and hold it there until the engine starts.
- When it starts, release the key, allowing it to return to the ON position.

NOTE: Using the starter for longer than 5 seconds at a time will overheat the motor and can damage it. This type of overheating is not covered under warranty. If the engine fails to start within 5 seconds, release the key, and wait at least 10 seconds before trying the starter again.

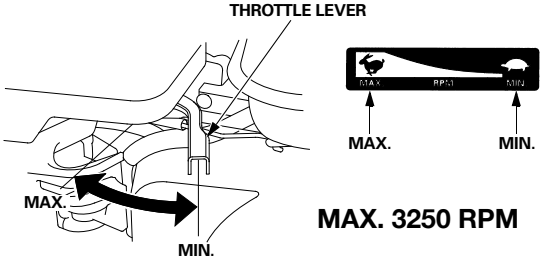


2. If the choke lever was moved to the CLOSED position to start the engine, gradually move it to the OPEN position as the engine warms up.



Setting Engine Speed

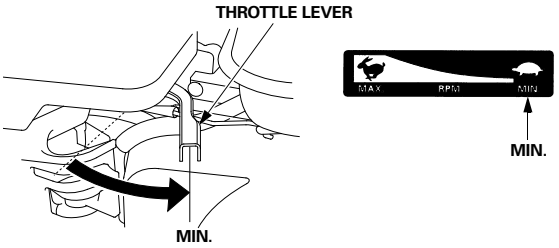
Move the throttle lever to somewhere between the MAX. and MIN. position to set desired engine speed.



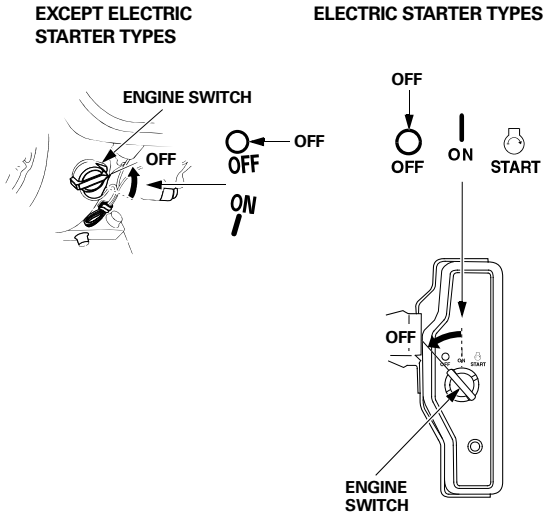
Engine

Stopping Engine

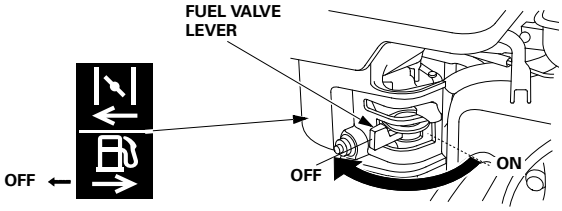
1. Move the throttle lever to the MIN. position.



2. Turn the engine switch to the OFF position.

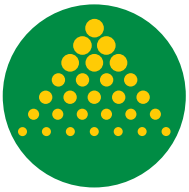


3. Move the fuel valve lever to the OFF position.



EMERGENCY SHUTDOWN: Turn the engine switch to the OFF position.

The full shutdown procedure should be followed during normal operation.



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